

Lepanthes variabilis (Orchidaceae: Pleurothallidinae), a new endemic species from Costa Rica

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Abstract. *Lepanthes variabilis*, a new species from Costa Rica, is described and illustrated. It is endemic to the northern part of the Talamanca mountain range, from 2750–2850 m. It is compared to the similar *L. minutilabia*, which also occurs in Costa Rica.

Key Words: *Lepanthes*, *Lepanthes variabilis*, *Lepanthes minutilabia*, Pleurothallidinae, Orchidaceae, Costa Rica.

Resumen. Se describe e ilustra una nueva especie de Costa Rica, *Lepanthes variabilis*. La cual es endémica a la parte norte de la Cordillera de Talamanca, de 2750–2850 m. La cual es comparada con *L. minutilabia* que también ocurre en Costa Rica y con la cual se asemeja más.

Lepanthes Sw. is one of the largest genera of orchids. It contains over 900 species and occurs from southern Mexico and the West Indies to Bolivia and northern Brazil (Luer, 1996; Pupulin & Bogarín, 2012). In Costa Rica there are over 100 species of *Lepanthes* (Luer, 2003), about 20 of which have been described in the last decade mostly thanks to botanical expeditions conducted by the staff of the Lankester Botanical Garden as part of ongoing projects (Bogarín et al., 2012; Karremans et al., 2012). Two of these projects are: “Flora Costaricensis: Taxonomía y filogenia de la subtribu Pleurothallidinae (Orchidaceae) en Costa Rica” and “Inventario y taxonomía de la flora epífita de la región Neotropical 1. Orchidaceae.” It was on botanical expeditions for these projects that *L. minutilabia* Ames & C. Schweinf. was re-collected from the type locality. This led us to realize that what was often identified as this species in herbaria was actually a new species.

Lepanthes usually has a lip that is provided with two lateral, erect blades that encircle the

column, but a few species lack this structure. Among the species recorded from Costa Rica lacking this structure are *L. rafaiana* Pupulin, *L. spadarii* Pupulin, and *L. vestigialis* Bogarín & Pupulin. These have a simple lip greatly reduced in comparison with the norm (Pupulin, 2001; Pupulin et al., 2010, 2011). Based on lip reduction, Ames and Schweinfurth (1930) described from Costa Rica *L. minutilabia* Ames & C. Schweinf., a species that presents a simple lip about 0.5 mm long and 1 mm wide (Ames & Schweinfurth, 1930). Paul C. Standley and Juvenal Valerio collected the holotype in the Cerros de Zurquí in Central Volcanic range, at an elevation of 2000–2400 m. Syntypes were gathered at the same locality and at the nearby Cerro de las Caricias at the same elevation. Another species, also with a reduced lip, that has been collected in the northern part of the Talamanca mountain range at elevations of 2750–2850 m is here described as new to science. We first describe *L. minutiloba* as a basis for comparison of the new species.

Lepanthes minutilabia Ames & C. Schweinf., *Schedul. Orchid.* 10: 49. 1930. Type: Costa Rica. Heredia: Cerros de Zurquí, northeast of San Isidro, 2000–2400 m, 3 Mar 1926, on tree, *Paul C. Standley & Juvenal Valerio 50388* (holotype: AMES-33483). (Figs. 1 and 2A)

