

A NEW *LEPANTHES* (ORCHIDACEAE: PLEUROTHALLIDINAE) FROM PENÍNSULA DE OSA, PUNTARENAS, COSTA RICA

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Abstract. *Lepanthes* is one of the most species-rich genera of orchids in the Neotropics, with most of the species found in medium to high elevation forests and few species in lowlands. We describe and illustrate *Lepanthes osaensis*, a new species from the very wet lowland forest of Península de Osa, Costa Rica. It is similar to *Lepanthes cuspidata* but differs mostly in the vinous leaves; smaller sepals; the narrower, bilobed petals; and the smaller lip with triangular blades. Notes on its distribution, habitat, flowering, and conservation status, as well as discussion of a taxon with similar morphology, are provided.

Keywords: *Lepanthes cuspidata*, orchid endemism, Pleurothallidinae taxonomy, twig epiphytes, very wet lowland forest

Lepanthes Sw. is one of the most species-rich genera of Pleurothallidinae (Orchidaceae), with over 1200 species from southern Mexico and the Antilles to Bolivia and northern Brazil (Pridgeon, 2005; Luer and Thoerle, 2012; Vieira-Urbe and Moreno, 2019; Bogarín et al., 2020). *Lepanthes* comprises plants with ramicauls enclosed by several infundibular sheaths, named “lepanthiform sheaths,” racemose inflorescences of successive flowers, subsimilar, glabrous sepals, petals wider than long, frequently bilobed with divergent lobes, the lip usually trilobed with the lateral lobes surrounding the column, and the midlobe minute, modified as an appendix, connate at the base of the column (Luer, 2003; Pridgeon, 2005). In Central America, Costa Rica harbors the highest species diversity of *Lepanthes* with 153 spp., followed by Panama with 61 spp. (Luer, 2003; Bogarín et al., 2020). In Costa Rica, about 77% of the species inhabit cloud, premontane, and montane forests between 1000 and 2500 m, whereas only 23% of *Lepanthes* species inhabit forests lower than 1000 m (Luer, 2003; Bogarín and Kisel, 2014; Bogarín et al., 2020). In addition, only four species have been found at lower than 100 m elevation: *Lepanthes confusa* Ames & C. Schweinf., *L. crucitasensis* Chinchilla, M. Cedeño & Bogarín, and *L. truncata* Luer & Dressler, from the Caribbean plains; and only one species from the southern Pacific lowlands, *L. glicensteinii* Luer, from Refugio Nacional de Vida Silvestre Golfito (Luer, 2003; Bogarín et al., 2020).

Recently, two new species of *Lepanthes* were described from the Caribbean of Costa Rica, one occurring in the lowlands (Bogarín et al., 2020). The extremely low diversity of *Lepanthes* (and members of the Pleurothallidinae) in the Pacific lowlands of Costa Rica is not an artifact of undercollecting, as demonstrated by comprehensive orchid inventories in the region (Pupulin, 1998; Weber et al., 2001;

Jiménez and Grayum, 2002; Bogarín and Pupulin, 2007; Rakosy et al., 2013) and the continued long-term fieldwork by the second author (RA). A possible explanation is the marked seasonality between dry and wet seasons from the north toward the central Pacific, contrasting with the prevailing wet conditions in the Caribbean throughout the year (Kohlmann et al., 2002). The most suitable areas for lowland *Lepanthes* in the Pacific are the tropical wet forests from Carara in the central Pacific to Península de Osa and Burica. However, curiously, in very wet lowland forests at the Península de Osa (a region adjacent to Golfito), no *Lepanthes* species has previously been recorded. Nonetheless, this region potentially harbored *Lepanthes* species because of its very humid forests (Luer, 2003).

