A NEW SPECIES OF *BULBOPHYLLUM* (ORCHIDACEAE) FROM THE ANDEAN REGION OF COLOMBIA

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Abstract. A new species of *Bulbophyllum*, section *Xiphyzusa*, found in the Andean region of Colombia, in the department of Huila, is described and illustrated. The species is discussed in relation to its morphologically similar and closest relatives. Information on its distribution, ecology, and habitat is provided.

Keywords: Huila, section Xiphyzusa, systematics, taxonomy

Resumen. Se describe e ilustran una nueva especie para el género *Bulbophyllum* sección *Xiphyzusa* encontrada en la región andina de Colombia, en el departamento del Huila. La especie se discute con las especies morfológicamente más cercanas y se proporciona información sobre su distribución, ecología y hábitat.

Palabras claves: Huila, sección *Xiphyzusa*, sistematica, taxonomía

Bulbophyllum Thouars (Orchidaceae) is one of the largest genera of angiosperms comprising more than 2200 species of epiphytic, lithophytic, and occasionally terrestrial orchids. These plants are characterized by their unique floral structures, which include a prominent lip and a column that is generally adorned with intricate appendages (Vermeulen et al., 2015). In terms of distribution, *Bulbophyllum* species are found mainly in tropical regions around the world, with the majority located in Southeast Asia, Africa, and South America, with some species present in Australia and the Pacific Islands (Gravendel, 2014, Chase et al., 2015, Naive and Cootes, 2022).

In the Neotropical region, there are around 70 species of *Bulbophyllum*, primarily found in the Andes, the Amazon basin, and the Brazilian Atlantic Forest. Brazil has the highest representation of *Bulbophyllum* with 60 species, most of which are endemic (Smidt et al., 2007, Mancinelli and Smidt, 2012, Santos et al., 2020). In Colombia, only seven species have been reported to date (Ministerio de Ambiente y Desarrollo Sostenible y Universidad Nacional de Colombia, 2015).

The Neotropical section *Xiphizusa* Rchb. f. of *Bulbophyllum* comprises approximately 25 species. Morphologically, it is characterized by having discoid, compressed, aggregated, and small monofoliate pseudobulbs; long inflorescences with a thin rachis and flowers arranged distichously; the lateral sepals fused to form a synsepal in most species; ciliated margins on the petals; a trilobed labellum with erect and occasionally ciliated lateral lobes; a smooth or longitudinally crested disk, which can be thin, slightly thick, or fleshy, sometimes sessile or more commonly constricted in some species; the lamina can be flat or concave, and usually smooth or rarely ciliated on the margin and surface (Borba and Smidt, 2004; Smidt and Borba, 2007)

Here, we describe and illustrate a new species of *Bulbophyllum* in the subsection *Xiphizusa*, found in the department of Huila, Colombia.

Materials and Methods

Field trips were conducted to forest fragments located in the municipality of Tello-Huila between the months of November and December 2022. At the location, a single population of this species was found in its natural habitat. The individuals under study were photographed in detail in order to record each of their morphological characteristics, using a Nikon D5300 camera, accompanied by a NIKKOR AF 105 mm f/2.8 D Macro lens. Additionally, ecological and geographical data of the species were recorded.

The type specimens were prepared by storing vegetative structures on newspaper soaked in 75% ethanol. The floral structures were preserved in a plastic container with glycerol in a concentration of equal parts of glycerin and alcohol. Subsequently, the collected material was dried in an electric oven at 75˚C for 14 hours and entered into the collection of the TOLI Herbarium, Dendrology section of the University of Tolima. The floral structures in glycerol were examined under a Motic Series SMZ 168 Led stereoscope and were deposited and entered into the collection. Finally, to confirm the identity of the new species, online revisions of international herbaria, such as AMES (www.huh.harvard.edu) and KEW (apps.kew.org/herbcat/gotoHomePage.do), and national herbaria, such as TOLI, HPUJ, JBB and COL, were carried out (www.biovirtual.unal.edu.co/es/colecciones/search/plants/colecciones/search/plants/).

