

Two New *Lepanthes* from Costa Rica

Describing Taxa in the Pleurothallidinae: Orchidaceae/By Franco Pupulin and Diego Bogarin

EVEN IN A SMALL COUNTRY SUCH as Costa Rica, known for having been well botanized in the past, and notwithstanding the immense labor by Auguste R. Endrés in the 19th century and by Carlyle A. Luer, MD, to the present (Luer 1995, 1996, 2003), the genus *Lepanthes* continues revealing an endless number of novelties.



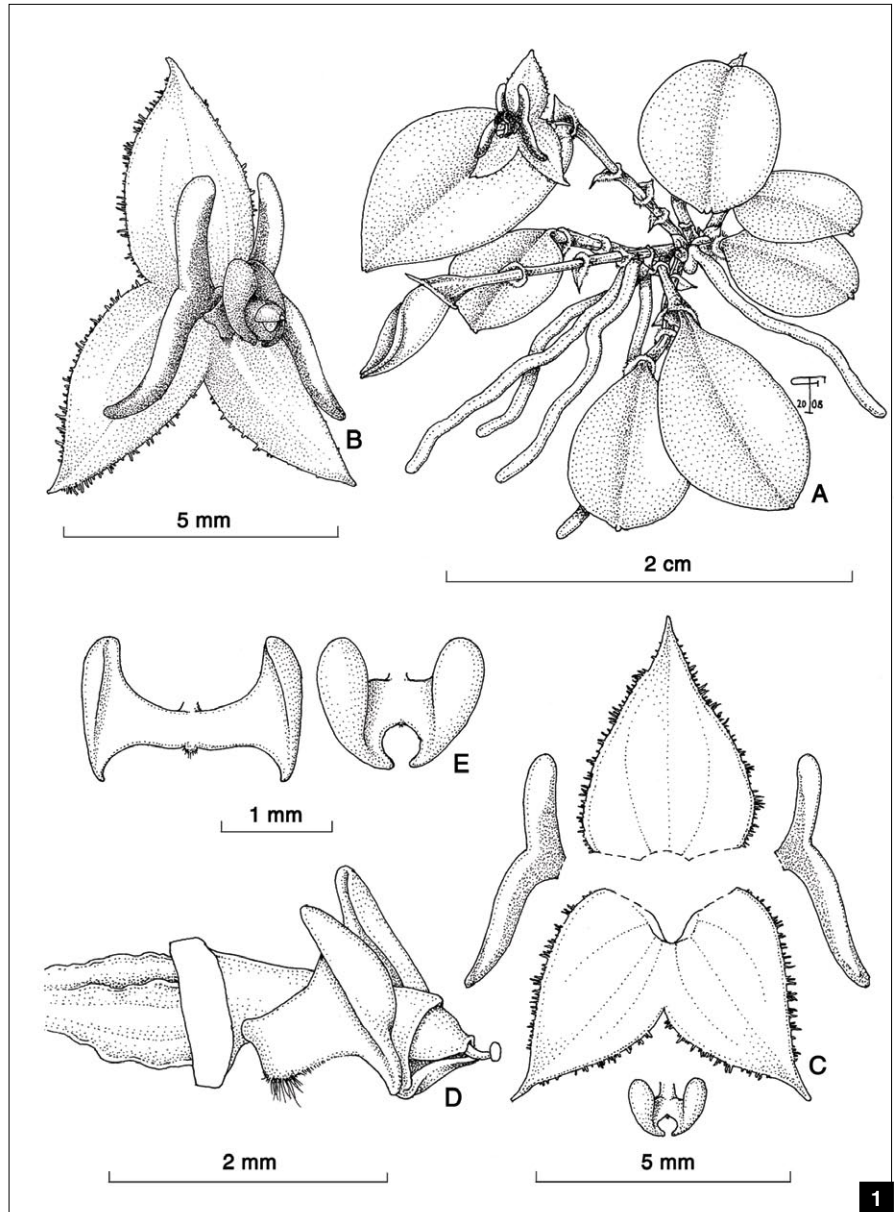
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Diego Bogarin

