

A second species of *Restrepiella* (Orchidaceae: Pleurothallidinae)

Authors: Pupulin, Franco, and Bogarín, Diego

Source: *Willdenowia*, 37(1) : 323-329

Published By: Botanic Garden and Botanical Museum Berlin (BGBM)

URL: <https://doi.org/10.3372/wi.37.37122>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

FRANCO PUPULIN & DIEGO BOGARÍN

A second species of *Restrepiella* (Orchidaceae: Pleurothallidinae)**Abstract**

Pupulin, F. & Bogarín, D.: A second species of *Restrepiella* (Orchidaceae: Pleurothallidinae). – Willdenowia 37: 323-329. – ISSN 0511-9618; © 2007 BGBM Berlin-Dahlem. doi:10.3372/wi.37.37122 (available via <http://dx.doi.org/>)

Restrepiella lueri is described as a species new to science and illustrated from Costa Rica. The new species differs from *R. ophiocephala* by (1) the free lateral sepals with irregularly dentate margins, (2) the glabrous petals provided with three low, longitudinal keels, (3) the elliptic, simple lip, longer than the column and as long as the petals, ciliate along the margins and hirsute at apex, with three longitudinal keels from the base extending to the middle of the blade, and (4) the column without a foot. A key to the species of *Restrepiella* is provided.

Key words: orchids, *Restrepiella lueri*, cleistogamy, Costa Rica, taxonomy.

Introduction

When Garay & Dunsterville (1966) founded the orchid genus *Restrepiella*, they defined the new taxon by the fasciculate inflorescence, the abbreviate pedicels, the dissimilar floral segments and the presence of four pollinia, a set of features useful in distinguishing a group of species that do not fit well either *Pleurothallis* R. Br., *Restrepia* Kunth or *Octomeria* R. Br. (Garay 1967). They selected as the *typus* generis *Pleurothallis ophiocephala* Lindl. 1838, nom. illeg. [non *P. ophiocephala* Barb. Rodr. 1822 = *Acianthera ophiantha* (Cogn.) Pridgeon & M. W. Chase] ≡ *R. ophiocephala* Garay & Dunst. (Art. 53.3 and 58.1 ICBN, see Mc Neill & al. 2006), a species based on a collection by G. Loddiges & G. Barker from Mexico (Lindley 1838), and transferred to *Restrepiella* four other species formerly placed under *Pleurothallis* (Garay & Dunsterville 1966).

With the removal to *Dresslerella* Luer (1986) and *Restrepiopsis* Luer (1978) of some discordant elements originally included by Garay in his concept of *Restrepiella* (Garay 1967), the genus became monotypic with *Restrepiella ophiocephala* as the unique representative species.

Today *Restrepiella* is one of the few genera of the large neotropical subtribe *Pleurothallidinae* that received strong and unanimous support as a monophyletic unit from anatomical, morphological and molecular data. Vegetatively, *Restrepiella* is characterized by the caespitose