We thank Biota Consultancy and Environment, especially its directors and professionals in the Flora component, who participated and accompanied field trips during the project when this species was first collected. We also thank the company Atención Social Integral (ASI) for their participation in the process of finding the species. We thank the Research Seedbed in Ethnobiology for their support and motivation to carry out these studies. Finally, we thank the TOLI Herbarium, directed by Professor Hilda Rocío Mosquera Mosquera, who facilitated access to the collection.

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To illustrate the new species, sketches from living and preserved specimens were digitized, and the images were used for diagramming a draft composite template in Adobe Photoshop® CS6. A digital composite line drawing was then made (lines and stippling) in Procreate illustration application for iPad 6th generation tablet computer (Bogarín et al., 2019), and a composite dissection plate Lankester (LCDP) was created using Adobe Photoshop® CS6.

Taxonomic Treatment

Bulbophyllum parex J.Alvarez-Diaz & J.S.Moreno *sp. nov*.

TYPE: COLOMBIA. Huila, municipality of Tello, road to Sierra la cañada, 1070 m, Dec 10 2022. *J. Alvarez-Diaz & B. Tovar 01* (Holotype: TOLI). Fig. 1–2.

Bulbophyllum parex is morphologically closest to *Bulbophyllum bidentatum* (Barb.Rodr.) Cogn., from which it differs in having lanceolate petals with a ciliate margin (*vs*. ovate-lanceolate petals with a lacerate-ciliate margin), the labellum with slightly ciliate lateral lobes (*vs*. to entire