Epiphytic, caespitose, erect herb, up to 6 cm tall. Roots slender, flexuous, up to 0.35 mm in diameter. Ramicaules erect to suberect, 2–3.8 cm long, with 5–7 internodes; caulinar sheaths blackish brown, micropapillose along the ribs, the ostia oblique, dilated, thickened along the margin, stiffly papillose. Leaves coriaceous, dark green, elliptic, broadly obtuse to rounded, minutely emarginate, with abaxial apicule, the base cuneate, 10–14 × 7–9 mm, the rounded base narrowing into a petiole ca. 2 mm long. Inflorescence 1–3 per growth, born above and below the leaf, longer than the leaves, a successively several-flowered (to 9), congested, glabrous, distichous raceme to 3.9 cm long, peduncle 8–15 mm long, with a brown, adpressed bract near the base, 0.7–1 mm long; rachis fractiflex, 5–24 mm long. Floral bracts ovate, acute to subacuminate, keeled, sparsely hirsute, brown, 1 mm long. Pedicel terete, 1.5–2 mm long, persistent. Ovary subclavate, 0.7–1 mm long, winged, the wings wavy. Flowers pale yellow to pale reddish green, the petals sometimes with pink markings. Dorsal sepal ovate, acute, cucullate, entire, connate to the lateral sepal for about 1 mm, 3.75 × 3 mm, with three nerves that are marked dorsally by low denticulate keels. Lateral sepals oblique, ovate-lanceolate, acute, entire, connate for about 1.25 mm forming a lamina, 3.25 × 4 mm, with two nerves that are marked dorsally by low denticulate keels. Petals very irregular, upper margin bilobed, flabellate, entire, 1.3–1.5 × 1.8–2 mm, the upper margin overlapping, the apex broadly rounded, with an obtuse angle in the outer margin, the lower portion rounded and much smaller than the upper one. Lip irregular, small, triangular to cordate, adnate at the base to the column, 0.35–0.45 × 0.30–0.90 mm. Column cylindric, 1 mm long, the anther dorsal, the stigma apical subventral. Pollinia two, ovoid. Anther cap cucullate, ovate-subquadrate, basally emarginate.

Distribution.—Costa Rica; 1300–2450 m (Fig. 3).

Habitat and ecology.—Epiphyte in primary and secondary lower montane rain forest and montane rain forest sensu Holdridge (1967).

Phenology.—Flowering from February to August, and in November.

Etymology.—The specific epithet *minutilabia* is derived from the Latin *minutus*, small, and *labium*, lip, in reference to the characteristically small lip.

Additional specimens examined. COSTA RICA. **Guanacaste:** Cordillera de Tilarán, Reserva Biológica Monteverde, en bosque perturbado al lado de la quebrada El Brillante, flores amarillas, epífita en tronco caído, 7 Aug 1977, 1300–1400 m, *Dryer s.n.* (CR); Volcán Miravalles, collected by *Sánchez s.n. sub. Pupulin 1371*, 25 Jan 1992, flowered in cultivation at Lankester Botanical Garden, 26 Feb. 1999 (JBL); same locality, flowered in cultivation at Lankester Botanical Garden, 6 May 1999, *Sánchez s.n.* (JBL). **Heredia:** San Isidro: Cerro de las Caricias, 2000–2400 m, 11 Mar 1926, *Standley & Valerio 52093* (AMES); San Isidro, Concepción, falda sur del Cerro Zurquí, ca. 3 km al norte de Concepción, entre dos afluentes de la Quebrada Caricias, 10°02'56.6" N 84°02'23.9" W, 1688 m, bosque pluvial montano bajo, epífitas en árboles aislados principalmente *Quercus* sp. y *Cupressus lusitanicus* en potreros, 26 Oct 2011, *Bogarín et al. 9309* (JBL, CR); same locality, flowered in cultivation at Lankester Botanical Garden, 5 Mar 2012, *Bogarín et al. 9283* (USJ); same locality, flowered in cultivation at Lankester Botanical Garden, 8 Nov 2011, *Bogarín et al. 9326* (JBL); Alto Gallito, epiphytic in cloud forest, 2000 m, beyond the pass north of El Castillo, 21 Jun 1981, *Luer & Luer 6359* (CR). **San José:** Moravia, San Jerónimo, 2.5 km después del peaje de la carretera Braulio Carrillo ruta 32, frente al restaurante La Fonda, 10°02'53.26" N 84°00'23.78" W, 1584 m, bosque pluvial montano bajo, epífitas en cercas de fincas y bosque secundario, 10 Apr 2011, flowered in cultivation at Lankester Botanical Garden, 8 Nov 2011, *Bogarín & Karremans 8584* (JBL); same locality, 10 Apr 2011, *Bogarín & Karremans 8586* (JBL); Dota, Pan American Highway, km 55 South, between Casa Mata and Tres de Junio, La Chonta, 9°41'57.3" N 83°56'34.8" W, 2450 m, montane rain forest, epiphytic on old *Quercus* trees scattered in pastures, 12 Mar 2012, *Pupulin et al. 8210* (JBL).