The Costa Rican lowland humid forests of the southern Pacific continuously reveal new plant species. Most of these new species have been described from Península de Osa: *Chrysophyllum moralesianum* Aguilar, D. Santam. & J.M. Chaves, *Chrysophyllum sierpense* Aguilar, D. Santam. & J.M. Chaves (Sapotaceae), *Epidendrum zunigae* Hágsater, Karremans & Bogarín (Orchidaceae), *Hirtella crusa* Aguilar & D. Santam. (Chrysobalanaceae), *Pentagonia osapinnata* Aguilar, N. Zamora & Hammel (Rubiaceae); it is the first species reported from this family that has opposite, pinnately compound leaves), *Peperomia sierpeana* Callejas (Piperaceae), *Protium aguilarii* D. Santam. (Burseraceae), *Sterculia allenii* E.L. Taylor ex Al. Rodr. & D. Santam. (Malvaceae), *Virola chrysocarpa* D. Santam. & Aguilar (Myristicaceae), among others, demonstrating the need for floristic studies in the region (Bogarín et al., 2008; Hammel, 2015; Santamaría-Aguilar et al., 2016, 2019; Santamaría-Aguilar and Lagomarsino, 2017; Santamaría-Aguilar and Aguilar Fernández, 2017; Callejas Posada, 2020; Rodríguez

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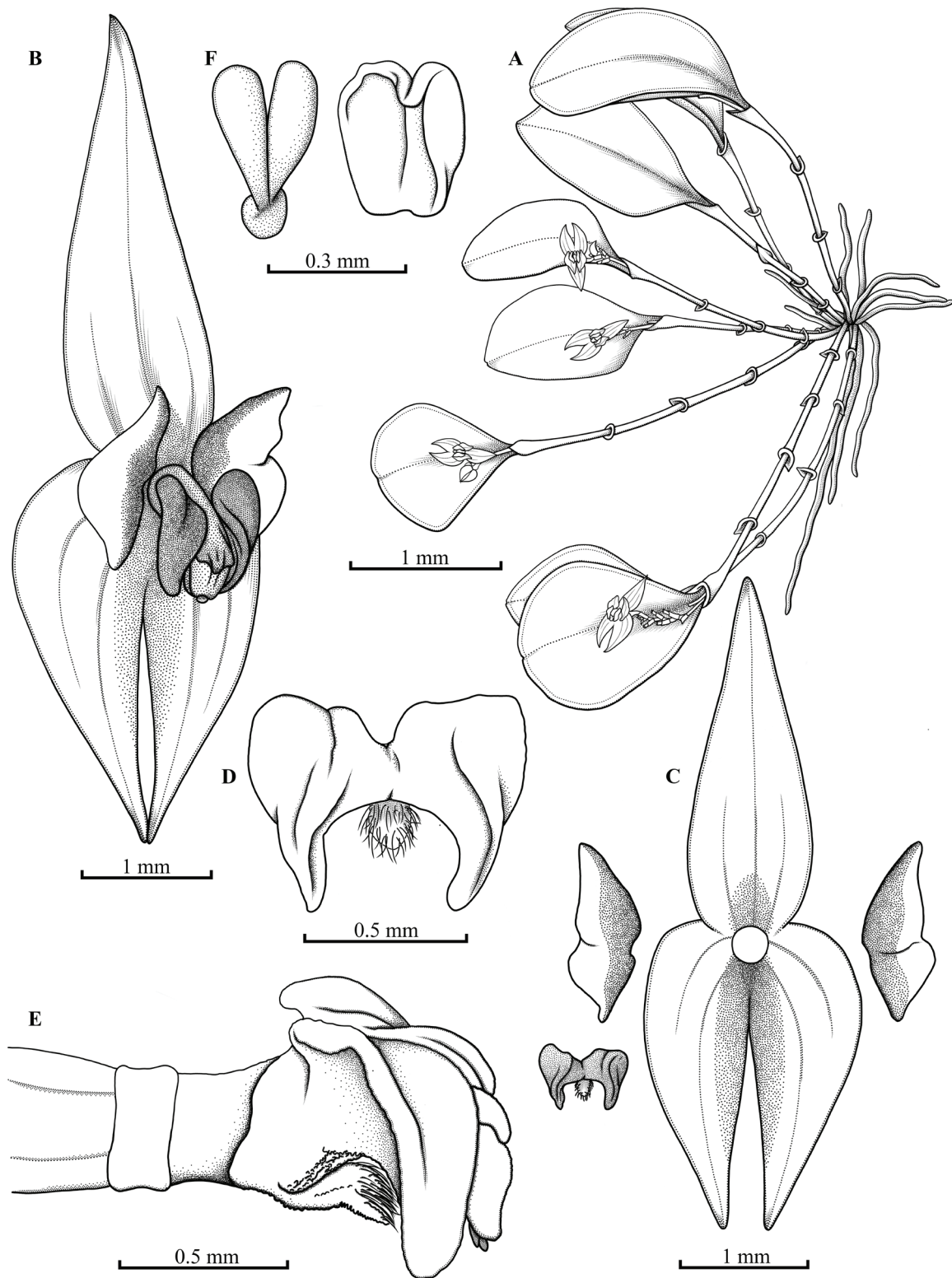