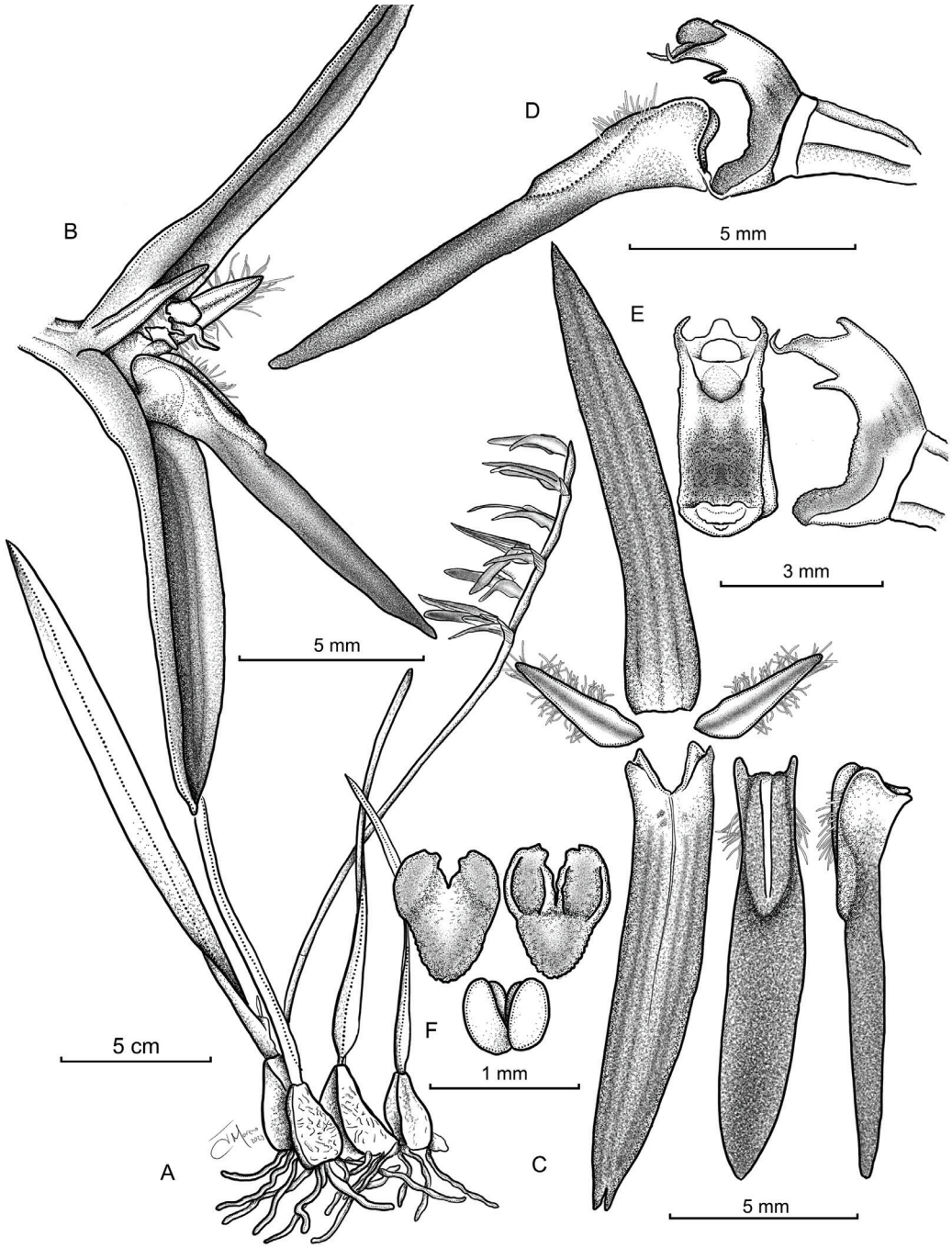

Figure 1. *Bulbophyllum parex* J. Alvarez-Diaz & J.S. Moreno. **A**, Habit; **B**, Flower; **C**, Dissected perianth; **D**, Lip and column lateral view; **E**, Column; **F**, Anther and Pollinia. Illustration by A. J. S. Moreno based on the plant that served as the holotype.

