 doi: http://dx.doi.org/10.15517/zzdx7h51

A NEW SPECIES OF *PLEUROTHALLIS* (PLEUROTHALLIDINAE) FROM THE *P. TALPINARIA* COMPLEX, WITH NOTES ON COMPARATIVE FLORAL MORPHOLOGY AND POLLINATION ECOLOGY

Mario Alexei Sierra-Ariza[1,2,3,7], Jose Armando Alvarez-Diaz[4], Fernando Tinoco[5] & Mark Wilson [6]

[1]Jardín Botánico Alejandro von Humboldt, Universidad del Tolima, Cl. 42 #1, Ibagué, Tolima, Colombia.

[2]Estudiante de Maestría en Ciencias Biológicas, Departamento Biología, Facultad de Ciencias, Universidad del Tolima, Cl. 42 #1, Ibagué, Tolima, Colombia.

[3]Grupo de Investigación Schultes, Fundación Ecotonos, Carrera 72 #13ª-56, Cali, Colombia.

[4]Grupo de Investigación en Genética, Biotecnología Vegetal y Microbiana (GEBIUT), Universidad del Tolima, 730006299, Ibagué, Colombia.

[5]Grupo de Investigación en Biodiversidad y Dinámica de Ecosistemas Tropicales, Universidad del Tolima, 730006299, Ibagué, Colombia.

[6]Department of Organismal Biology and Ecology, Colorado College, Colorado Springs, CO 80903, U.S.A.

[7]Author for correspondence: mrsierraariza80@gmail.com

Abstract. A new species of *Pleurothallis* subgenus *Talpinaria*, discovered in the department of Tolima, Central Andes of Colombia, is described, illustrated, and discussed. The new species, *Pleurothallis vallejoi* is compared with *P. talpinaria* from Colombia and Venezuela, *P. trimeroglossa* from Peru and Ecuador, *P. jostii*, presumed to occur in Ecuador, and *P. gracilicolumna* from Colombia. The new species is distinguished from the previous ones by a lip with subquadrate lateral lobes, with narrowly elliptical basal auricles, and a callus that is elongated, thin, and slightly elevated, with the median lobe occupying almost half of the total lip length. Additionally, the pollination mechanism of the *P. talpinaria* complex is described and discussed.

Resumen. Se describe, ilustra y discute una nueva especie de *Pleurothallis* subgénero *Talpinaria*, descubierta en el departamento del Tolima, en los Andes Centrales de Colombia. La nueva especie se compara con *Pleurothallis talpinaria* de Colombia y Venezuela, *P. trimeroglossa* de Perú y Ecuador, *P. jostii*, presumiblemente presente en Ecuador, y *P. gracilicolumna* de Colombia. La nueva especie se distingue de las anteriores por su labelo con lóbulos laterales subcuadrados, con aurículas basales estrechamente elípticas y un callo alargado, delgado y ligeramente elevado, con el lóbulo medio ocupando casi la mitad de la longitud total del labelo. Además, se describe y discute el mecanismo de polinización del complejo *P. talpinaria*.

Keywords / Palabras clave: Andean orchids, Diptera, orquídeas andinas, *Pleurothallis gracilicolumna*, *Pleurothallis jostii*, *Pleurothallis talpinaria*, *Pleurothallis trimeroglossa*, *Sylvicola*

Introduction. *Pleurothallis* R.Br. is a neotropical genus widely distributed from southern Mexico to South America, including the Antilles (Ackerman *et al.*, 2014). It is the fourth most diverse genus within the subtribe Pleurothallidinae, preceded by *Lepanthes* Sw., *Stelis* Sw., and *Masdevallia* Ruiz & Pav. (Karremans, 2016; Karremans & Vieira-Uribe, 2020). Currently, the diversity of the genus exceeds 550 species with the inclusion of recently published new species (Damián-Parizaca *et al.*, 2025; Moreno *et al.*, 2023; Pupulin *et al.*, 2021; Sierra-Ariza, 2023, 2024; Sierra-Ariza *et al.*, 2022; Wilson *et al.*, 2022). Colombia stands out as the country with the highest number of species recorded in the genus, with 247 documented species (Karremans *et al.*, 2023).

ORCID of the Author: MASA, JAAD, FT, MW
Received 5 May 2025; accepted for publication 26 August 2025. First published online: 15 October 2025.

