

THE UPSIDE-DOWN *PLEUROTHALLIS* (ORCHIDACEAE) OF MESOAMERICA, WITH A NEW SPECIES FROM COSTA RICA⁵

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ABSTRACT: A new species of *Pleurothallis* from the premontane forest of Costa Rica is described and illustrated as *Pleurothallis bogarinii* Pupulin & J.D. Zúñiga. This species is similar to *P. scaphipetala* Luer, but is distinguished by its narrowly elliptic leaves, the ovate synsepal, the smaller, slightly concave petals and the deeply cymbiform-navicular lip.

BOTH THE ONGOING work by Carlyle A. Luer, mostly based on the comparison of morphological features (Luer 1986a, 1986b, 1989, 1994, 1998a, 1998b, 1999, 2000, 2004a, 2004b, 2005), and the recent molecular studies intended to reconstruct the phylogeny of the Pleurothallidinae (Pridgeon et al., 2001; Pridgeon and Chase, 2001, 2002), unequivocally show that the genus *Pleurothallis sensu lato* is grossly polyphyletic. In recent years, a broad agreement has been reached among botanists about the necessity to divide *Pleurothallis s.l.* into several genera on the basis of morphological characters and comparison of DNA sequences. However, the circumscription of the core group of *Pleurothallis* is still subject to an intense debate, and no accord has been reached so far about the taxa to be included in *Pleurothallis sensu stricto*. Pridgeon and Chase (2001, 2002) favor a broad circumscription of *Pleurothallis*, while Szlachetko and Margonska (2001) and Szlachetko and Kulak (2006) transferred most of the *Pleurothallis* previously assigned to the section *Macrophyllae-Fasciculate* Lindl. (1859) to the genus *Zosterophyllanthos* Szlach. & Margonska. In his recent revision of this section, Luer (2005) adopted for the group the old name of *Acronia*, which was originally proposed by Carl Presl in 1827 and typified by *A. phalangifera*, reducing *Zosterophyllanthos* to synonymy with *Acronia*.

Nevertheless, it is interesting to note that in their papers dealing with the systematics of the Pleurothallidine, Szlachetko and Margonska (2001) and Szlachetko and Kulak (2006) did not transfer to *Zosterophyllanthos* a small group

of *Pleurothallis* close to *P. excavata* Schltr. (*Acronia sensu* Luer), characterized by an elliptic leaf, cuneate at the base and nonresupinate flowers. This small assemblage of species is easily recognized by the relatively constant floral morphology and the vegetative architecture, and in this paper we refer to them as *Pleurothallis* (in the broad sense). The group, eminently Central American in distribution, includes five described species, namely *P. aurita* C. Sweinf. (Fig. 1), *P. bitumida* Luer (Fig. 2), *P. dorotheae* Luer, *P. excavata* (Fig. 3) and *P. scaphipetala* Luer (Fig. 4) (Pupulin, 2002; Dressler, 2003). The center of distribution of this group is probably in Costa Rica, where most of the taxa occur on the Caribbean slopes of the Central Volcanic and Tilarán mountain ranges at elevations of 300–1,600 m (1,000–5,250 feet). *Pleurothallis excavata* also occurs in the provinces of Chiriquí and Coclé in Panamá.

While most of the species in this group are rather uniform in flower morphology and color (i.e., *P. aurita*, *P. bitumida*, *P. scaphipetala* and the species described herein as *P. bogarinii*), others exhibit substantial variation in the color of the perianth. *Pleurothallis dorotheae*, named in honor of Dorothy Lankester, the daughter of the great British orchidologist naturalized in Costa Rica, is noteworthy in presenting, intermixed in the same populations, flowers of a yellowish-green phase, others of a dull red-purple, and a rarer and more attractive form with cream background color vividly spotted and blotched with purple (Figs. 5–7, page 692).

During the revision of this group of *Pleurothallis* characterized by small vegetative habit and nonresupinate flowers, we discovered a new species that is described herein.