The knowledge of the genus in Costa Rica began with the early efforts by the Dane A.S. Oersted, who collected in the country in 1846–1848, and the German H. Wendland, who traveled through most of the Costa Rican mountains some 10 years later. On the basis of their collections, between 1849 and 1866, H.G. Reichenbach described the first nine species of *Lepanthes* from Costa Rica (Reichenbach 1855, 1858, 1866). Before the end of 19th century, Costa Rica saw the prodigious botanical work by A.R. Endrés, who collected, described and illustrated more than 60 species of the *Lepanthes* we know today.

New species of *Lepanthes* were added to the still meager list of Costa Rican flora in the first decades of the 20th century, beginning with the work by Rudolf Schlechter, who described his first Costa Rican *Lepanthes*, *Lepanthes wercklei*, in 1912 (Schlechter 1912). In the next 10 years, he described another 13 species of *Lepanthes*, mainly on the basis of collections by the Costa Ricans Alberto M. Brenes, Guillermo Acosta and Otón Jiménez (Schlechter 1923a, 1923b, 1923c). In 1923, in the fourth release of his series *Schedulae Orchidianae*, Professor Oakes Ames described three more species from Costa Rican collections made by Charles H. Lankester and Alfredo Sancho (Ames 1923). The fascicle begins a series of publications, continued in the next seven years, in which Ames and his coauthor Charles Schweinfurth revealed to the science 24 new species of *Lepanthes* from Costa Rica (Ames and Schweinfurth 1925, 1930).



More than 50 years elapsed before Luer and Rodrigo Escobar described *Lepanthes mystax* and *Lepanthes nymphalis* on the basis of two collections made by Luer and his wife, Jane, in central Costa Rica (Luer 1983). In the next 12 years, Luer was responsible for the monumental task of disclosing the real diversity of Costa Rican *Lepanthes*, publishing 67 new species and critically revising and illustrating old specific concepts (Luer 1987, 1995, 1996). Since 2001, this task has been taken over by the staff of Lankester Botanical Garden, whose scientists added 16 additional new species to the country's floristic inventory

[1] *Lepanthes falx-bellica* Pupulin & Bogarin. A. Habit. B. Flower. C. Perianth, flattened. D. Column and lip, lateral view. E. Lip, adaxial view, spread and in natural position. Drawn by F. Pupulin from the holotype.

(Pupulin 2001, 2003, Pupulin and Bogarin 2004, 2010, Pupulin et al. 2009, 2010a, 2010b, Bogarin and Pupulin, in press). Here we describe two more.

Lepanthes falx-bellica Pupulin & Bogarin, *sp. nov.*

TYPE Costa Rica. Puntarenas: Santa Elena, road toward Cerro Amigos, 10°19'20"N 84°48'01"W, 5,577 feet (1,700

m), July 30, 2003, flowered in cultivation at Lankester Botanical Garden, University of Costa Rica, February 4, 2005, D. Bogarín 394, M. Blanco & M. Whitten (holotype, JBL-Spirit; isotype, USJ). Figs. 1–2.

Species *Lepanthes monteverdensi* Luer et R. Escobar similis, distincta habito perparvo, colore floribus, petalibus multo majoribus, laminis labelli ovatis non lunatis columnam aequantis, appendice integra.