Compared with other species of *Lepanthes* in Costa Rica, which are frequently known from very narrow geographical areas, *L. minutilabia* ranges over the three main mountain ranges of the country, from the northern Cordillera de Tilarán to both the watersheds of the Central Volcanic range and the western slopes of the Cordillera de Talamanca, where it reaches its highest elevation at about 2500 m. In

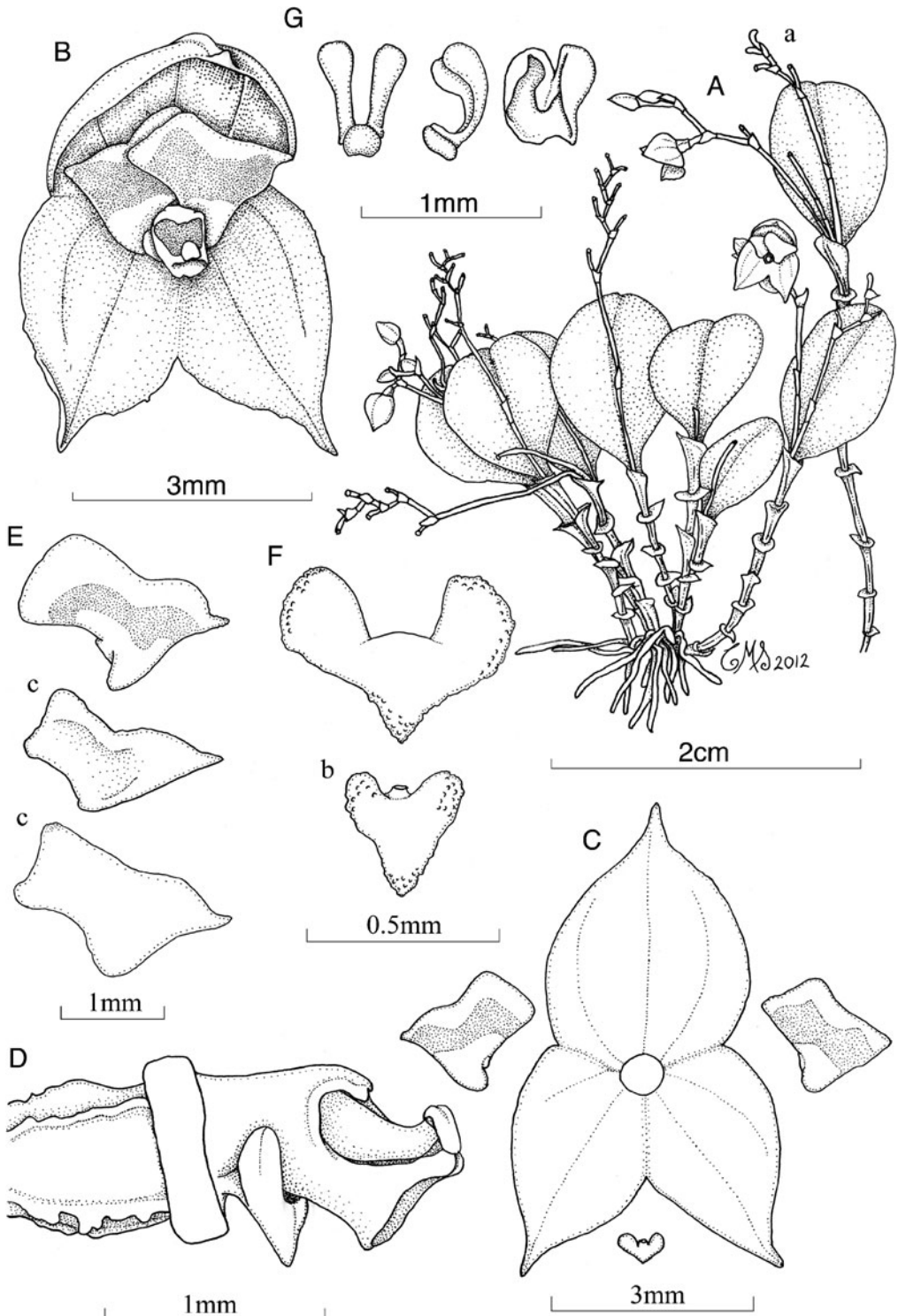


FIG. 1. *Lepanthes minutilabia*. A. Habit. B. Flower. C. Dissected perianth. D. Ovary, column and lip. E. Petals. F. Lips. G. Pollinarium and anther cap. (A–C drawn from Bogarin 9310, JBL; D–F from Bogarin 9309, JBL).