Pleurothallis subgen. *Talpinaria* is morphologically characterized by a petiolate leaf and a single successive flower produced subapically, emerging from the annulus located very close to the apex of the stem, with a conspicuous spathaceous bract near the apex of the ramicaul. The dorsal sepals are ovate and free from the lateral sepals, which are fully connate into an ovate synsepal, dorsal sepal and synsepal appear to be similar to each other in shape and size, and petals are narrowly acute (Luer, 1998).

The first known species of this subgenus was described in 1859 by the German botanist Gustav Karl Wilhelm Hermann Karsten as *Talpinaria bivalvis* H.Karst., based on a collection from the Eastern Cordillera of Colombia. However, the name *T. bivalvis* did not last long. In 1886, Heinrich Gustav Reichenbach transferred the species to the genus *Pleurothallis*, renaming it *Pleurothallis talpinaria* Rchb.f., due the previous existence of *Pleurothallis bivalvis* Lindl.

In 1921, Friedrich Richard Rudolf Schlechter described the second species in this subgenus, *Pleurothallis trimeroglossa* Schltr., based on a collection made by Weberbauer near Huancayo, Junín, Peru (Schlechter, 1921). Although Schlechter did not compare it with *P. talpinaria*, later Schweinfurth (1942) and Luer (1998) concluded that both entities belonged to the same species. It is believed that the holotype of *P. trimeroglossa* was destroyed in Berlin during World War II. Fortunately, before its destruction, Gordon Dillon drew the lip and column of the type in great detail, and the drawing was deposited in the AMES Herbarium at Harvard University, allowing for future morphological analysis. The name *P. trimeroglossa* was ultimately accepted as a distinct species by Wilson *et al.* (2017).

During the reorganization of the genus *Pleurothallis*, Luer (1986) established the subgenus *Talpinaria*, designating *P. talpinaria* as the type species. He also included *P. hitchcockii* Ames, *P. punctulata* Rolfe, and *P. sandemanii* Luer in this subgenus. Although this author noted that the flowers of the subgenus differ significantly from each other, leading to an uneasy alliance, Luer (2004) reinstated the genus *Talpinaria* for these four species.

Phylogenetic studies, such as those conducted by Pridgeon, Solano & Chase (2001), as well as by Wilson *et al.* (2011, 2013), confirmed that *P. talpinaria* belongs to a clade within *Pleurothallis*, supporting Reichenbach's transfer of *T. bivalvis* to *Pleurothallis*. These studies also clarify that subgenus *Talpinaria* is polyphyletic, corroborating Luer's previous observations of the uneasy morphological alliances within the subgenus and confirming the morphological diversity noted by Luer.

Wilson *et al.* (2017) described a third species related to *P. talpinaria*, named *P. jostii* Mark Wilson & J.Portilla. A year later, Wilson (2018) described a fourth species, *P. gracilicolumna* Mark Wilson, which added significant morphological complexity to this group.

Despite the accumulated knowledge about the morphology and systematics of *Pleurothallis*, little is known about its reproductive ecology. Specifically, pollination in species of *Pleurothallis sensu stricto* remains poorly understood, with most available records limited to observations of floral visitors without conclusive evidence of pollination. Dipterans, particularly from the family Drosophilidae, have been frequently reported as visitors to these flowers (Pridgeon, 2005). A fly of the genus *Lycoria* Meigen (Sciaridae) was observed transporting pollinia of *Pleurothallis monocardia* Rchb.f.; visits of Drosophilidae to *Pleurothallis xanthochlora* Rchb.f. were also recorded, although without evidence of pollination (Dodson, 1962). A species of *Drosophila* Fallén was identified as an effective pollinator of *Pleurothallis ruscifolia* (Jacq.) R.Br. and *Pleurothallis eumecocaulon* Schltr. (Dodson, 1965).

Additionally, a high diversity of dipteran visitors has been documented in species of the genus, including representatives from Bibionidae, Drosophilidae, Empididae, Mycetophilidae, Sciaridae, and Tachinidae; beetles (Curculionidae, Chrysomelidae) carrying pollinia have also been observed, as well as wasps (Vespidae, Braconidae) visiting flowers of *Pleurothallis* sp. (Duque, 1993). Furthermore, phenomena such as autogamy in *P. ruscifolia* (Catling, 1990) and cleistogamy in *Pleurothallis cleistogama* Luer have been documented. A more recent well-documented case is that of *Pleurothallis helleri* A.D.Hawkes, which attracts various arthropods (flies, beetles, butterflies, and even spiders), but only the tiny flies of the family Ceratopogonidae have been identified as effective pollinators (Karremans, 2023). Regarding *Pleurothallis* subgen. *Talpinaria* no reports have been found concerning its pollinators or even floral visitors.