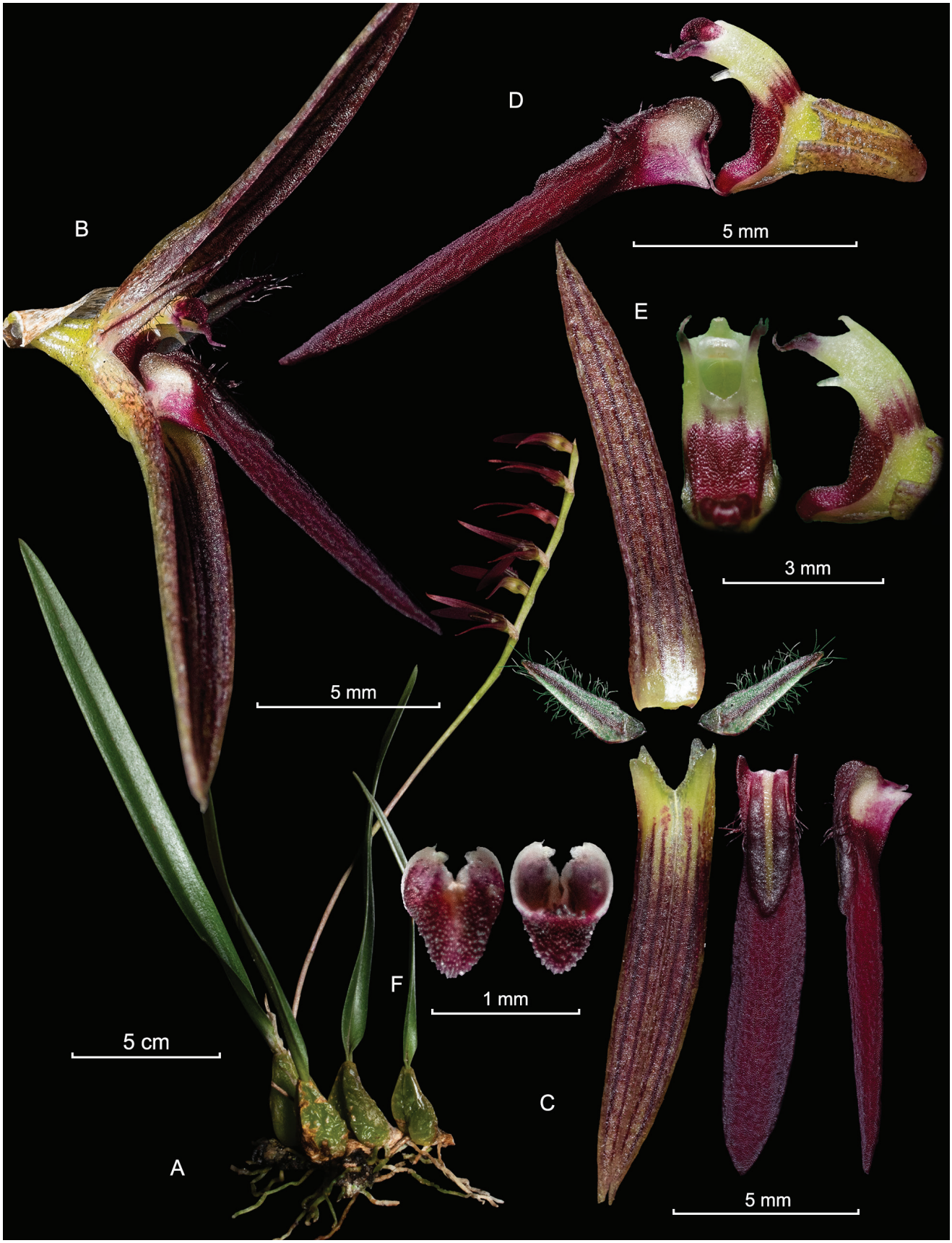

FIGURE 2. *Bulbophyllum parex* J. Alvarez-Diaz & J.S. Moreno. **A**, Habit; **B**, Flower; **C**, Dissected perianth; **D**, Lip and column lateral view; **E**, Column; **F**, Anther. LCDP by M. A. Sierra-Ariza, based on the holotype.

lateral lobes), and the middle lobe oblong-elliptic (vs. linear-ligulate).

Plant epiphytic. *Heteroblastic pseudobulbs* grouped, ovate, rigid, rough, covered by narrow, papery, whitish sheaths, which are lost when the stem matures, unifoliate, 11–16 × 10–12 mm (dry, 10–14 × 8–11 mm). *Leaf* linear-oblong, coriaceous, keeled, with the base conduplicate, acute apex, 5–10.5 × 0.5–0.8 cm. *Inflorescence* a spike, erect to slightly inclined, 12–16 cm long, the rachis not thickened; floral bracts ovate, papery, acute up to 3 mm long. *Flowers* arranged in two columns, intercalated between resupinate and non-resupinate. *Sepals* purple with darker veins, yellowish towards the base, membranous, papillose. *Dorsal sepal* oblong-lanceolate, 3-veined, slightly concave, acute, 14–16 × 2.5–3.0 mm. *Lateral sepals* connate into an oblong-lanceolate synsepal, 7-veined, concave, sagittate at the base, bifid at the apex, 14–16 × 3–4 mm. *Petals* white with purple edges and veins, lanceolate, membranous, ciliate margin, acute, 5–4 × 1.5–2.0 mm. *Lip* dark purple with a white line in the callus, papillose, striated, 10–12 × 2–3 mm, trilobed, small, basal, rounded, oblique side lobes, with slightly ciliate margins, 2–3 mm long, prominent, fleshy, oblong-elliptic mid-lobe, acute, 9–10 mm long; basal callus prominent, fleshy, flat, oblong when viewed from above, 4 × 1.5 mm, sulcate with a central division that extends from the base to near the apex. *Column* white with purple base and apex, slightly curved, semi-terete, flat in the lower part, 4 mm long, with 4 teeth, 2 lateral teeth towards the center, acute, oblique, 2 long apical teeth. Apical stigma, noticeable, rounded. *Anther* purple with white edges, papillose, thickened, ovate, cordate, 1.3 × 1.0 mm. *Pollinia* 2, light yellow, round.

Etymology: The specific epithet, *parex*, is given in gratitude to Parex Resources company, for their financial and logistic support in the process of studying and publishing the new species.