Epiphytic, small, caespitose, suberect to prostrate herb, to 2.5 cm tall. Roots slender, flexuous, about 1 mm in diameter. Ramicauls 0.7–1.4 cm long, enclosed by three to five lepanthiform, micropubescent sheaths, the ostia obliquely dilated, with ciliate margins. Leaves coriaceous, flat, conduplicate, ovate-elliptic to suborbicular, broadly obtuse-rounded, minutely emarginate, abaxially provided with a minute, rounded apicule, 6–12 × 6–10 mm, the base shortly cuneate, narrowing into a petiole 1.0–1.5 mm long. Inflorescence racemose, ditichous, successively flowered, borne above the leaf, to 1 cm long; peduncle filiform, about 5 mm long. Floral bracts conduplicate, ovate, subacute, sparsely muriculate, about 1 mm long. Pedicel 1.2 mm long, persistent. Ovary subclavate, rounded-subwinged, the wings membranaceous-crenulate, in section, 1 mm long. Flowers with the sepals orange-yellow, the veins tinged pale yellow, the petals basally orange, the proximal half red, the apex of the lower lobe red, the lip concolorous purple red, the column purple, the anther strongly suffused with purple. Dorsal sepal triangular-ovate, acute, slightly concave toward the apex, 4.5 × 3.5 mm, three-veined, the margins minutely and irregularly ciliate, connate to the lateral sepals for about 1.5 mm. Lateral sepals triangular-ovate, acute to subacuminate, three-veined, the margins irregularly ciliate, slightly concave at apex, 4.5 × 3.0 mm, connate at the base 1.5 mm. Petals transversely bilobed, 0.5 × 5.0 mm, the upper lobe transversely linear-subfalcate, rounded, 0.5 × 2.0 mm, the lower lobe transversely linear-subfalcate, rounded, 0.5 × 3.0 mm, acute-rounded. Lip three-lobed, basally connate to the column, 1.2 × 2.0 mm, cellular-subpubescent along the blades, shortly hispid under the body, the blades ovate, acute, the connectives broadly oblong, the appendix external, short, subglobose, hirsute. Column short, 1.2 mm long, with the anther dorsal, the stigma apical. Anther cap cucullate, two-celled. Pollinia two.

HABITAT Epiphytic in lower montane rain forest on the Pacific slopes of Cordillera de Tilarán, Costa Rica.

DISTRIBUTION Known only from the type locality.



DERIVATION OF NAME From *falx-bellica*, the Latin word for halberd, the weapon that came to prominent use during the 14th and 15th centuries, in reference to the shape of the petals.

Within the complex of endemic species close to *Lepanthes monteverdensis* (including, in Costa Rica, *Lepanthes mentosa* and *Lepanthes cribbii*), *Lths. falx-bellica* can be distinguished by the diminutive habit, the small, ovate-rounded leaves, the proportionally broader petals (broader than the length of the dorsal sepal), the body of the lip without a chin, the fully formed, nonlunate blades of the lip, and the small, rounded, external appendix. The flowers of *Lths. falx-bellica* also differ in color from their close relatives, with concolorous sepals and bright orange petals, basally blotched and suffused with red.