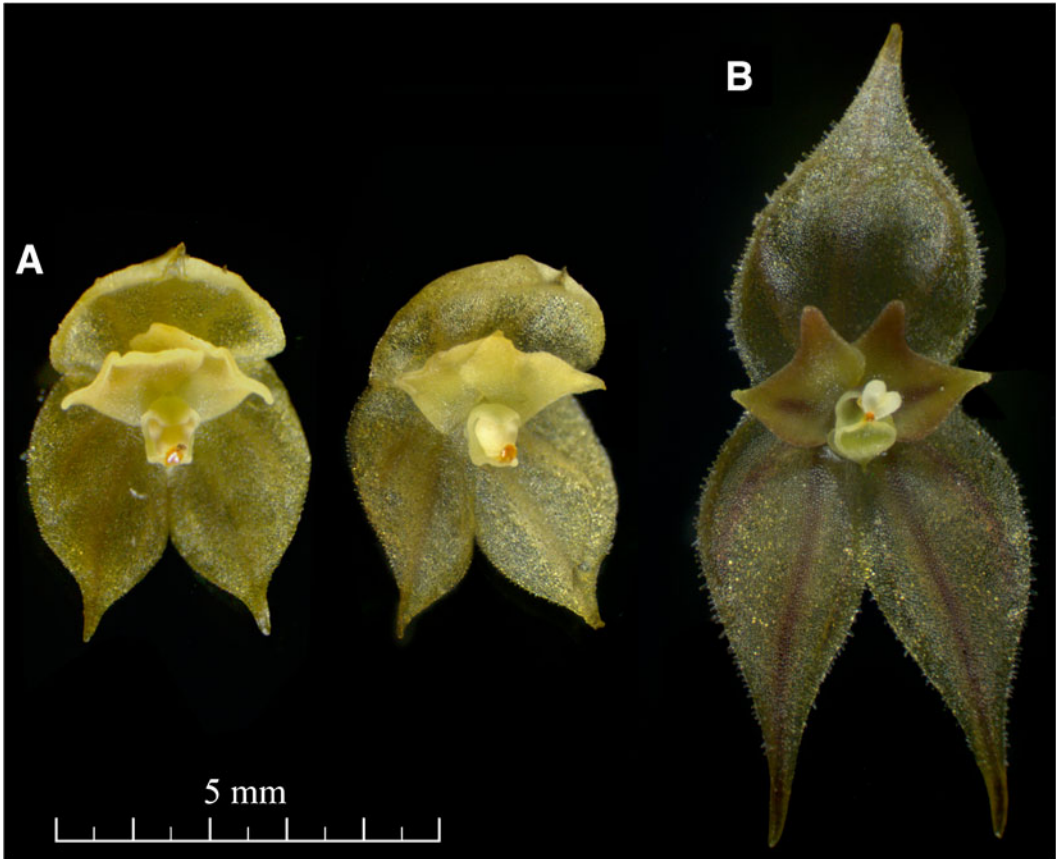


FIG. 2. A. *Lepanthes minutilabia* (Bogarín 9309, JBL). B. *Lepanthes variabilis* (Bogarín 8999, JBL).

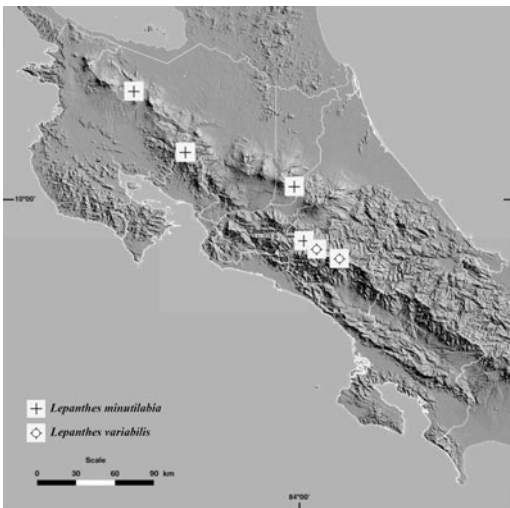


FIG. 3. Distributions of *Lepanthes minutilabia* and *L. variabilis*.

both herbarium and living collections, *L. minutilabia* has been confused with a similar species that occurs at higher elevations in the Talamanca range. This similar species is new and is described below.