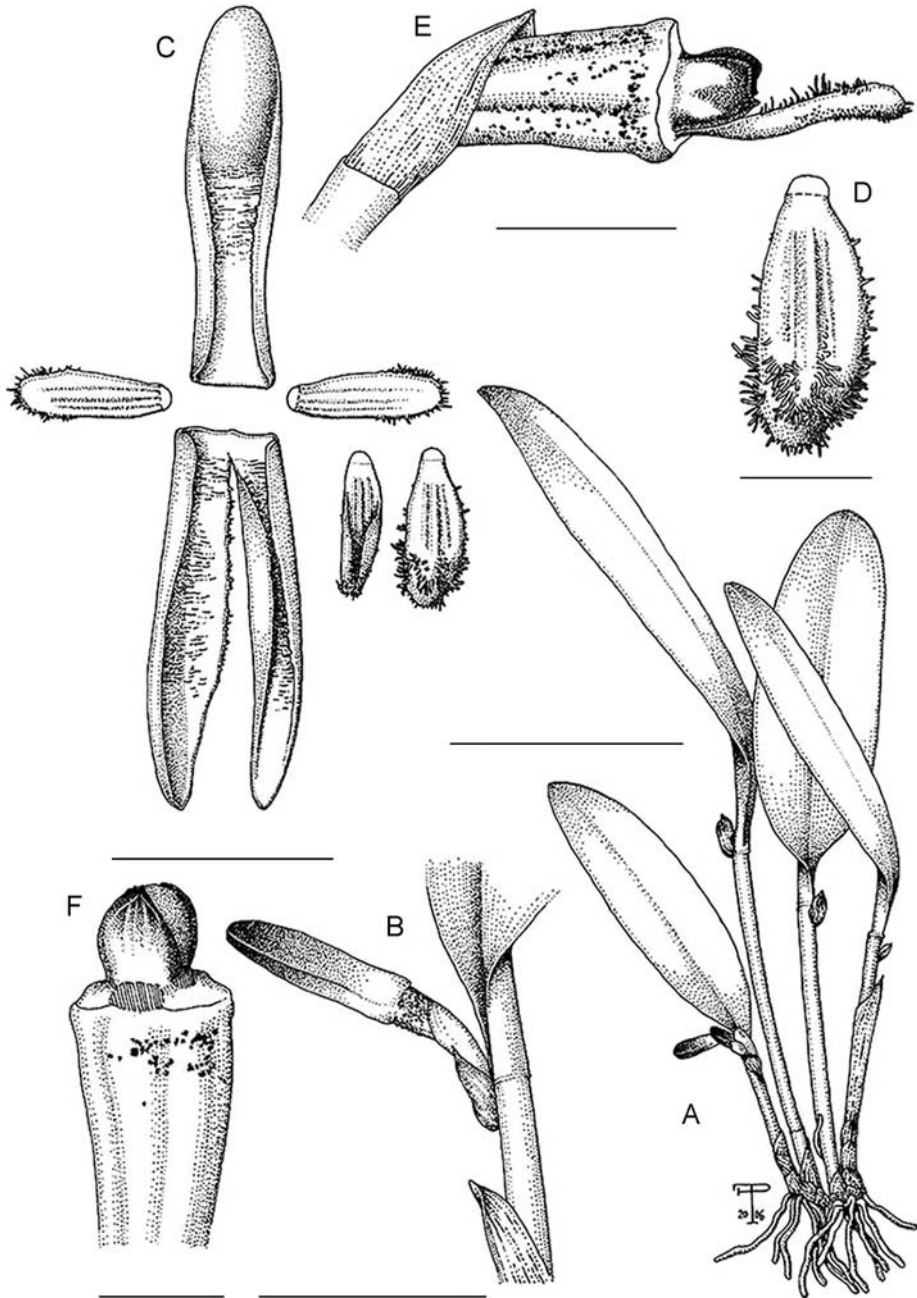


Fig. 1. *Restrepiella lueri* – A: habit; B: apex of stem and inflorescence; C: dissected perianth; the lip in natural position (left) and flattened (right); D: lip, flattened; E: ovary, column and lip, lateral view; F: column, ventral view. – Scale bar: A = 5 cm, B = 2 cm, C = 1 cm, D = 3 mm, E = 5 mm, F = 3 mm. – Drawn from the holotype.

habit with thick ramicauls provided with a few imbricating sheaths at the base and a tubular sheath near the middle, a leathery, shortly petiolate leaf without an annulus and a fascicled inflorescence of single successive flowers produced from a prominent spathe (Luer 1991). The flowers are characterized by a bilabiate, fleshy and shortly pubescent perianth, minutely pubescent to furfuraceous sepals, ciliate-pubescent petals, a thick, oblong-ovoid, entire lip with obtuse, erect, basal angles and 4 obovoid pollinia with short caudicles (Luer 1991). The minutely papillose abaxial cuticle of the leaf, the anticlinally rectangular, dome-shaped or triangular marginal epidermal cells, the thick cuticle of the stem, as well as the rarity of sunken, glandular trichomes with prominent nuclei in both trichome cells and the absence of helical thickenings in the hypodermal cells (present in most *Pleurothallidinae* taxa) are anatomically diagnostic (Pridgeon 1981, 1982). Cladistic analysis of 45 anatomical and morphological characters by Neyland & al. (1995) and molecular results from nuclear and plastid DNA sequences by Pridgeon & al. (2001) and Pridgeon & Chase (2001) confirmed the monophyly of *Restrepiella*. The resulting cladograms show that the monotypic *Restrepiella* is sister to *Barbosella* in a clade that includes a group of clearly monophyletic genera with four or eight pollinia (*Restrepia*, *Restrepiella*, *Barbosella* including *Barbrodria*, *Dresslerella* and *Restrepiopsis/Pleurothallopsis*).