***Pleurothallis bogarinii* Pupulin & J.D. Zúñiga, sp. nov.**

TYPE: Costa Rica. Limón: Pococí: San José-Limón Highway, ca. Km 49, on steep hills on the left of the road, 10

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Fig. 1. *Pleurothallis aurita* is easy to recognize by the narrow lateral sepals and the synsepal reflexed at the apex. This specimen was originally collected in southern Costa Rica, along the trail to Cerro Pelón, at an elevation of 1,640 m (5,380 feet) (Pupulin *et al.* 2347, JBL-Spirit). All photographs by Franco Pupulin.



Fig. 2. *Pleurothallis bitumida* is the smallest member of the group. This specimen was collected on the lower Caribbean slopes of the Central Volcanic range, close to the Braulio Carrillo National Park (Bogarín & Pupulin 875, JBL-Spirit).



Fig. 3. One of the rarest members of the group, *P. excavata* was the first species to be described by Schlechter in 1923.



Fig. 4. Carlyle A. Luer, MD, described *P. scaphipetala* in 1996 on the basis of a plant grown in the collection of Jardín Botánico Lankester. This photograph is from the original plant on which Luer based his description, still living in Lankester Garden's greenhouses (Luer 17371, JBL-Spirit).

11°38'N 83°54'27"W, 450-520 m. Tropical wet transition to wet premontane wet forest, epiphytic on primary forest edge and scattered trees in pastures, 9 July 2004. *F. Pupulin* 5285 & *D. Bogarín* (holotype, CR!: isotype, JBL-Spirit).

Species Pleurothallidi scaphipetalae Luer similis, foliis anguste ellipticis, synsepalo ovato, petalis minoribus laevibus concavis et labello profunde cymbiformi-navicularis recedit.

Plant epiphytic, caespitose-repent, up to 10 cm tall. Roots glabrous, flexuous, 0.5–1.0 mm in diameter. Stem erect, filiform, 3.5–4.5 cm long, unifoliate at the apex, covered below the middle with a tubular, obliquely slightly dilated at the apex, minutely five-nerved, scabridrusculus, persistent, papyraceous sheath. Leaf sessile, narrowly elliptic, cuneate at the base, acute, emarginate, minutely apiculate abaxially,



Fig. 5. *Pleurothallis dorotheae* is one of the more variable species in the group, with flowers varying from pure greenish-yellow to dull red-purple to cream color blotched with purple, as in this specimen collected along the southeastern slopes of the Tenorio Volcano in Guanacaste, Costa Rica, at about 100 m (320 feet) elevation (D. Bogarín et al. 2406, JBL-Spirit).



Fig. 6. A dull red form of *P. dorotheae*, collected at the same locality as the plant in Fig. 1 (D. Bogarín et al. 2397, JNL-Spirit). All photographs by Franco Pupulin.

fleshy, decumbent, 5.3–6 cm long, 1.2–1.4 cm wide. Inflorescence a fascicle of successive flowers, subtended by a membranous, prostrate spathe 3 mm long, becoming papyraceous with age. Pedicel cylindrical, ca. 2 mm long. Ovary cylindrical, 3 mm long. Peduncle concealed within the sheath, 4 mm long. Floral bract tubular, tightly concealing the pedicel, ca. 3 mm long. Flower nonresupinate, sepals cream-yellow, finely spotted red-brown and striped red-brown along the veins, petals orange-yellow, lip yellow, striped red-brown along the keels, column yellow. Dorsal sepal ovate, acute, slightly concave, three-veined, 6.5 × 4.8 mm. Synsepal broadly ovate, subacute, strongly concave at the base to form a short mentum, five-veined, 7 × 6 mm. Petals elliptic-obovate, rounded, provided with a short, rounded apicule, distinctly concave toward the apex, one-veined, 2.2 × 1.1 mm. Lip ovate, deeply concave-cymbiform, hinged to the base of the column, obtuse, abruptly apiculate, the apicule incurved, 2.6 × 2.3 mm, provided at the base with two linear-subfalcate, rounded, retrorse lobes; the disc with a pair of low, rounded keels flanking the central cavity, almost converging at apex, slightly thickened toward the base. Column short, stout, 1.8 mm long, 1.5 mm wide at apex, with a short foot, the stigma transverse, the anther apical. (Figs. 8, 9 [page 694], 10–11 [page 695]).