Lepanthes variabilis C. M. Sm., Pupulin & D. Jiménez, **sp. nov.** Type: Costa Rica. San José: Cantón de Dota, Copey, Salsipuedes, Dos Amigos, ca. 19 km del Empalme hacia San Isidro del General, Carretera Interamericana, Km 70, entrada al Mirador de Quetzales, 9°38'46.5" N 83°50'49.8" W, 2767 m, 23 Jul 2011, flowered in cultivation at Lankester Botanical Garden, 13 Mar 2012, D. Bogarín 8999 & M. Bonilla (holotype: JBL; isotypes: CR, JBL). (Figs. 2B, 4 and 5)

Lepanthes minutilabiae affinis, sed plantafloribusque distincte maioribus, foliis subacutis in lamina inferiore

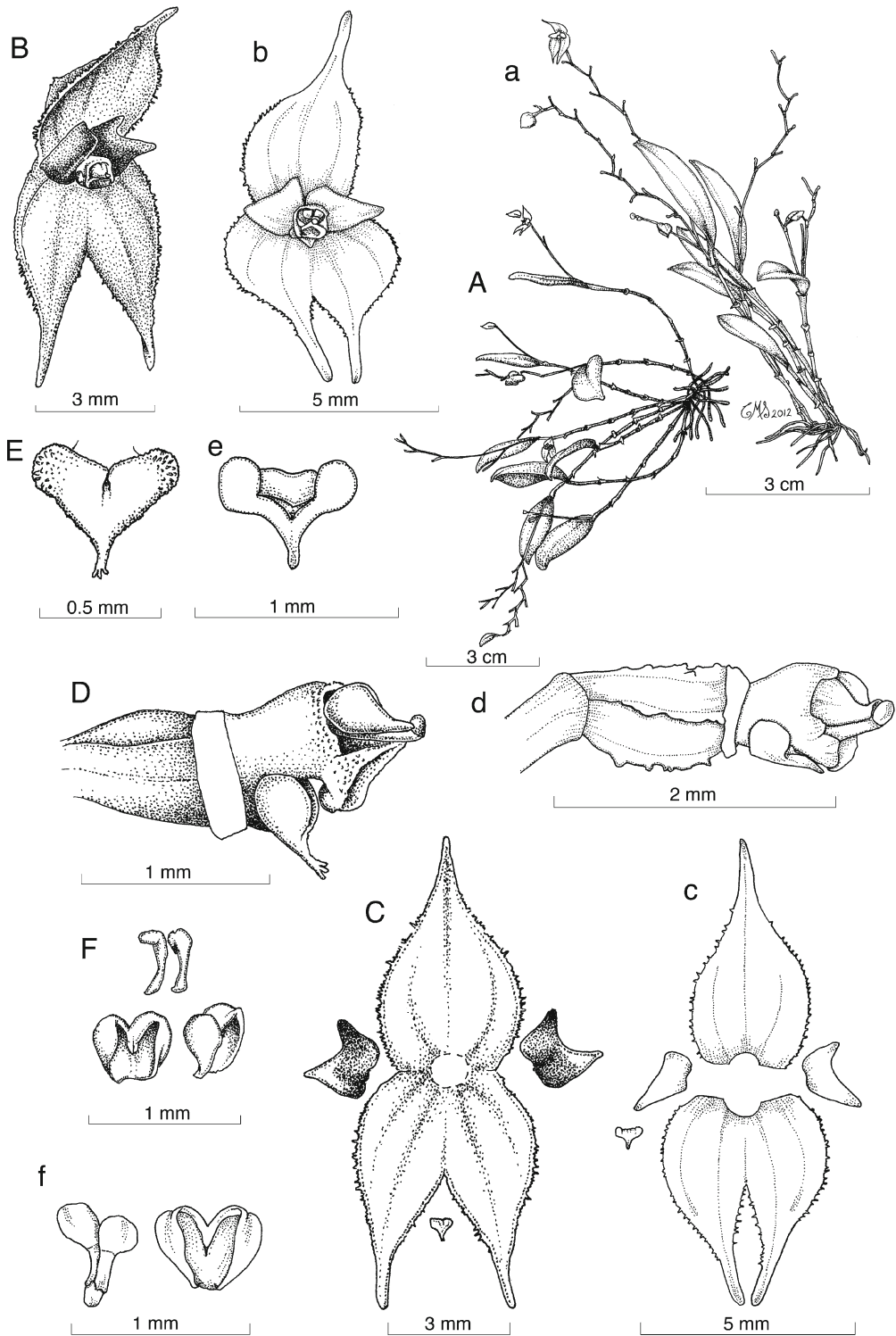


FIG. 4. Variation in *Lepanthes variabilis*. A, a. Habit. B, b. Flower. C, c. Dissected perianth. D, d. Ovary, column and lip. E, e. Lip. F, f. Pollinaria and anther cap. (A–F Drawn from *Bogarin* 8999, JBL; a–f Drawn from *Bogarin* 4737, JBL.)

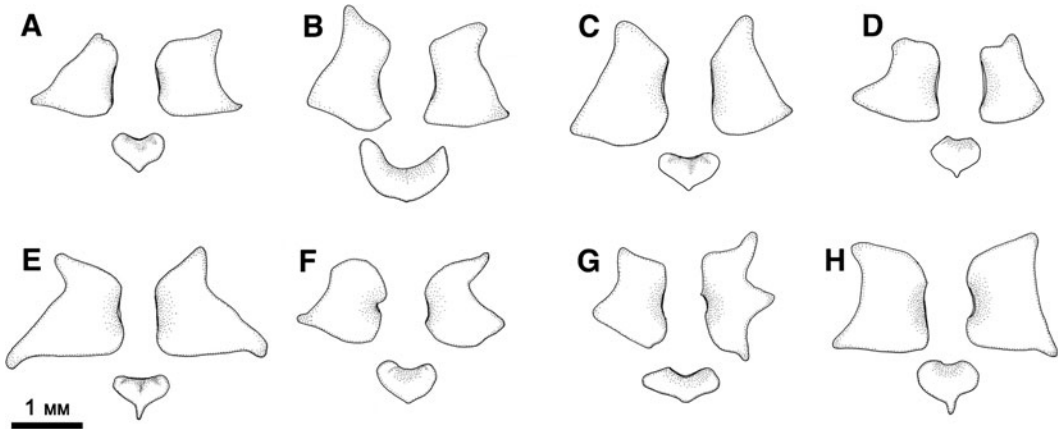


FIG. 5. Petal and lip variation of *Lepanthes variabilis*. A. *Pupulin* 7291 (JBL). B. *Bogarín* 5229 (JBL). C. *Pupulin* 7297 (JBL). D. *Bogarín* 7055 (JBL). E. *Bogarín* 4737 (JBL). F. *Bogarín* 6682 (JBL). G. *Bogarín* 6686 (JBL). H. *Bogarín* 6676 (JBL).

purpureo-suffusus, inflorescentia racemosa laxa successive multiflora, floribus pallide brunneis vel luteo-aurantiacis, sepalis denticulatis acuminatis et petalis inaequalibus lobulis acutis sinu profundo disjunctis recedit.