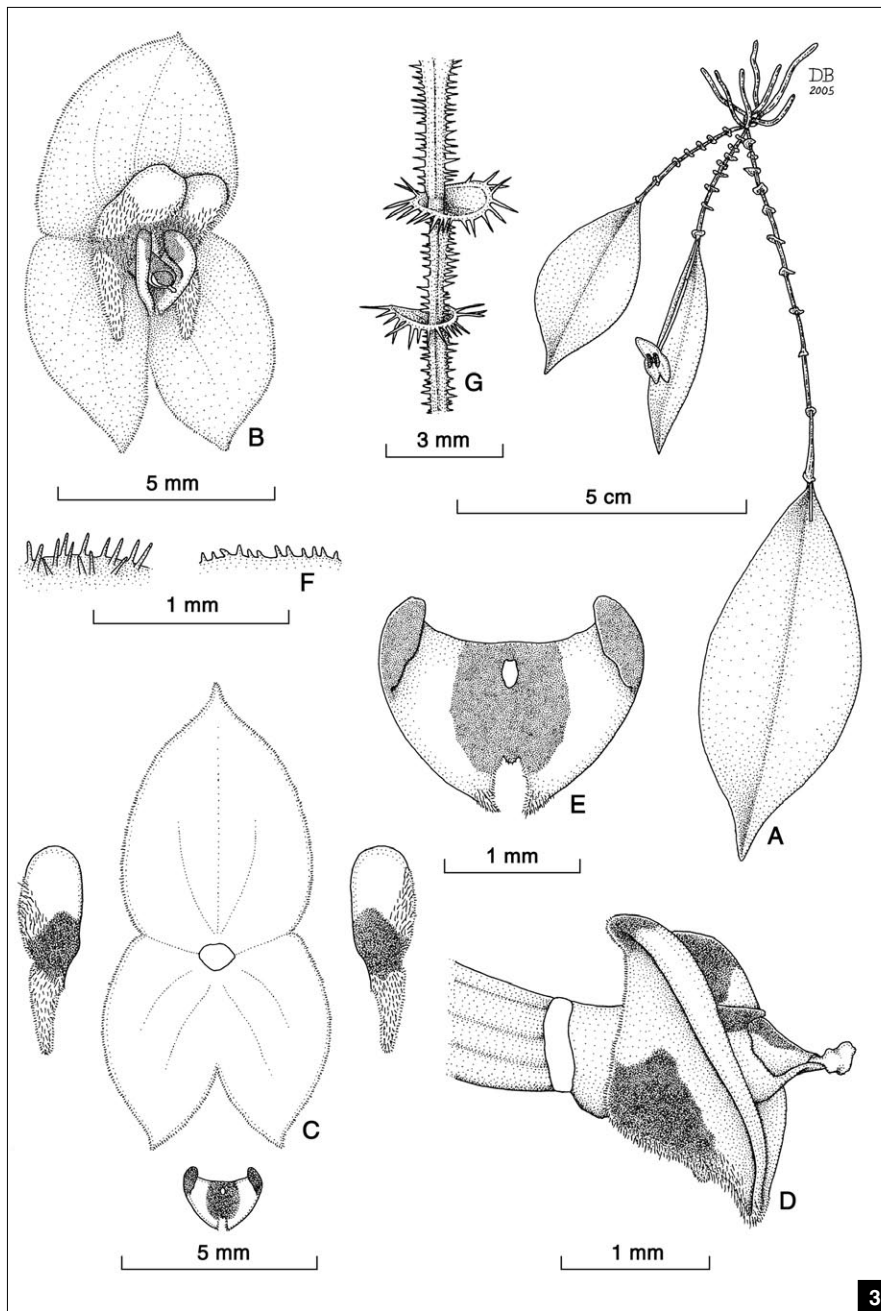
Lepanthes viridis Pupulin & Bogarín, *sp. nov.*

TYPE Costa Rica. Turrialba: Tuis, Cien Manzanas, 9°51'25"N 83°33'47"W, ca. 3,117 feet (950 m), along a minor tributary of Río Pacuare, premontane wet forest, secondary vegetation and remnants of primary, May 26, 2003, F. Pupulin 4801, R. and K. Dressler, J. Aguilar, G. Gerlach, P. Kindlmann, H. León-Paéz, S. Pugh-Jones and E. Serrano (holotype, JBL-Spirit). Figs. 3–6.

Species *Lepanthes* pan Luer et Dalström similis, folio obovato, colore floribus, sepalis lateralibus distincte minoribus quam supernum, petalis dense villosis lobulo superno rotundato, apicibus lobulis lateralibus labelli non apiculatis recedit.

[2] *Lepanthes falx-bellica*, flower from the plant that served as the holotype, flowered in cultivation at Lankester Botanical Garden, University of Costa Rica, and photographed in July 2003.