The following describes, illustrates, and discusses a new species of the genus *Pleurothallis* subgen. *Talpinaria*, from the Central Andes of Colombia. It is morphologically compared with *P. gracilicolumna* from Colombia, *P. jostii* presumably from Ecuador, *P. talpinaria* from Colombia and Venezuela, and *P. trimeroglossa* from Peru and Ecuador. The pollination mechanism within the *P. talpinaria* complex is also described and discussed.

Materials and methods. *Plant material, taxonomic and morphological comparisons.*— Between 2019 and 2024, several expeditions were carried out in the municipality of Ibagué, Tolima, where the new species was discovered. During these explorations, various populations of the species were identified in their natural environment. The specimens were photographed to document their morphological characteristics, using a D5300 camera with a NIKKOR AF 105mm f/2.8 D Micro lens.

The specimens were preserved in newspaper soaked with 75% ethanol, and the floral structures were stored in a 50% glycerol mixture (equal parts glycerin and 70% alcohol). The collected material was dried in an electric oven at 75°C for 14 h and then incorporated into the TOLI Herbarium collection. The floral structures were analyzed under a Motic SMZ 168 Led stereoscope.

To verify the identity of the new species, the available literature on the genus was reviewed (Luer, 1988, 2005; Wilson, 2018; Wilson *et al.*, 2017). Additionally, specimens were examined online from the AMES Herbarium (Harvard University, 2025) and KEW Herbarium (The Kew Data Portal, 2025), as well as from the national herbaria TOLI, HPUJ, JBB, and COL (www.biovirtual.unal.edu.co/es/colecciones/búsqueda/plantas/). Lankester composite digital plates (LCDP) were created using Adobe Photoshop® 2024 (25.3.1), where the vegetative and reproductive characteristics of each species were illustrated, showing the floral structures from different views in order to highlight their diagnostic features, thus facilitating comparison and delimitation among the studied taxa.

Scanning electron microscopy of lip.— Recently opened flowers of species of the *P. talpinaria* complex (*P. talpinaria*, *P. gracilicolumna, P. jostii* and *P.* cf. *trimeroglossa*) were harvested from plants in the Colorado College living collection. Lips of the flowers were removed by excision from the column base and preserved in Kew Mix (Wilson *et al.*, 2016). Flowers were prepared for and examined by scanning electron microscopy using methods described previously (Wilson *et al.*, 2016, 2018).

Taxonomic treatment

Pleurothallis vallejoi Sierra-Ariza, J. Alvarez-Diaz & Mark Wilson, ***sp. nov.*** (Fig. 1).

TYPE: COLOMBIA. Tolima: Municipio de Ibagué, corregimiento San Juan de La China, 2048 m. 10 March 2024, *M.A. Sierra-Ariza, J. Alvarez-Diaz & Fernando Tinoco 491* (Holotype: TOLI).

Diagnosis: *P. vallejoi* is morphologically most similar to *P. trimeroglossa* (Fig. 2), from which it differs in the sub-quadrate lateral lobes of the lip, 1.7–2.0 × 1.2–1.5 mm (*vs*. transversely oblong, 1.8–2.1 × 1.1–1.3 mm), basal auricles that are narrowly elliptical, 1.7–2.0 × 0.6–0.8 mm (*vs*. narrowly oblong, 2.0–2.3 × 0.4–0.6 mm), a callus that is elongated, thin, slightly elevated, and inconspicuous (*vs*. dome-shaped, flattened, and notably visible), and a median lobe of 4.1–4.3 mm long (*vs*. 4.8–5.1 mm).