Distribution and ecology: The species was only recorded in a fragment of low secondary vegetation, in a transition from tropical forest to premontane forest, located in the municipality of Tello-Huila, at elevations between 950 and 1150 meters, growing as an epiphyte and lithophyte. As an epiphyte, it was observed inhabiting trees of the genus *Roupala* (Proteaceae) and *Myrsine* (Primulaceae). As a lithophyte, it was growing on large rocks with a high presence of organic matter and lichens (Parmeliaceae) associated with the plant roots (Fig. 3–4).

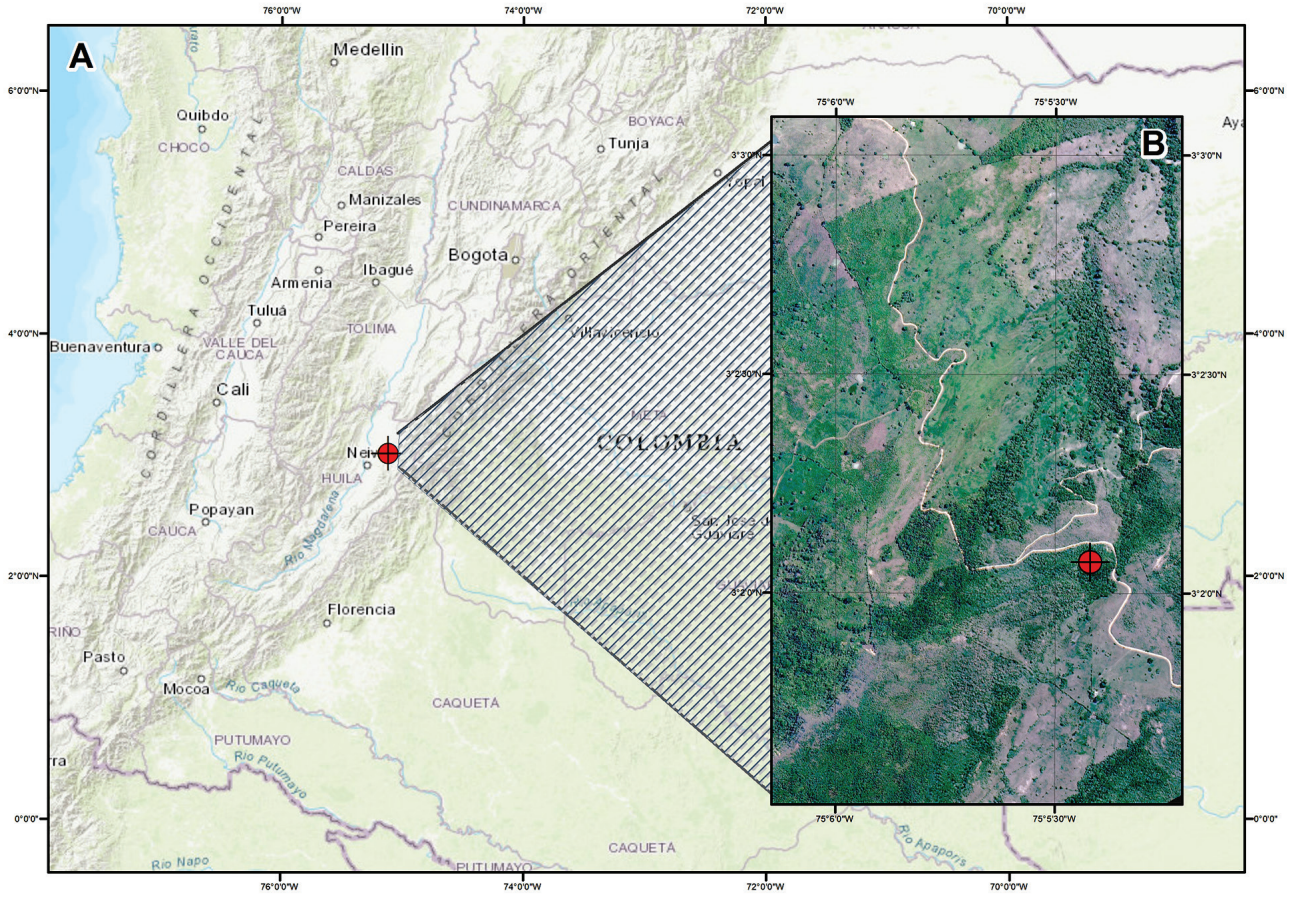

FIGURE 3. Distribution map of *Bulbophyllum parex* J. Alvarez-Diaz & J.S. Moreno. Prepared by J. A. Alvarez-Diaz.