As presently circumscribed, the genus is mainly distributed in Central America, ranging from central Mexico to Colombia, where it is usually found in lowland to premontane humid forests at elevations of 450–1900 m. Although the distribution of *Restrepiella* is usually stated to range south to Costa Rica (Luer 1991, Mora-Retana & Atwood 1992, Sheehan & Sheehan 1998, Pridgeon 2005), the type of the synonymous *Pleurothallis puberula* Klotzsch is actually from “New Granada”, or Colombia, and another Colombian specimen has been recorded from the region of Antioquia (*M. Ospina 81*, JAUM).

Two other species referable to Lindley’s concept of *Pleurothallis ophiocephala* have been described since 1843: *Pleurothallis peduncularis* Hook. 1843 and *P. puberula* Klotzsch 1854; in addition *P. stigmatoglossa* Lindl. 1859 was published as a nomen nudum. In his systematic revision of *Restrepiella*, Luer (1991) treats these three names as synonyms of *R. ophiocephala* and considers *Restrepiella* as unispecific.

In 1996, Irene Bock described a cleistogamous form of *Restrepiella ophiocephala*, the f. *clausa*, on the basis of a plant collected by Clarence K. Horich at Sabanillas de Acosta (San José, Costa Rica), along the northern Pacific slopes of the Talamanca mountain range (Bock 1996). This taxon should not be confused with *R. clausa* (Luer & R. Escobar) Braas & Mohr, based on *Restrepiopsis clausa* Luer & R. Escobar (Braas & al. 1982), a species today assigned to the distantly related genera *Restrepiopsis* or *Pleurothallopsis*. Besides its cleistogamous condition, *R. ophiocephala* f. *clausa* differs from the typical form by the shape of the trichomes covering the distal portion of the petals, which are dendroid instead of simple as in the forma typica (Bock 1996).

We recently had the opportunity to study living material of another cleistogamous form of *Restrepiella* from Costa Rica, coming from a different locality as the plant described by Bock, and we concluded that the morphological features of our finding deserve specific recognition. For this reason, we describe it here a new species in the genus *Restrepiella*.

***Restrepiella lueri* Pupulin & Bogarín, sp. nov.**

Holotype: Cultivated at Jardín Botánico Lankester from the collection “Costa Rica, Alajuela, Los Angeles de San Ramón, c. 800–1000 m, by D. Jiménez”, vouchers 14.12.2006, *D. Bogarín 3009* (CR; isotypes: Jardín Botánico Lankester [spirit], USJ [spirit]) – Fig. 1, 2.

A forma typica *Restrepiellae ophiocephalae* floribus plerumque cleistogamis statim dignoscenda; ab ea et forma *clausa* Bock sepalis lateralibus liberis marginibus irregulariter laceratis, petalis tribus carinis humilis ornatis, labello elliptico petalis aequilongo columnae duplo majore, apicaliter hirsuto marginibus ciliatis, tribus carinis ornato, lateralibus humilioribus, basi lobulis destituta, columna apoda recedit.