Epiphytic, caespitose *herb*, suberect to inclined, small, to 18 cm tall. *Roots* slender, 1.2 mm in diameter. *Ramicauls* reddish, 4.0–9.5 cm long, with a tubular sheath in the middle zone or in the lower third and two other sheaths at the base, papyraceous, fibrous, light brown. *Leaf* light green, cuneate, coriaceous to fleshy, oblong-lanceolate, acute, 5.4–8.0 × 1.2–16.0 cm, the base cuneate, older leaves glaucous and waxy. *Inflorescence* a fascicle of successive flowers, with generally one flower open at a time, erect, enclosed at the base by a spathaceous bract, conduplicate, fibrous, oblong, *ca*. 12 mm long; peduncle terete, green, 8 mm long; floral bract tubular, papyraceous, acute, 3 mm long. *Ovary* pale pink spotted with purple, papillate, pedicellate, cylindrical, longitudinal sulcate, curved, 9 mm long. *Flowers* resupinate; *sepals* pale pink with light purple spots on adaxial side and pink with brown spots on abaxial side, membranaceous, papillate, concave, 7-veined. *Dorsal sepal* ovate, rounded, 9.5–12.0

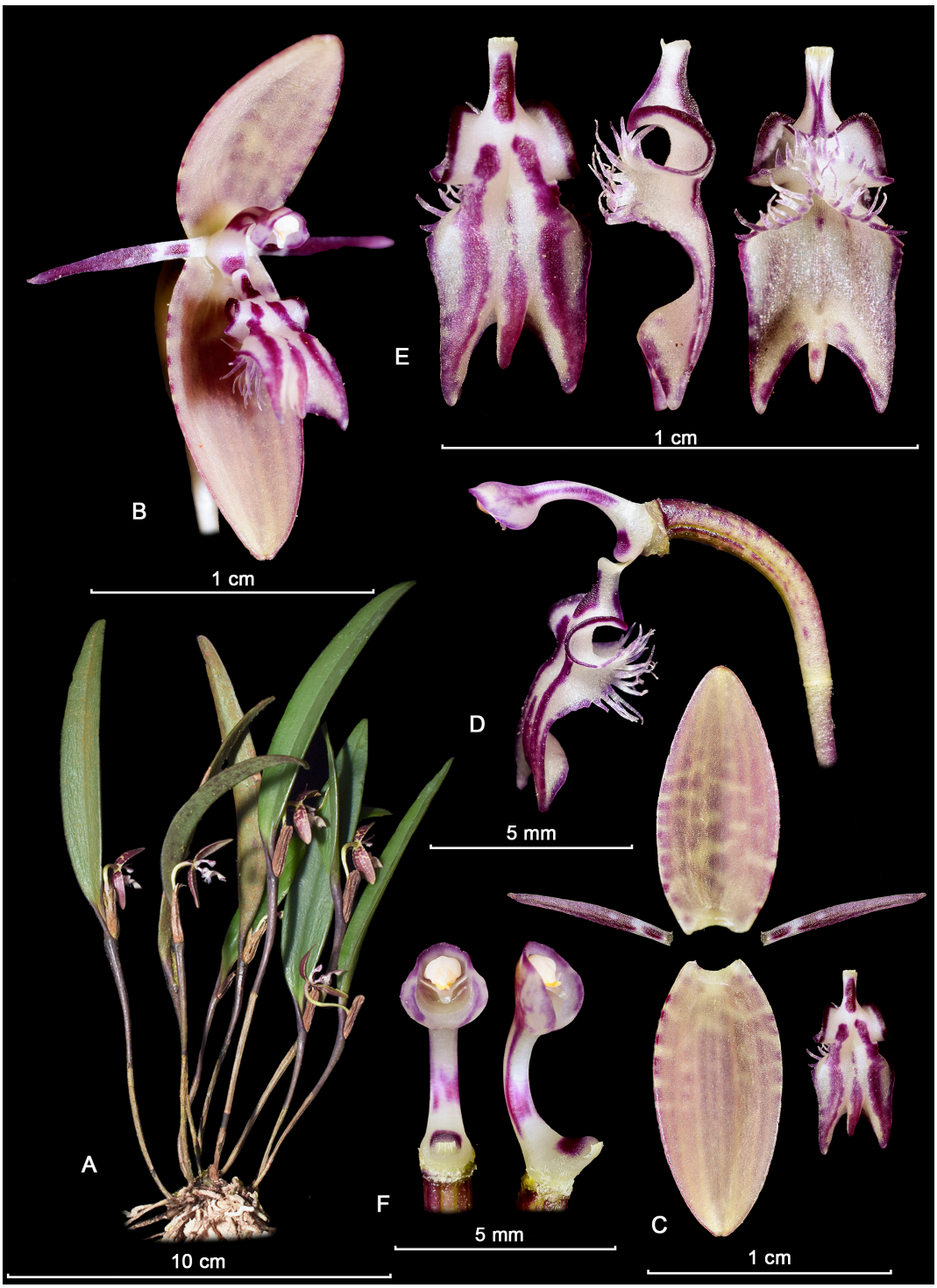

FIGURE 1. Lankester composite digital plate of *Pleurothallis vallejoi*. **A**. Habit. **B**. Flower. **C**. Dissected perianth. **D**. Lip and column lateral view. **E**. Lip. **F**. Column. LCDP by M. A. Sierra-Ariza based on *M.A. Sierra-Ariza, J. Alvarez-Diaz & Fernando Tinoco 491* (Holotipo: TOLI).