Epiphytic, caespitose, suberect to pendent herb, up to 10 cm tall. Roots slender, flexuous, up to 0.5 mm in diameter. Ramicauls suberect to pendent, 2.5–7.6 cm, with 5–8 internodes, caulinar sheaths pale brown, micropapillose along the ribs, the ostia oblique, dilated, thickened along the margins, papillose-subciliate. Leaves coriaceous, dark green, suffused with purple on the underside, elliptic, subacute, emarginate, with abaxial apicule, 22–30×9–15 mm, the base cuneate into a petiole ca. 2 mm long. Inflorescence 1–3 per growth, born above and below the leaf, longer than the leaves, successively many-flowered (to 13), lax raceme to 9 cm long; peduncle 4–30 mm long, with a tightly adpressed, tubular bract near the base, 2–2.5 mm long; rachis fractiflex 3–60 mm long. Floral bracts ovate, acute to subacuminate, glabrous, pale brown, 1.5 mm long. Pedicel terete, 2–4 mm long, persistent. Ovary subclavate, 1–1.2 mm long, with low, hyaline wings. Flowers pale brown to pale yellowish-orange, sepals with pinkish veins, lateral petals sometimes suffused with pink, petals with pink markings. Dorsal sepal ovate, acuminate, irregularly denticulate, subcucullate, connate to the lateral sepal for about 1 mm, 5.3–5.8×2.7–3.8 mm, with three nerves that are