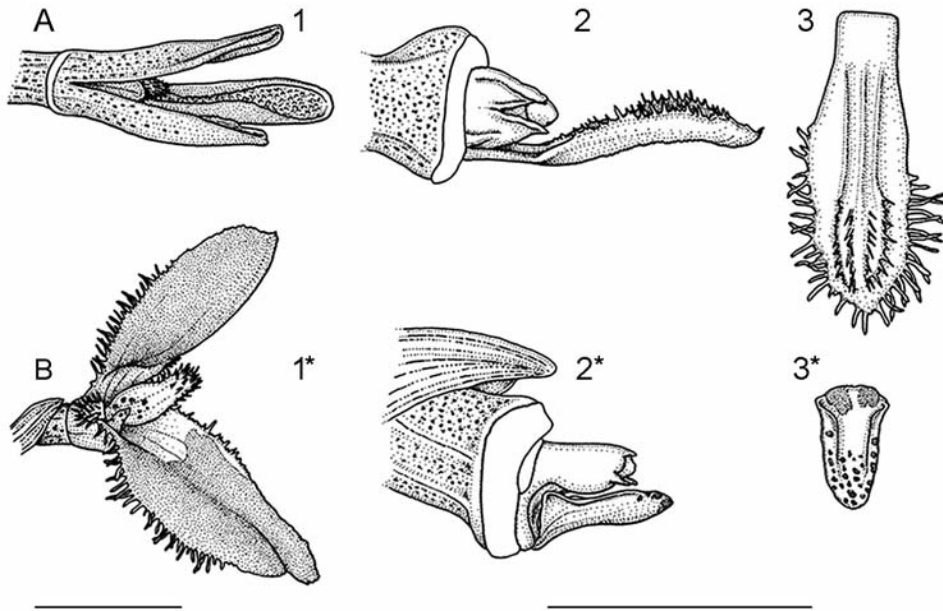


Fig. 2. Comparison between *Restrepiella lueri* (A) and *R. ophiocephala* (B) – 1-1*: flower; 2-2*: column and lip, lateral view; 3-3*: lip, adaxial view. – Scale bar: 1, 1* = 1 cm; 2-3, 2*-3* = 5 mm; A after Bogarín 3009 (Jardín Botánico Lankester [spirit]), B after Jardín Botánico Lankester 04262 (id., [spirit]).

Epiphytic, caespitose herb with monophyllous stems, to 23 cm long. *Roots* slender, flexuous, c. 1 mm in diameter. *Stems* terete, stout, erect, 3.5-8.5 cm long, 3-3.5 mm in diameter, covered by 3-4 short (to 9 mm long), imbricating, papyraceous sheaths at the base, and a tubular, apically loose, membranaceous sheath (becoming papyraceous and eventually shed with age) to 4.5 cm long, mostly exceeding half of the stem length. *Leaf* elliptic, coriaceous, erect, subacute to broadly obtuse, slightly emarginate at apex, cuneate at the base into a distinct petiole, 7-11.5 × 1.9-2.8 cm, the abscission layer a slightly protruding, rounded ring. *Inflorescence* a fascicle of 2-3 flowers produced singly in succession from a conspicuous, papyraceous, ovate-triangular, boldly nerved spathe near the apex of the stem, without an annulus, c. 1 cm long. *Peduncle* stout, cylindric, 3 mm long. *Floral bract* membranaceous, semiamplectent, shorter than the ovary, 7 × c. 4 mm. *Ovary* cylindric-subclavate, minutely and shortly hirsute-verrucose, 7 mm long, 3.7 mm wide at apex. *Flowers* cleistogamous, rarely partially opening and autogamous, boldly suffused with purple from a white base, externally glabrous. *Dorsal sepal* narrowly elliptic-oblong, rounded, apically convex into a distinct cushion, 15-18 × 5-6 mm, externally glabrous, the inner surface with short, transversal, low warts, the basal margins inrolled-replicate and irregularly serrulate. *Lateral sepals* narrowly elliptic-lanceolate, subacute, 16-18 × 4 mm, shortly connate at the base for less than 1 mm, adaxially marked with short, transversal, low warts, the margins strongly inrolled-tubular, irregularly ciliate-sublacerate. *Petals* linear-oblong, rounded, glabrous, 6 × 2 mm, 3-nerved, the nerves adaxially protruding into low, rounded keels, the apical margins ciliate. *Lip* elliptic from a shortly cuneate base, rounded, 4.5 × 2.5 mm, hirsute at apex, with 3 rounded keels running from the base to over the half of the blade, the lateral keels lower, the margins densely long-ciliate, apically strongly infolded in natural position. *Column* stout, quadrangular-cubic, bidenticulate on the lower apex, the margins shortly winged, the stigma ventral. Unpollinate column and *pollinia* not seen.

Eponymy. – Named in honour of Carlyle A. Luer, who more than any other botanist has contributed to the understanding of the diversity of *Pleurothallidinae* and their systematics.

Distribution and habitat. – Known only from the type locality in Costa Rica, close to the continental divide of the Tilarán mountain range, between 800 and 1000 m elevation. The species grows as an epiphyte in tropical wet forest, premontane belt transition and premontane rain forest in secondary vegetation along a small stream. According to Bock (1996), populations of *Restrepiella* are very common in Mexico but less frequent in other Central American regions. In Costa Rica, in spite of their large size compared with other pleurothallid species, plants of *Restrepiella* are poorly known ecologically and apparently rare in the field (Mora-Retana & Atwood 1992), at least judging by the few specimens represented in herbaria and living collections.