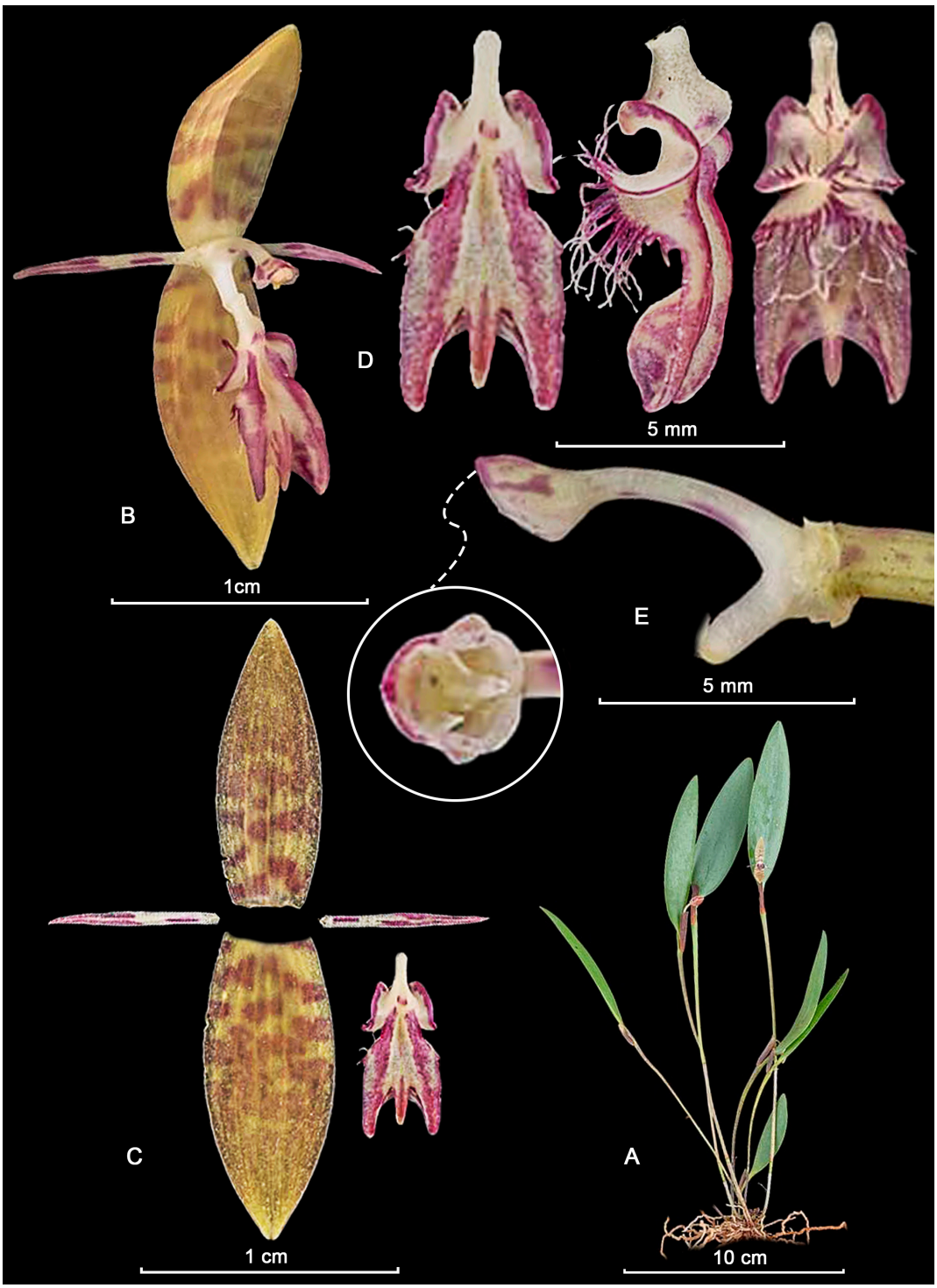

Figure 2. Lankester composite digital plate of *Pleurothallis trimeroglossa*. **A**. Habit. **B**. Flower. **C**. Dissected perianth. **D**. Lip. **E**. Column. Photographs by A. Goicochea. LCDP by M. A. Sierra-Ariza.