Epiphytic, small to medium, caespitose, pendulous herb, to 15 cm tall. Roots slender, flexuous, about 1 mm in diameter. Ramicauls 2.0–6.5 cm long, enclosed by seven to 11 lepanthiform, pubescent sheaths, the ostia obliquely dilated, with ciliate margins. Leaves pendulous, subcoriaceous, flat, conduplicate, oblanceolate to obovate, acuminate, minutely emarginate, abaxially provided with a short apicule, 3.7–6.3 × 0.8–2.6 cm, the base cuneate, narrowing into a petiole 1.8 mm long, with an ornamentation of translucent cells between the external veins and the margins. Inflorescence racemose, ditichous, successively flowered, borne above the leaf, to 3.2 cm long; peduncle filiform, about 2.5 cm long. Floral bracts conduplicate, ovate, subacute, muriculate, about 1.5 mm long. Pedicel 2.2 mm long, persistent. Ovary cylindrical, rounded in section, 2 mm long. Flowers rather large for the genus, the sepals yellow, with the nerves tinged pale yellow to greenish, the petals basally dark red, the upper lobe yellowish to greenish, the lower lobe yellow, the lip with the body dark red, connectives yellow to greenish, the blades yellow to greenish-yellow blotched with dark red, the column and the anther cap red. Dorsal sepal ovate, acuminate, concave, 6 × 5 mm, three-veined, setose between nerves, the margins minutely ciliate, connate to the



- [3] *Lepanthes viridis* Pupulin & Bogarín.
 A. Habit. B. Flower. C. Perianth, flattened.
 D. Column and lip, lateral view. E. Lip,
 adaxial view. F. Margins of petals.
 G. Detail of the ramicaul. Drawn by
 D. Bogarín from the holotype.
- [4] *Lepanthes viridis*, flower from the plant
 that served as the holotype.

lateral sepals for about 1.5 mm. Lateral sepals elliptic-ovate, acute to acuminate, slightly concave, 6×3 mm, two-veined, setose between nerves, the margins minutely ciliate, connate at the base 1.8 mm. Petals transversely bilobed, 0.8×5.1 mm, the upper lobe rectangular, oblong rounded, 1.5×3.0 mm, basally hispid, hirsutulous to cellular-pubescent at the apex, the lower lobe lanceolate, subfalcate, 0.7×2.5 mm, densely hispid. Lip bilobate, adnate to the column, 1.2×2.0 mm, cellular-pubescent along the blades, hispid at the apex and under the body, the blades subfalcate-lanceolate, acute, the connectives triangular, the body thin, rectangular, apically provided with a very small hirsutulous appendix. Column short, 1.7 mm long, with the anther

dorsal, the stigma apical. Anther cap cucullate, two-celled. Pollinia two.

HABITAT Epiphytic in premontane wet forest on the Caribbean slopes of Cordillera de Talamanca, Costa Rica.

DISTRIBUTION Known only from the type locality in Costa Rica.

DERIVATION OF NAME From the Latin *viridis*, green, in allusion to the bright green color of the petals.

Lepanthes viridis is superficially similar to the Ecuadorian *Lths. pan*, from which it mainly differs by the distinctly obovate leaves (vs. orbicular), the yellow flowers with bright green petals (vs. peach-colored flowers with red petals), the lateral sepals shorter than the dorsal sepal (vs. equal), the densely villose petals, with the upper lobe

rounded (vs. microscopically pubescent, the upper lobe obliquely truncate), and the apexes of the lateral lobes of the lip acute (vs. obtuse, apiculate).

The name, *Lepanthes equus-frisiae* (Pupulin et al. 2010b), was invalidly published according to article 37.7. of the *International Code of Botanical Nomenclature*, failing to specify the herbarium in which the type is conserved (McNeill et al. 2006). The species is validated here.

***Lepanthes equus-frisiae* Pupulin & H. Medina, sp. nov.**

TYPE Ecuador. Carchi: El Laurel, road to Maldonado, ca. 7,874 feet (2,400 m), collected by H. Medina, 1993, flowered in cultivation in the collection of Ecuagenera at Gualaceo, Accession No.

001588, Feb. 13, 2009, F. Pupulin 7795 (holotype, Herbarium of the Andean Orchid Research Center, University Alfredo Pérez Guerrero).

A Lepanthes micellilabiae Luer & R. Escobar similis, distincta sepalibus liberis basaliter trichomatibus instructis, petalis transverse rheniformi-suborbicularis rotundatis concavis, labello subsphaerico late obtuso; a Lepanthes rigidigitatae Luer & Hirtz habito caespitose et inflorescentia congesta praecipue recedit.