Phenology. – Flowering occurs mostly from late November to January, roughly corresponding in Costa Rica to the end of the rainy season.

Discussion

Although the number of pollinia has been traditionally emphasized as the essential diagnostic feature of *Restrepiella* (i.e., Luer 1986, Dressler 1993, 2003), the genus can be easily characterized among the *Pleurothallidinae* by a unique set of macro-morphological features, such as the caespitose plants with stem not cane-like, formed by two internodes, without an annulus, provided with cauline, tubular, not leafy nor lepanthiform sheaths, the single, not sheathing leaf attenuate at the base into a petiole, the flowers emerging near the apex of the stem, the fascicled inflorescence of solitary flowers and the sepals not united at their apices (Solano Gómez 2005).

Restrepiella lueri is distinguished from its relative, *R. ophioccephala*, as well as from the forma *clausa* of the latter species, by the free lateral sepals with irregularly dentate margins (vs. connate into a ciliate synsepal), the petals provided with three low, longitudinal keels (vs. smooth), the elliptic, simple lip with the basal margins flat, provided with three low, longitudinal keels (vs. 3-lobed, with erect, basal angles and two high keels), longer than column and as long as the petals (vs. as long as the column and shorter than petals), hirsute at apex and ciliate along the margins (vs. entire), and the column without a foot (vs. with a distinct foot). The flowers of *R. lueri* are mostly cleistogamous, but in some cases the segments of the perianth spread out slightly before self-pollination takes place, and D. Jiménez photographed a cultivated specimen of *R. lueri* with the flower almost completely open at anthesis. When they show the cleistogamous condition, plants of *R. lueri* are likely undistinguishable from those of *R. ophioccephala* f. *clausa* without dissection of the flower.

Key to the species of *Restrepiella*

1. Lip without basal lobes, hirsute at apex and ciliate along the margins, twice longer than the column and as long as the petals; column without a foot; lateral sepals free *R. lueri*
- Lip provided with erect basal lobes, entire at apex and along the margins, slightly longer than the column and shorter than petals; column with a distinct foot; lateral sepals connate into a synsepal 2
2. Flowers always opened at anthesis, not autogamous; trichomes at the apex of petals simple *R. ophioccephala* f. *ophioccephala*
- Flowers cleistogamous; trichomes at the apex of petals dendroid *R. ophioccephala* f. *clausa*

Acknowledgements

We are indebted to Daniel Jiménez, who kindly provided the living specimens used for this study from his collection. We acknowledge Rudolf Jenny and his service through Bibliorchidea and

Carlos Ossenbach for his help with historical literature. Gratitude is extended to the officers of the Ministry of Environment and Energy of Costa Rica (MINAE) and its National System of Conservation Areas (SINAC) for extending the Scientific Passports No. 1281 and 1285 to collect and manage orchid specimens in the collections of Lankester Botanical Garden. We thank Robert L. Dressler and another, anonymous reviewer for their suggestions and improvements of the manuscript. Part of this study has been sponsored by the Darwin Initiative, UK, in the framework of the project "Conservation and Monitoring of Meso-American Orchids". We acknowledge their support to the research and conservation of Costa Rican orchids.