× 5.0–6.5 mm. *Lateral sepals* connate into a lanceolate, bifid synsepal, 9.5–13.0 × 5–6 mm. *Petals* deep purple, whitish at the base, fleshy, linear, acuminate, slightly oblique, papillose, 7–9 × 0.7–0.9 mm, 1–veined. *Lip* white with purple spots, protuberant, trilobed, 7.2–8.0 × 3.0–3.5 mm; prolonged base, oblong, 1.0–1.3 × 0.5–0.7 mm; subquadrate, revolute, fimbriated lateral lobes, 1.7–2.0 × 1.2–1.5 mm, forming two basal auricles, narrowly elliptical when viewed from above, 1.7–2.0 × 0.6–0.8 mm; with a callus located at the intersection of the base and the lateral lobes, elongated, thin, and slightly elevated, almost imperceptible to the naked eye, at the insertion of the lateral lobes and the middle lobe, a waist of 2.0–2.5 mm in width is formed, where a median sulcus of moderate depth is located; middle lobe tridentate, teeth separated, lateral teeth longer than the central, subtriangular, straight, rounded, 1.7–2.0 × 0.8–1.0 mm, middle tooth oblong, rounded, 1.0–1.3 × 0.3–0.5 mm. *Column* white spotted purple, slender, terete, arching, strongly dilated at the apex, 6.5–7.2 × 1.8–2.2 mm, pronounced column foot, 1.2 mm long. *Anther* cap white, subapical, rounded, papillose, 1.0–1.3 mm. *Pollinia* 2, yellow, rounded. *Capsule* not seen.

Eponymy: Named in honor of Dr. Gustavo Adolfo Vallejo, a distinguished researcher from Tolima, recently recognized as a member of the *Academia Colombiana de Ciencias Exactas, Físicas y Naturales*, the first from that university to receive such distinction. This dedication highlights his significant contributions to tropical parasitology, particularly in identifying American trypanosomes affecting vulnerable populations, as well as his commitment to training new researchers and his lasting human and scientific legacy.

Additional specimen examined: COLOMBIA. Tolima: Municipio de Ibagué, corregimiento San Juan de La China, 2070 m. 10 March 2024, *J. Alvarez-Diaz, Fernando Tinoco* & *M.A. Sierra-Ariza 21* (JBB).

Phenology: The species exhibits continuous flowering throughout the year, with peak records between February and September. However, this cycle is influenced by climatic variables, with flowering being more frequent during rainy seasons and in areas with higher light exposure.

Distribution, Habitat and Ecology: The new species has been recorded in the Andes, on the eastern slope of the Central Cordillera, in various localities in the department of Tolima, mainly in the mountains surrounding the city of Ibagué. Its habitat is located in the transition zone between premontane and lower montane forests, at elevations ranging from 1800 to 2200 m. The ecosystem where it grows is subject to strong human intervention, which has reduced the natural areas to small fragments of forest and secondary vegetation, with a landscape dominated by open areas and pastures. In these zones, land use is mainly devoted to agricultural crops and livestock activities.

The species shows tolerance to environmental changes within its ecological niche, establishing itself along roadsides and forest fragments, where it occurs in the lower vertical strata and on the lower branches of trees. Most individuals were found on hosts with fissured bark, with principal phorophytes including species of the genera *Weinmannia* L. (Cunoniaceae), *Ladenbergia* Klotzsch (Rubiaceae), *Vismia* Vand. (Hypericaceae), and, to a lesser extent, some species of Lauraceae.

In addition, it is worth noting that the flowers of this species exhibit intraspecific color variation, with shades ranging from creamy white to light yellow, and with spots varying from light purple to red.

Conservation status: Data Deficient (DD). So far, *Pleurothallis vallejoi* has only been recorded in some forest remnants in the municipality of Ibagué, Tolima, Colombia. The area where it grows is highly degraded due to changes in land use for livestock and agricultural crops. Given the level of disturbance in its habitat and the low number of observed individuals, it is recommended to assess the conservation status of the species based on an evaluation of habitat availability and quality, as well the study of its known populations.