marked dorsally by low denticulate keels. Lateral sepals oblique, ovate-lanceolate, acuminate, irregularly denticulate, connate for about 2 mm forming a lamina, 4–5.5×3.9–4.9 mm, with two nerves that are marked dorsally by low denticulate keels. Petals very irregular, generally transversally bilobed, the lobes variably acute, entire, 1.24–1.9×1.24–1.8 mm, separated by a deep sinus, the upper margin overlapping each other. Lip very irregular, small, cordate, acute to acuminate, basally adnate to the column, 0.50–1.5×0.5–1.3 mm. Column cylindrical, 1 mm long, the anther dorsal, the stigma apical-subventral. Pollinia two, ovoid. Anther cap cucullate, ovate, basally emarginate.

Distribution.—Costa Rica; close to the continental divide in the northern part of the Talamanca mountain range; 2750–2850 m (Fig. 3).

Habitat and ecology.—Epiphyte in primary and secondary montane rain forest sensu Holdridge (1967).

Phenology.—Flowering January to March, and July.

Etymology.—This species is named after the wide variability in the shape of the petals and lips (Fig. 5).

Additional specimens examined. **Costa Rica.** **Cartago:** Paraiso, Orosi, Villa Mills, desvío hacia el Refugio de Vida Silvestre Cuericí, ca. 3 km al este de Villa Mills, 9°33'15.63" N 83°40'57.93" W, 2830 m,

bosque pluvial montano, en bosque de robles y bosque secundario a orillas del camino, 24 Apr 2008, flowered in cultivation at Lankester Botanical Garden, 24 Jul 2008, *Bogarín et al. 4737* (JBL); El Guarco, San Isidro, Salsipuedes, camino a Dos Amigos, Carretera Interamericana, km 69–70, 9°38'35.7" N 83°50'44.1" W, 2773 m, epífitas en bosque pluvial montano, 31 Mar 2009, *Bogarín et al. 6676* (JBL); Same locality, 9 Oct 2008, flowered in cultivation at Lankester Botanical Garden, 6 Jan 2009, *Bogarín et al. 5226* (JBL); El Guarco, San Isidro, Salsipuedes, camino a Dos Amigos, Carretera Interamericana, km 69–70, 9°38'35.7" N 83°50'44.1" W, 2773 m, epífitas en bosque pluvial montano, 31 Mar 2009, *Bogarín et al. 6682* (JBL-drawing); same locality, *Bogarín et al. 6686* (JBL-drawing); same locality, 9 Oct 2008, *Bogarín et al. 5229* (JBL-drawing); Paraiso, Orosi, Villa Mills, desvío hacia el Refugio de Vida Silvestre Cuericí, ca. 3 km al este de Villa Mills, 9°33'15.63" N 83°40'57.93" W, 2830 m, bosque pluvial montano, en bosque de robles y bosque secundario a orillas del camino, 8 May 2009, *Bogarín et al. 7055* (JBL-drawing); El Guarco, San Isidro, Salsipuedes, road to Dos Amigos, southern Panamerican highway, Km 69–70, 9°38'35.7" N 83°50'44.1" W, 2773 m, epiphytic in montane rain forest, 9 Oct 2008, *Pupulin et al. 7291* (JBL-drawing); El Guarco, San Isidro, Salsipuedes, road to Dos Amigos, southern Panamerican highway, Km 69–70, 9°38'35.7" N 83°50'44.1" W, 2773 m, epiphytic in montane rain forest, 9 Oct 2008, *Pupulin et al. 7297* (JBL).

Lepanthes variabilis has been misidentified as *L. minutilabia* in herbaria and living

collections. Although sharing some characteristics such as the reduced lip, they differ in that *L. variabilis* is larger, being almost twice the height of *L. minutilabia*. *Lepanthes variabilis* can also be distinguished by the larger (22–30×9–15 mm vs. 10–14×7–9 mm), subacute (vs. broadly obtuse to rounded) leaves suffused with purple on the underside (vs. all dark green), and the successively many flowered (to 13 vs. to 9), lax (vs. congested) inflorescences to 9 cm long (vs. to 3.9 cm long) (Table I). The flowers of *L. variabilis* are pale brown to pale yellowish-orange, with pinkish veins on the sepals, the petals always with pink markings, and the lateral petals suffused with pink (vs. pale yellow to pail reddish green in *L. minutilabia*, the petals only sometimes with pink markings). Also, in *L. variabilis* the sepals are irregularly denticulate and acuminate (vs. entire and acute), and the petals are irregular (Fig. 5), unequal to each other, and with acute lobes separated by a deep sinus (vs. subtrapezoidal, the sinus shallow). The shape of the lip is also very irregular in *L. variabilis* (Fig. 5). *Lepanthes variabilis* has only been collected in the Talamanca Mountains in Costa Rica (Fig. 3).