References

- Bock, I. 1996: Eine neue Form von *Restrepiella ophiocephala* aus Costa Rica / New form of *Restrepiella ophiocephala* from Costa Rica. – *Orchidee* (Hamburg), Suppl. **3**: 3-10.
- Braas, L. A., Braem, G. J. & Mohr, H. 1982: Beiträge zur Subtribus *Pleurothallidinae* I. – *Orchidee* (Hamburg) **33**: 147-156.
- Dressler, R. L. 1993: Field guide to the orchids of Costa Rica and Panama. – Ithaca.
- 2003: *Orchidaceae*. – Pp. 216-255 in: Hammel, B. E., Grayum, M. H., Herrera, C. & Zamora, N. (ed.), Manual de plantas de Costa Rica 3. Monocotiledóneas (*Orchidaceae-Zingiberaceae*). – Monogr. Syst. Bot. Missouri Bot. Gard. **93**.
- Garay, L. A. 1967: The genus *Restrepiella* G. & D. – *Orchid Digest* **31**: 38-40.
- & Dunsterville, G. C. K. 1966: *Restrepiella* Garay & Dunsterville. – P. 266 in: Dunsterville, G. C. K. & Garay, L. A., Venezuelan orchids illustrated **4**. – London.
- Lindley, J. 1838: *Pleurothallis ophiocephala* Lindl. – Edwards's Bot. Reg. **24**: Misc.: 34.
- Luer, C. A. 1986: Icones pleurothallidarum I. Systematics of the *Pleurothallidinae* (*Orchidaceae*). – Monogr. Syst. Bot. Missouri Bot. Gard. **15**.
- 1991: Icones pleurothallidarum VIII. Systematics of *Lepanthopsis*, *Octomeria* subgenus *Pleurothallopsis*, *Restrepiella*, *Restrepiopsis*, *Salpistele* and *Teagueia*. Addenda to *Platytele*, *Porroglossum* and *Scaphosepalum*. – Monogr. Syst. Bot. Missouri Bot. Gard. **39**.
- McNeill, J., Barrie, F. R., Burdet, H. M., Demoulin, V., Hawksworth, D. L., Marhold, K., Nicolson, D. H., Prado, J., Silva, P. C., Skog, J. E., Wiersema, J. H., Turland, N. J. (ed. & compilers) 2006: International Code of Botanical Nomenclature (Vienna Code, 2006) adopted by the Seventeenth International Botanical Congress Vienna, Austria, July 2005. – *Regnum. Veg.* **146**.
- Mora-Retana, D. E. & Atwood, J. T. 1992: *Restrepiella ophiocephala* (Lindley) Garay & Dunsterville. – *Icon. Pl. Trop.* **15**: sub pl. 1488.
- Pridgeon, A. M. 1981: Absorbing trichomes in the *Pleurothallidinae* (*Orchidaceae*). – *Amer. J. Bot.* **68**: 64-71. [[CrossRef](#)]
- 1982: Diagnostic anatomical characters in the *Pleurothallidinae* (*Orchidaceae*). – *Amer. J. Bot.* **69**: 921-938. [[CrossRef](#)]
- 2005: *Restrepiella*. – Pp. 398-400 in: Pridgeon, A. M., Cribb, P. J., Chase, M. W. & Rasmussen, F. N. (ed.), Genera orchidacearum 4. *Epidendroideae* (part one). – New York.
- & Chase, M. W. 2001: A phylogenetic reclassification of *Pleurothallidinae* (*Orchidaceae*). – *Lindleyana* **16**: 235-271.
- , Solano, R. & Chase, M. W. 2001: Phylogenetic relationships in *Pleurothallidinae* (*Orchidaceae*): combined evidence from nuclear and plastid DNA sequences. – *Amer. J. Bot.* **88**: 2286-2308. [[CrossRef](#)]
- Neyland, R., Urbatsch, L. E. & Pridgeon, A. M. 1995: A phylogenetic analysis of subtribe *Pleurothallidinae*. – *Bot. J. Linn. Soc.* **117**: 13-28. [[CrossRef](#)]
- Solano Gómez, R. 2005: Artificial key to the genera of *Pleurothallidinae*. – Pp. 325-328 in: Pridgeon, A. M., Cribb, P. J., Chase, M. W. & Rasmussen, F. N. (ed.), Genera orchidacearum 4. *Epidendroideae* (part one). – New York.

Sheehan, T. & Sheehan, M. 1998: Orchid genera illustrated: 181. *Restrepiella*. – *Orchids* **67**: 258-259.

Addresses of the authors:

Franco Pupulin, Jardín Botánico Lankester, Universidad de Costa Rica. P.O. Box 1031-7050 Cartago, Costa Rica, CA; Research Associate, Harvard University Herbaria, Harvard University, Cambridge, MA, U.S.A. and Marie Selby Botanical Gardens, Sarasota, Florida, U.S.A.; e-mail: fpupulin@cariari.ucr.ac.cr

Diego Bogarín, Jardín Botánico Lankester, Universidad de Costa Rica. P.O. Box 1031-7050 Cartago, Costa Rica, CA; e-mail: dbogarin@cariari.ucr.ac.cr