PARATYPE: Costa Rica. Limón: Sarapiquí, Horquetas, Blanco 2421 (JBL-Spirit!).

ETYMOLOGY: Named in honor Diego Bogarín, who participated in the collection of the type specimen.

ECOLOGY: Epiphytic in premontane wet forest, in primary and secondary mature vegetation, at elevation of 400–600 m (1,300–1,950 feet). Flowering occurs from August to December, roughly corresponding to the rainy season.

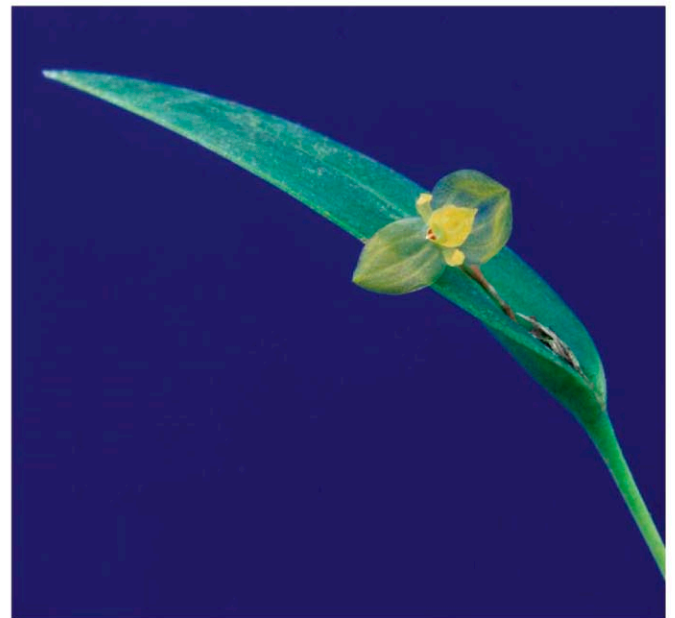
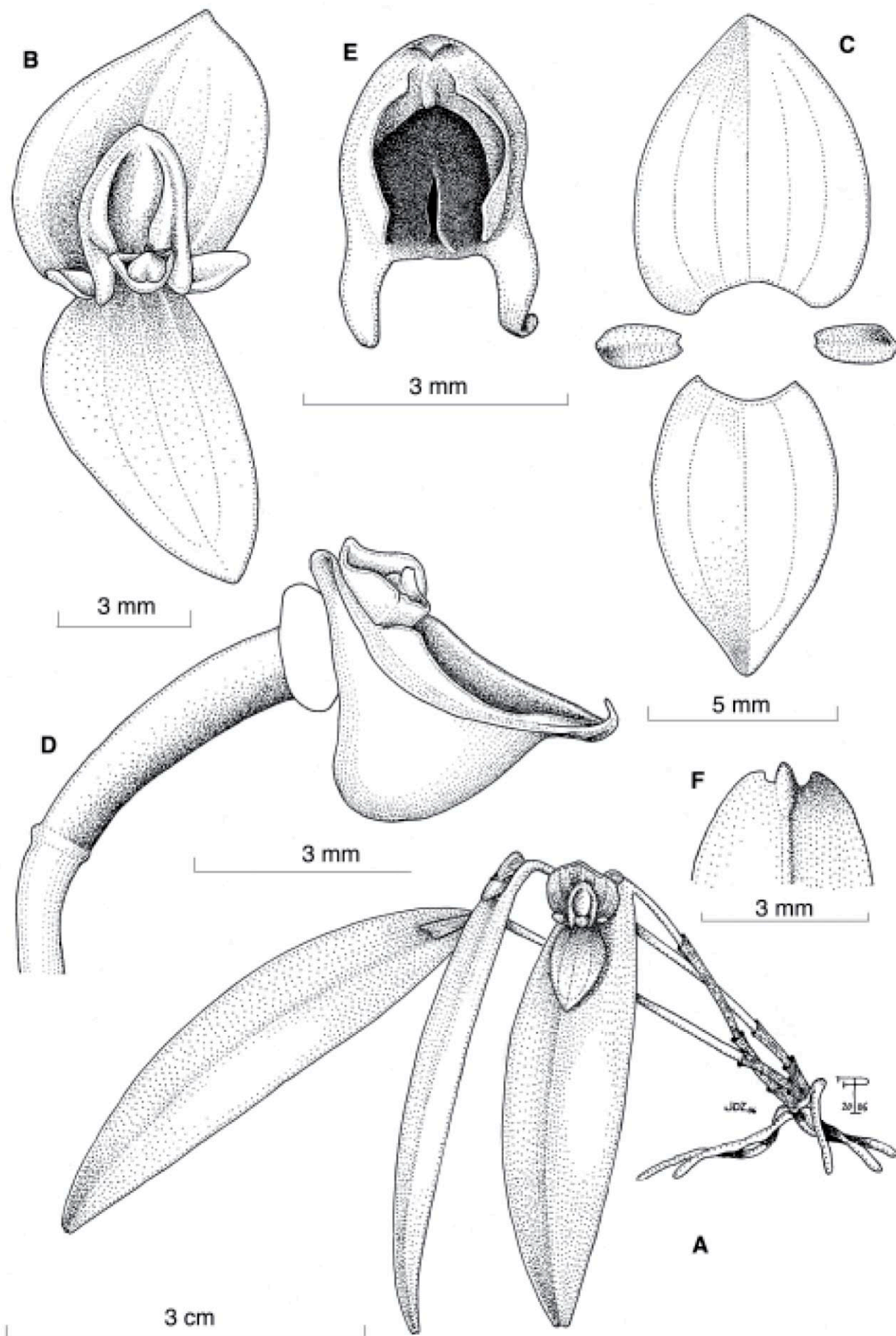