Discussion. *Taxonomy.— Pleurothallis vallejoi* (Fig. 1) belongs to the *P. talpinaria* complex, together with *P. trimeroglossa* (Fig. 2), *P. jostii* (Fig. 3), *P. talpinaria* (Fig. 4), and *P. gracilicolumna* (Fig. 5), but is distinguished by its narrowly elliptic auricles of intermediate size and subquadrate lateral lobes. The middle lobe is comparatively shorter than in allied species, while the lateral teeth are conspicuously longer than the cen-

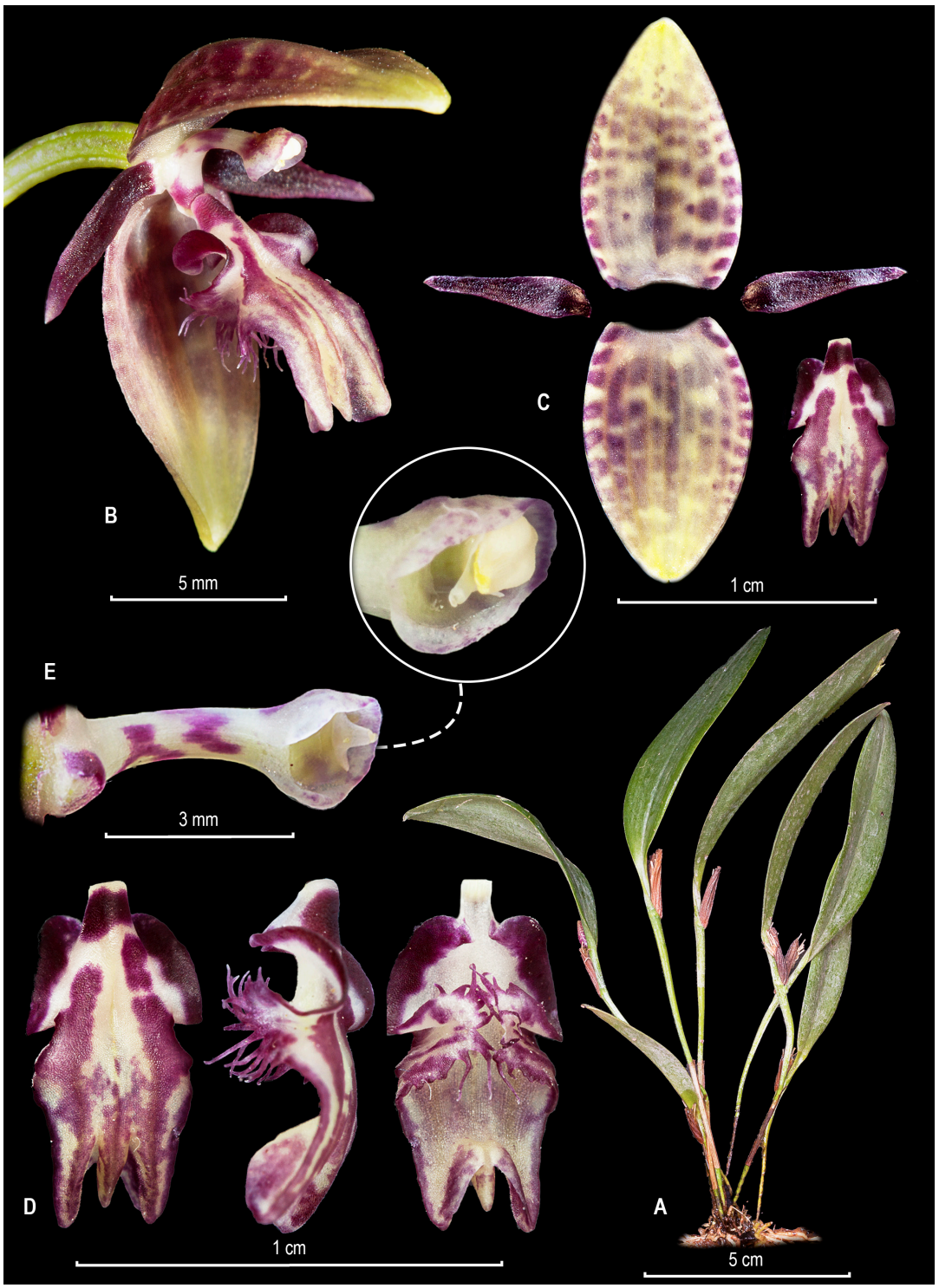

Figure 3. Lankester composite digital plate of *Pleurothallis jostii*. **A**. Habit. **B**. Flower. **C**. Dissected perianth. **D**. Lip. **E**. Column. Photographs by M. Wilson. LCDP by M. A. Sierra-Ariza.