FIGURE 1. **A–F.** *Lepanthes osaensis* Chinchilla, Aguilar and Bogarín. **A,** habit; **B,** flower in natural position; **C,** dissected perianth, flattened; **D,** lip spread, adaxial view; **E,** lip, ovary, and column, lateral view; **F,** pollinarium (left) and anther cap (right). Prepared by I. F. Chinchilla and D. Bogarín from the holotype.

and Santamaría-Aguilar, 2020). In addition, some of these plant species could inhabit areas highly vulnerable to habitat fragmentation and loss (Karremans and Lehmann, 2018; Bogarín, et al., 2020). To update the inventory of the

lowland orchid species of Costa Rica, we propose a new species of *Lepanthes* as a result of the extensive fieldwork in the area. This species is the first record of the genus in Península de Osa.

MATERIALS AND METHODS

This study was based on field collections in Península de Osa in southern Costa Rica. Living plants were documented with photographs and sketches using a Nikon® D7100, and a Leica® MZ 9.5 stereomicroscope with a drawing tube at Jardín Botánico Lankester, Universidad de Costa Rica. The sketches were digitalized and diagrammed in a composite plate using Adobe Photoshop CS6® and digitally inked with the aid of an Apple Pencil® in Procreate application

for iPad Pro® tablet (Apple Inc.). Phenological data were recorded in the field and in cultivation. Georeferences were obtained using a Garmin eTrex Vista GPS. We prepared a map based on a satellite image of the year 2000 from NASA's Jet Propulsion Laboratory, National Imagery and Mapping Agency of the United States. We examined specimens and types at the following herbaria: CR, JBL, K, MO, SEL, US, USJ, and W.

TAXONOMIC TREATMENT

Lepanthes osaensis Chinchilla, Aguilar and Bogarín, *sp. nov.* TYPE: COSTA RICA. Puntarenas: cantón Osa, distrito Sierpe, no estación no sendero a Mogos, a 33 km de Chacarita, entrada de San Luis, fin del camino, antes de llegar a la finca de Luis Mejía, 08°45'00"N, 083°26'05"O, 179 m, 24 abril 2017, *R. Aguilar 16206* (Holotype: JBL [J0571]). Fig. 1, 2B, and 3.

Lepanthes osaensis is distinguished from *L. cuspidata* Luer by the abaxially vinous leaves with the adaxial margin vinous, greenish yellow, the smaller sepals, the narrower, bilobed petals, vinous up to the midbase and apically yellow, and the smaller lip with triangular blades.

Plant epiphytic, caespitose, erect, up to 3.5 cm tall. *Roots* slender, flexuous, up to 3.4 cm long, 0.6 mm in diam.



FIGURE 2. Comparison of flowers in *Lepanthes cuspidata* Luer and *L. osaensis* Chinchilla, Aguilar and Bogarín. **A**, *Lepanthes cuspidata*, oblique view; **B**, *L. osaensis*, oblique and frontal view, and lateral view with the dorsal sepal removed. Photographs: A, by D. Bogarín from *Bogarín 7237* (JBLspirit); B, by I. F. Chinchilla from the holotype, *Aguilar 16206* (JBLspirit).

Ramicauls slender, suberect or erect, 1.0–2.1 cm long, enclosed by 4–5 beige, ciliate, adpressed lepanthiform sheaths, the ostia ciliate, ovate, acuminate. *Leaves* elliptical, coriaceous, papillose, with the adaxial margin vinous, abaxially vinous, stained greenish yellow; obtuse, emarginate, apiculate, 1.0–1.5 × 0.7–1.0 cm, the obtuse base narrowing into a petiole ca. 1.3 mm long. *Inflorescence* racemose, distichous, papillose, successively flowered, extending on abaxial or adaxial surface of the leaf, shorter than the leaves, up to 6.7 mm long, peduncle up to 3.7 mm long, rachis up to 3.5 mm long. *Floral bracts* yellowish green, ovate, acuminate, muricate, 0.6–1.0 mm long. *Pedicels* 0.8–1.4 mm long, persistent. *Ovary* microscopically papillose, 0.70–0.75 mm long. *Flowers* with greenish-yellow, translucent sepals, the petals vinous up to close to midbasal and apically yellow, the lip light fuchsia, the column light fuchsia, abaxially whitish. *Dorsal sepal* lanceolate, acute, abaxially 1-carinate, entire, connate to the lateral sepals for about 0.3 mm, 2.6 × 0.96 mm, 3-nerved. *Lateral sepals* obliquely lanceolate, acute, apically convergent, abaxially 1-carinate, connate for 0.83 mm, 2.2 × 0.85 mm, 2-nerved. *Petals* transversely