FIGURE 4. In-situ pictures of *Bulbophyllum parex* J. Alvarez-Diaz & J.S. Moreno. **A**, Growing on a rock as a lithophyte; **B**, Growing on a stem as an epiphyte. Prepared by J. A. Alvarez-Diaz.

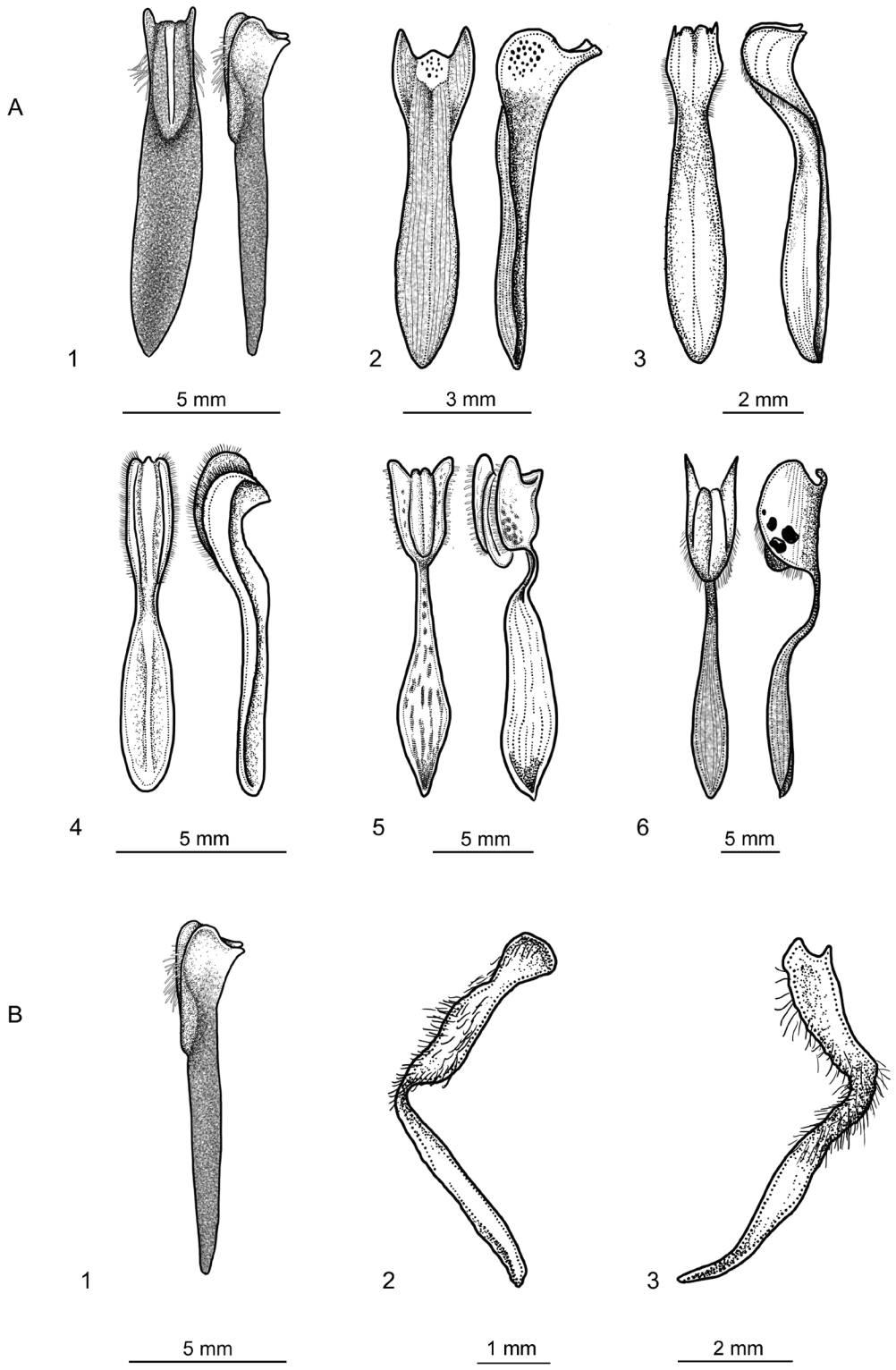

FIGURE 5. **A**, Adaxial and lateral view of the labellum of species of *Bulbophyllum* from South America. **A1**, *Bulbophyllum parex* J. Alvarez-Diaz & J.S. Moreno; **A2**, *B. bidentatum* (Barb.Rodr.) Cogn.; **A3**, *B. gehrtii* E.C. Smidt & Borba; **A4**, *B. filifolium* Borba & E.C. Smidt.; **A5**, *B. weberbauerianum* Kraenzl.; **A6**, *B. plumosum* (Barb.Rodr.) Cogn. **B**. Lateral view of the labellum of species of *Bulbopyllum* from Colombia. **B1**, *B. parex*; **B2**, *B. antioquiense* Kraenzl.; **B3**, *B. lehmannianum* Kraenzl. Redrawn by A. J. S. Moreno: A1 and B1 based on the Holotype (TOLI); A2 on Cogniaux (1902, t. 1188-II); A3–4 on Borba and Smidt (2004) and Smidt and Borba (2009), respectively; A5 on a drawing by F. Hammer (see Holotype: Ames [00106060]); A6 on Cogniaux (1902: t. 118-I); and B2–3 on drawings by F. Hammer (See Isotype: Ames [00000508] and *Lehmann 7274*, AMES [00000390], respectively).

Conservation status: Data Deficient (DD). *Bulbophyllum parex* is currently only known from the locality where the type specimen was found, where few individuals are observed. Therefore, further field efforts are necessary to assess its current conservation status.