Fig. 7. A yellow phase of *P. dorotheae*, without collecting data, flowered in cultivation at Jardín Botánico Lankester in November 2006 (JBL-02344, Spirit collection).

Fig. 8. (opposite) *Pleurothallis bogarinii* Pupulin & J.D. Zuñiga. A–Habit. B – Flower. C – Dissected perianth. D – Column and lip, lateral view, E – Lip, adaxial view. F – Apex of leaf, abaxial view. Drawn by the authors from the holotype.





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Fig. 9. Photographs of the plant that served as the holotype of *P. bogarinii* (Pupulin & Bogarín 5285, CR, JBL-Spirit), originally collected in 2004 along the highway that connects the capital city of Costa Rica to the port of Limón, at 500 m (1,640 feet) elevation. All photographs by Franco Pupulin.

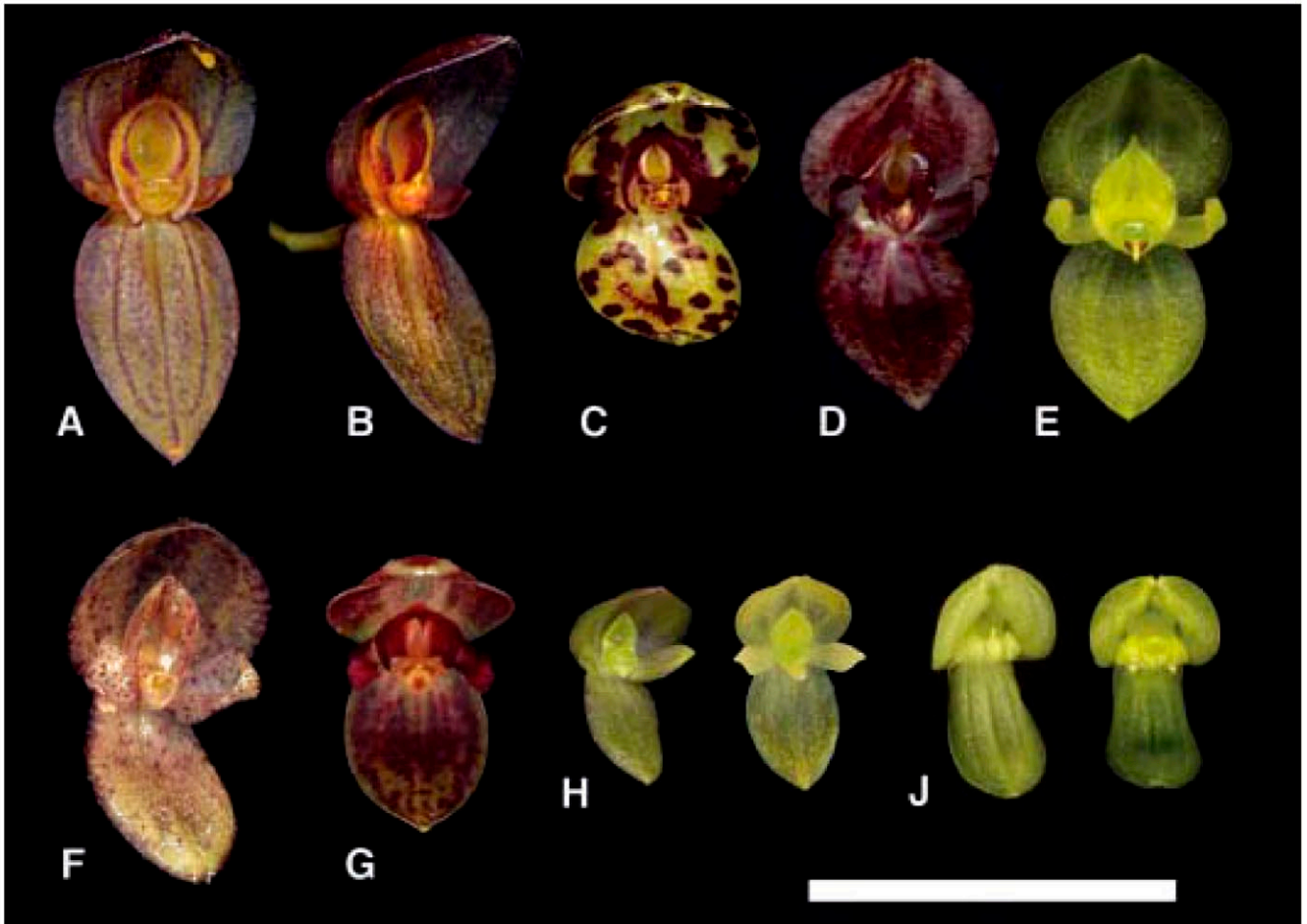


Fig. 11. Comparison of the species of the *Pleurothallis excavata* group. A – *P. bogarinii* (Pupulin 5285). B – *P. bogarinii* (Blanco 2421). C – *P. dorotheae* (Bogarín et al. 2406). D – *P. dorotheae* (Bogarín 2397). E – *P. dorotheae* (JBL-02186). F – *P. scaphipetala* (Luer 17371). G. *P. excavata* (Luer 17357). H – *P. bitumida*, three quarters and frontal views (Bogarín 875). J – *P. aurita*, two views (Pupulin 2347). All the vouchers preserved in the spirit collection of Jardín Botánico Lankester. Scale bar = 1 cm.



Fig. 10. Another specimen of *P. bogarinii*, collected by M. Blanco at Finca Terrafofia, near the Rara Avis reserve, on the Caribbean slopes of the Cordillera Volcánica central at 500 m (1,650 feet) elevation (Blanco et al. 2421, JBL-Spirit).