bilobed, microscopically papillose, 0.5 × 1.4 mm, the upper lobe obliquely deltate, acute, diverging, 0.85 mm long, the lower lobe, obliquely ovate, acute, diverging, 0.55 mm long. *Lip* bilaminate, adnate to the column base, 0.70 × 0.75 mm, not exceeding the column length, the blades triangular, obtuse to rounded, slightly convergent toward the apex; the connective cuneate, 0.4 × 0.1 mm; the body narrowly oblong, thick, adnate to the column base, 0.16 × 0.10 mm; appendix cylindrical, obtuse, pubescent, 0.1 mm long. *Column* cylindrical, 1.1 mm long; anther apical; stigma ventral. *Pollinia* 2, claviform, 0.32 × 0.10 mm, joined at the base by a rounded viscidium. *Anther cap*, obovate, abaxially concave, 0.34 × 0.30 mm. *Fruit* not seen.

Etymology: the specific epithet refers to the type locality of Osa, and the homonymous Península de Osa, one of the most plant-species-rich regions in the Neotropics. Osa derives from the Cacique Osa, an indigenous Boruca ruler who reigned in most of the territory that comprises the canton of Osa at the time of the Spanish colonization.

Distribution: only known from the type locality in Costa Rica (Fig. 3).

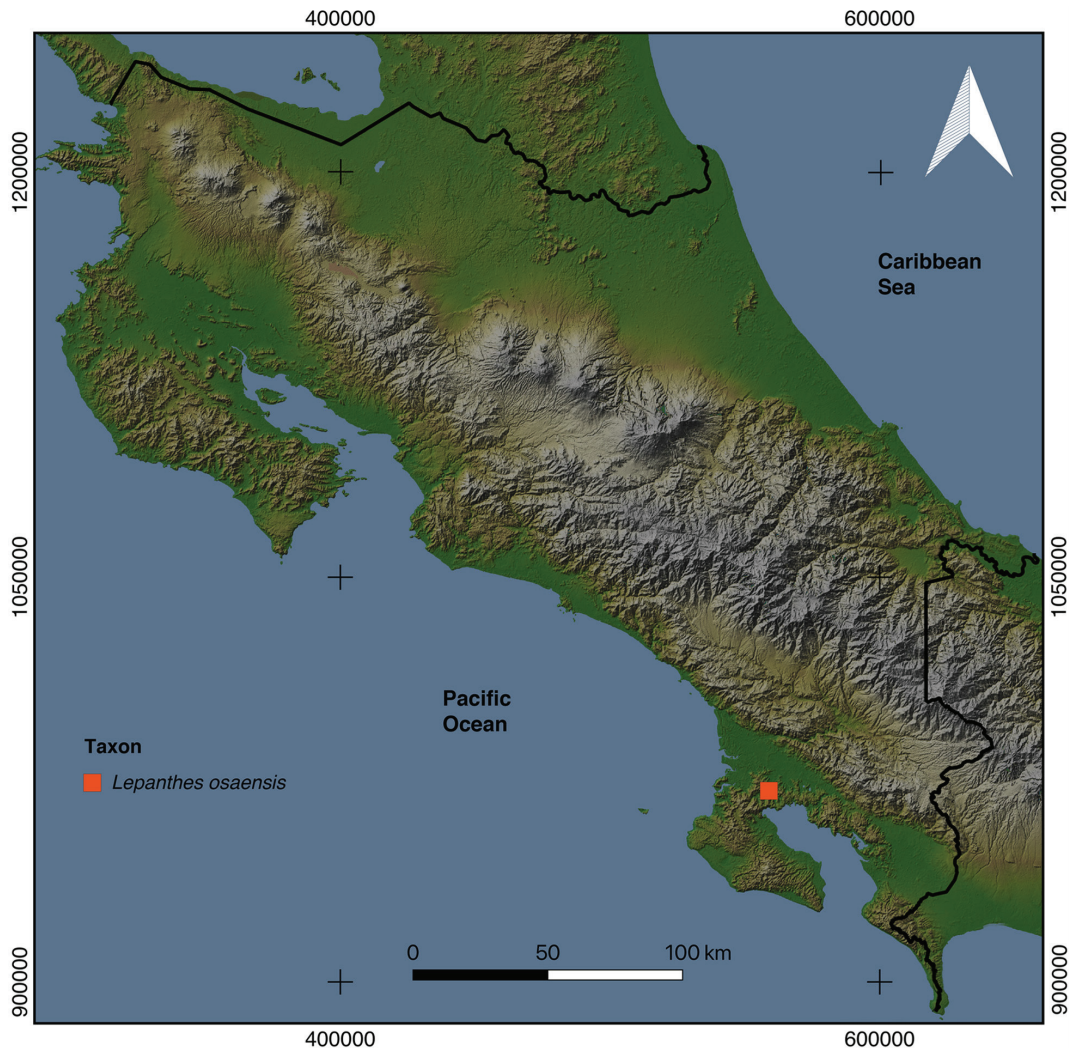


FIGURE 3. Distribution of *Lepanthes osaensis* Chinchilla, Aguilar and Bogarín. Satellite image source: NASA/JPL/NIMA (2000). Prepared by I. F. Chinchilla.

Habitat: plants were found growing as epiphytes on twigs of *Hirtella* L. sp. (Chrysobalanaceae) at around 15–20 m above the ground, in very wet forest on the Reserva Forestal Golfo Dulce, at 129 m elevation. Other common plants in the area are *Copaifera camibar* Poveda, N. Zamora & P.E. Sánchez, *Dialium guianense* (Aubl.) Sandwith, *Peltogyne purpurea* Pittier (Fabaceae), and *Pouteria laevigata* (Mart.) Radlk. (Sapotaceae). Also present are less common species such as *Parkia