The species morphologically most similar to *Bulbophyllum parex* are *Bulbophyllum bidentatum* (Barb. Rodr.) Cogn., *Bulbophyllum filifolium* Borba & E.C. Smidt, *Bulbophyllum gehrtii* E.C.Smidt & Borba, and *Bulbophyllum plumosum* (Barb.Rodr.) Cogn, which are endemic to Brazil. However, it differs from them by having a lip with slightly ciliated lateral lobes and a fleshy, oblong-elliptic, acute mid-lobe. *Bulbophyllum bidentatum* is distinguished by having a lip with entire lateral lobes, a slightly fleshy mid-lobe, and a linear-ligulate, obtuse apex. *Bulbophyllum filifolium* is characterized by having mid-lobes with the margin densely covered with short cilia, a fleshy, linear-elliptic mid-lobe with an adaxial longitudinal crest, and a rounded apex. *Bulbophyllum gehrtii* has a lip with pubescent lateral lobes in the distal half, a concave, lanceolate central lobe with a constricted base, and an acute apex. *Bulbophyllum plumosum* is characterized by having a lip with glabrous lateral lobes, a slightly fleshy, linear-ligulate mid-lobe with a slightly constricted base and obtuse apex. In Colombia, this new species could be similar to *Bulbophyllum antioquiense* Kraenzl. and *Bulbophyllum lehmannianum* Kraenzl. *B. antioquiense* is distinguished by having a lip with long cilia on the lateral lobes and a linear mid-lobe with cilia at the base. *B. lehmannianum* is distinguished by having a lip with separated cilia on the lateral lobes and a linear-lanceolate median lobe with a pilose base and an acute apex. The new species also resembles *Bulbophyllum weberbauerianum* Kraenzl., but this species only inhabits Bolivia and Peru, and is characterized by having a lip with fimbriated lateral lobes and a median lobe tapered at the base and lanceolate towards the apex (Fig. 5).

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