TABLE I
COMPARISON OF *LEPANTHES MINUTILABIA* AND *L. VARIABILIS*.

	<i>Lepanthes minutilabia</i>	<i>Lepanthes variabilis</i>
Habit	caespitose, erect	caespitose, suberect to pendent
Roots	0.35 mm diam.	0.5 mm diam.
Ramical	2–3.8 cm	2.5–7.6 cm
Caulinar sheaths	blackish brown	pale brown
Ostia	stiffly papillose	papillose-subciliate
Leaf	broadly obtuse to rounded, 10–14 × 7–9 mm, entirely dark green	subacute, 22–30×9–15 mm, dark green, suffused with purple on the underside
Inflorescence	congested raceme to 3.9 cm long, with up to 9 flowers; peduncle 8–15 mm long; bract 0.7–1 mm long	lax raceme to 9 cm long, with up to 13 flowers; peduncle 4–30 mm long; bract 2–2.5 mm long
Floral bracts	sparsely hirsute, brown, 1 mm long	glabrous, pale brown, 1.5 mm long
Flowers	pale yellow to pale reddish green, petals sometimes with pink markings	pale brown to pale yellowish-orange, sepals with pinkish veins, lateral petals sometimes suffused with pink, petals with pink markings
Dorsal sepal	acute, entire	acuminate, denticulate
Lateral sepals	acute, entire, lamina 3.25×4 mm	acuminate, denticulate, lamina 4–5.5×3.9–4.9 mm
Petals	bilobed-flabellate, broadly rounded, obtuse angle in outer margin	transversally bilobed, lobes variably acute, separated by a deep sinus
Lip	triangular to cordate, 0.35–0.45 × 0.30–0.90 mm	cordate, 0.50–1.50×0.50–1.30 mm

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Literature cited

- Ames, O. & C. Schweinfurth.** 1930. New or noteworthy orchids. *Schedulae Orchidianae* 10: 49–51.
- Bogarín, D., A. P. Karremans & F. Pupulin.** 2012. Three new *Lepanthes* (Orchidaceae: Pleurothallidinae) from south-east Costa Rica. *Lankesteriana* 12: 107–114.
- Holdridge, L. R.** 1967. Life zone ecology. Tropical Science Center. San José, Costa Rica.
- Karremans, A. P., D. Bogarín, M. Fernández, C. M. Smith & M. A. Blanco.** 2012. New species and records of Orchidaceae from Costa Rica. II. *Lankesteriana* 12: 19–51.
- Luer, C. A.** 1996. *Icones Pleurothallidarum XIV. Systematics of *Draconanthes*, *Lepanthes* subgenus *Marsipanthes* and subgenus *Lepanthes* of Ecuador.* Monographs in Systematic Botany from the Missouri Botanical Garden 61: 1–255.
- . 2003. *Lepanthes*. Pages 216–255. In: B. E. Hammel, M. H. Grayum, C. Herrera & N. Zamora (eds.). *Manual de plantas de Costa Rica, Volumen III: Monocotiledóneas (Orchidaceae-Zingiberaceae).* Monographs in Systematic Botany from the Missouri Botanical Garden, vol. 93.
- Pupulin, F.** 2001. New taxa in Costa Rican *Lepanthes* (Orchidaceae). *Harvard Papers in Botany* 6: 289–294.
- & **D. Bogarín.** 2012. *Lepanthes novae Tapantienses*. *Orchid Digest* 76: 20–29.
- , **H. Medina & D. Bogarín.** 2010. Two *Lepanthes* (Orchidaceae: Pleurothallidinae) with strongly reduced corolla. *Orchideen Journal* 17: 117–121.
- , ——— & ———. 2011. Two *Lepanthes* (Orchidaceae: Pleurothallidinae) with strongly reduced corolla. *Orchids Journal* 1: 31–35.