For a complete description, illustration and photograph of *Lths. equus-frisiae*, see Pupulin et al. 2010b.

References

- Ames, O. 1923. Additions to the Orchid Flora of Central America. *Schedul. Orch.* 4:1–60.
- Ames, O., and C. Schweinfurth. 1925. New or Noteworthy Species of Orchids from the American Tropics. *Schedul. Orch.* 8:1–84.
- . 1930. New or Noteworthy Orchids. *Schedul. Orch.* 10:1–112.
- Bogarín, D., and F. Pupulin (in press). *Lepanthes danieljimenezii* (Orchidaceae: Pleurothallidinae), a New Species Close to *L. guardiana*. *Die Orchideen* (Hamburg).
- Luer, C.A. 1983. New Species of *Lepanthes* (Orchidaceae). *Phytologia* 54(4):325–378.
- . 1987. New *Lepanthes* Species from Costa Rica and Panama. *Lindleyana* 2:185–217.
- . 1995. New Species of *Lepanthes* (Orchidaceae) from Costa Rica (with a Biographical Note on A.R. Endrés). *Lindleyana* 10(3):133–175.
- . 1996. New Species in the Pleurothallidinae (Orchidaceae) from Costa Rica. *Lindleyana* 11(2):54–113.
- . 2003. *Lepanthes*. p. 216–255. In: B. E. Hammel, M. H. Grayum, C. Herrera and N. Zamora, editors. Manual de Plantas de Costa Rica. Volumen III: Monocotiledóneas (Orchidaceae–Zingiberaceae). *Monographs in Systematic Botany from the Missouri Botanical Garden* 39.
- McNeill, J., F.R. Barrie, H.M. Burdet, V. Demoulin, D.L. Hawksworth, K. Marhold, D.H. Nicholson, J. Prado, P.C. Sulva, J.E. Skog, J.H. Wiersma and N.J. Turland. 2006. International Code of Botanical Nomenclature (Vienna Code). *Repert. Sp. Nov. Reg. Veg.* 146.
- Pupulin, F. 2001. New Taxa in Costa Rican *Lepanthes* (Orchidaceae). *Harvard Pap. Bot.* 6(1):289–294.
- . 2003. Orchideenflora Mittelamerika - Ergänzungen (Teil 1). Orchid Flora of Central America — Supplements (Part 1). Additamenta ad Orchideologiam Mesoamericanam (Pars 1). *Die Orchidee* (Hamb.) 54(4):467–477.
- Pupulin, F., and D. Bogarín. 2004. Two New Species of *Lepanthes* (Orchidaceae: Pleurothallidinae) from Costa Rica. *Kew Bull.* 59:559–563.
- . 2010. Illustrations and studies in Neotropical Orchidaceae — The *Lepanthes jimenezii* group (Pleurothallidinae). *Harvard Pap. Bot.* 15(1):111–121.
- Pupulin, F., D. Bogarín and D. Jiménez. 2009. New Species and Records in Mesoamerican *Lepanthes*. *Orch. Dig.* 73:136–145.
- Pupulin, F., D. Bogarín and C.M. Smith. 2010a. Two New Species of *Lepanthes* from Costa Rica Close to *L. schizocardia* (Orchidaceae: Pleurothallidinae). *Lankesteriana* 9(3):423–430.
- Pupulin, F., H. Medina and D. Bogarín. 2010b. Two *Lepanthes* (Orchidaceae: Pleurothallidinae) with Strongly Reduced Corolla. *Orchideen J.* 17(3):117–121.
- Reichenbach, H.G. 1855. Symbolae Orchidaceae. *Bonplandia* 3:212–227.
- . 1858 (1856). *Lepanthes lindleyana*. *Xenia Orchid.* 1:149, t. 50, f. 8–10.
- . 1866. *Beiträge zu einer Orchideenkunde Central-Amerika's*. F. Pritzels, Hamburg.
- Schlechter, R. 1912. Orchidaceae novae et criticae. *Repert. Sp. Nov. Regni Veg.* 10:248–256.