pendula* (Willd.) Benth. ex Walp. (Fabaceae), *Oenocarpus mapora* H. Karst. (Arecaeae), and *Ruptiliocarpon caracolito* Hammel & N. Zamora (Lepidobotryaceae), as well as epiphytic bromeliads such as *Araeococcus pectinatus* L.B. Sm., *Guzmania lingulata* (L.) Mez, *Tillandsia anceps* G. Lodd., and *Tillandsia monadelpha* (E. Morren) Baker (Bromeliaceae).

Phenology: plants flower in April and May in the field and in cultivation.

Conservation status: data deficient; only a few plants are known from the type locality. It is most probably found in the Parque Nacional Corcovado.

Lepanthes osaensis is morphologically similar to several

Central America species characterized by the small habit (<5 cm tall), elliptical to broadly elliptical leaves, flowers with narrowly ovate-elliptical sepals, transversely bilobed, flabelliform-bilobed petals (often with an apiculus in the sinus), oblong and the bilobed lip with falcate lobes embracing the column and a pyramidal, pubescent appendix. Some of the species sharing these characters are *Lepanthes cuspidata*, *L. excedens* Ames & Correll, *L. empis* Luer, *L. mariposa* Luer, *L. pygmaea* Luer, and *L. volsella* Luer & R. Escobar.

Among them, *Lepanthes osaensis* resembles *L. cuspidata*; however, it differs in the leaves with the adaxial vinous margin, abaxially vinous, stained greenish yellow (vs. green on both surfaces), smaller sepals (2.2–2.6 × 0.85–0.96 mm vs. 3.50–4.85 × 1.25–1.70 mm), the petals vinous up to close to midbase and apically yellow (vs. the upper lobe red, the midlobe and the lower lobe yellow), narrower (1.4 mm vs. 2.0–3.0 mm), bilobed (vs. trilobed, with an obtuse lobule between the lobes), and smaller lip (0.70 × 0.75 mm vs. 0.9–1.0 × 0.90–1.35 mm), with triangular blades (vs. oblong blades) (Fig. 1 and 2).

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