—. 1923a. Beiträge zur Orchideenkunde von Zentralamerika, II. Additamenta ad Orchideologiam Costaricensis, I. Orchidaceae Amparoanae. *Repert. Sp. Nov. Regni Veg. Beih.* 19:3–75.

—. 1923b. Beiträge zur Orchideenkunde von Zentralamerika, II. Additamenta ad Orchideologiam Costaricensis, III. Orchidaceae Brenesianae. *Repert. Sp. Nov. Regni Veg. Beih.* 19:158–269.

—. 1923c. Beiträge zur Orchideenkunde von Zentralamerika, II. Additamenta ad Orchideologiam Costaricensis, IV. Orchidaceae novae et rariores collectorum variorum in Costa Rica collectae. *Repert. Sp. Nov. Regni Veg. Beih.* 19:270–307.

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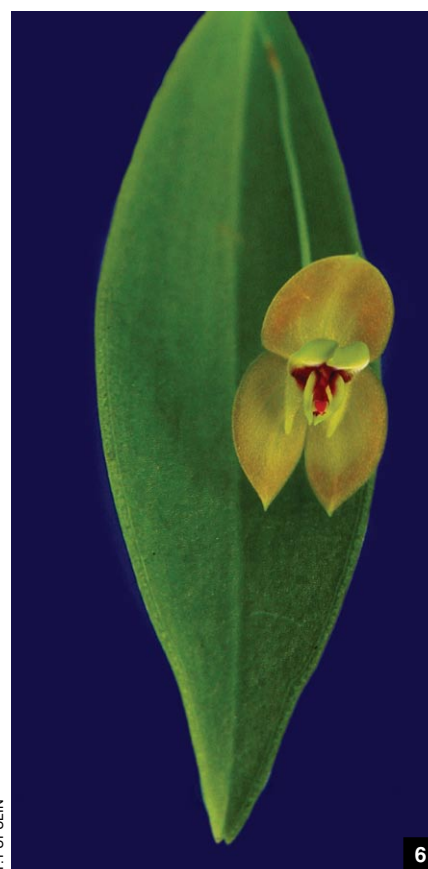
Franco Pupulin is a senior research professor at the University of Costa Rica, where he works as director of research with Lankester Botanical Garden. He is especially interested in the systematics and evolution of advanced orchid groups in subtribes Oncidiinae, Pleurothallidinae and Zygopetalinae. Pupulin is working on several monographic and floristic projects on Neotropical orchid floras. Author of more than 150 scientific articles and several books on the orchids of the Mesoamerican region, he is a research associate of the Oakes Ames Orchid Herbarium at Harvard University and the Marie Selby Botanical Gardens, Sarasota, Florida, and the director of the Ángel Dreoretta Research Center on Andean Orchids of the University Alfredo Pérez Guerrero, Ecuador. (e-mail franco.pupulin@ucr.ac.cr).

Diego Bogarín is particularly interested in the evolution and systematics of Neotropical Orchidaceae. He is developing floristic projects for conservation in Costa Rican national parks and has participated in research projects on DNA barcoding and orchid conservation with the Royal Botanic Gardens, Kew. He is an orchid taxonomist at Lankester Botanical Garden and research associate of the Ángel Dreoretta Research Center on Andean Orchids of the University Alfredo Pérez Guerrero, Ecuador. Bogarín has published a number of scientific papers on the orchid flora of Costa Rica and other Neotropical regions.

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- [5] *Lepanthes viridis*, a flower from the clonotype in cultivation at Lankester Botanical Garden, University of Costa Rica, photographed in September 2008.
- [6] *Lepanthes viridis*, a flower from the clonotype in cultivation at Lankester Botanical Garden, University of Costa Rica, photographed in June 2009.