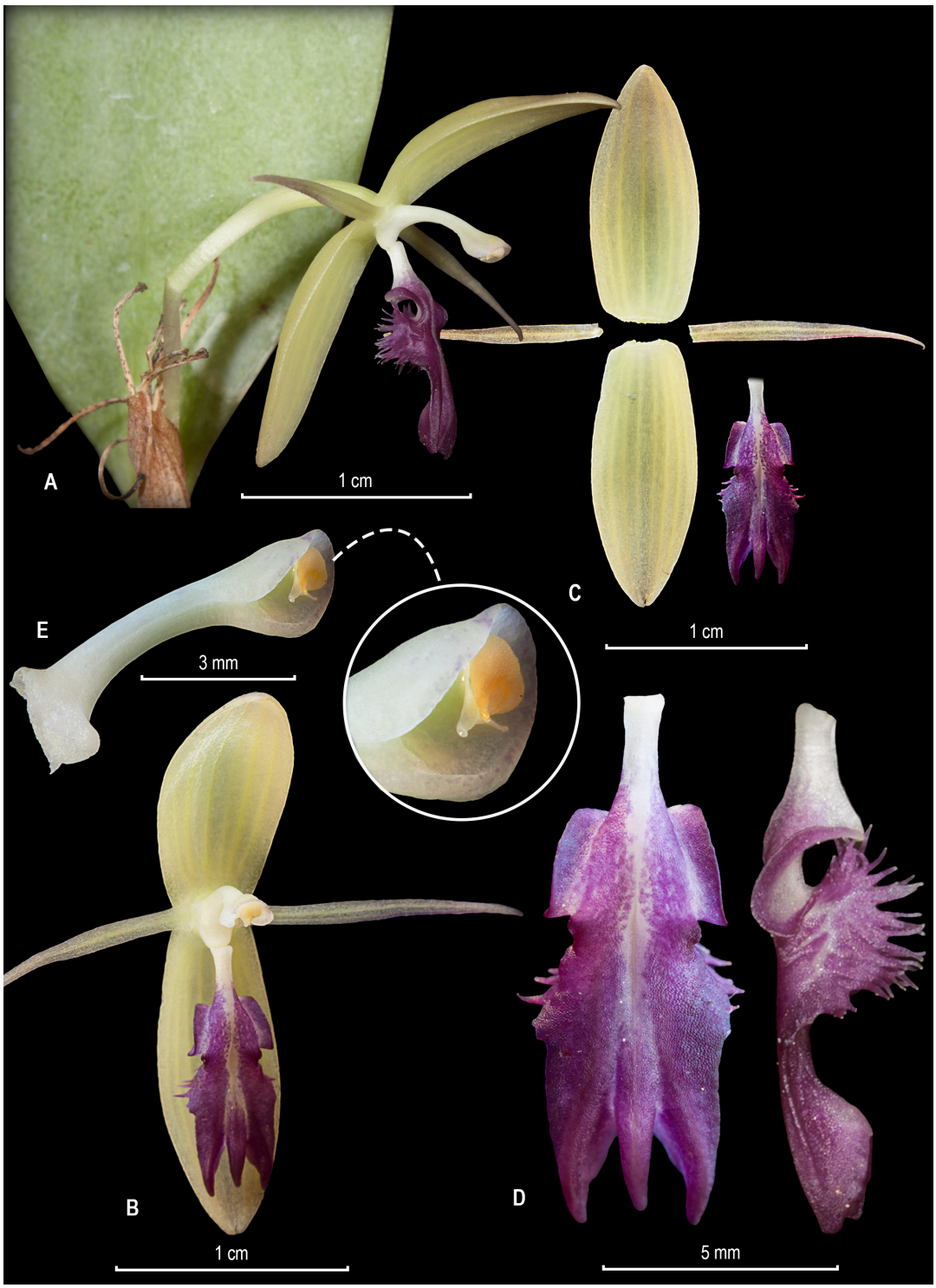

FIGURE 4. Lankester composite digital plate of *Pleurothallis talpinaria*. **A**. Flower, ovary, pedicel, and spathaceous bract. **B**. Flower. **C**. Dissected perianth. **D**. Lip. **E**. Column. Photographs by M. Wilson. LCDP by M. A. Sierra-Ariza.

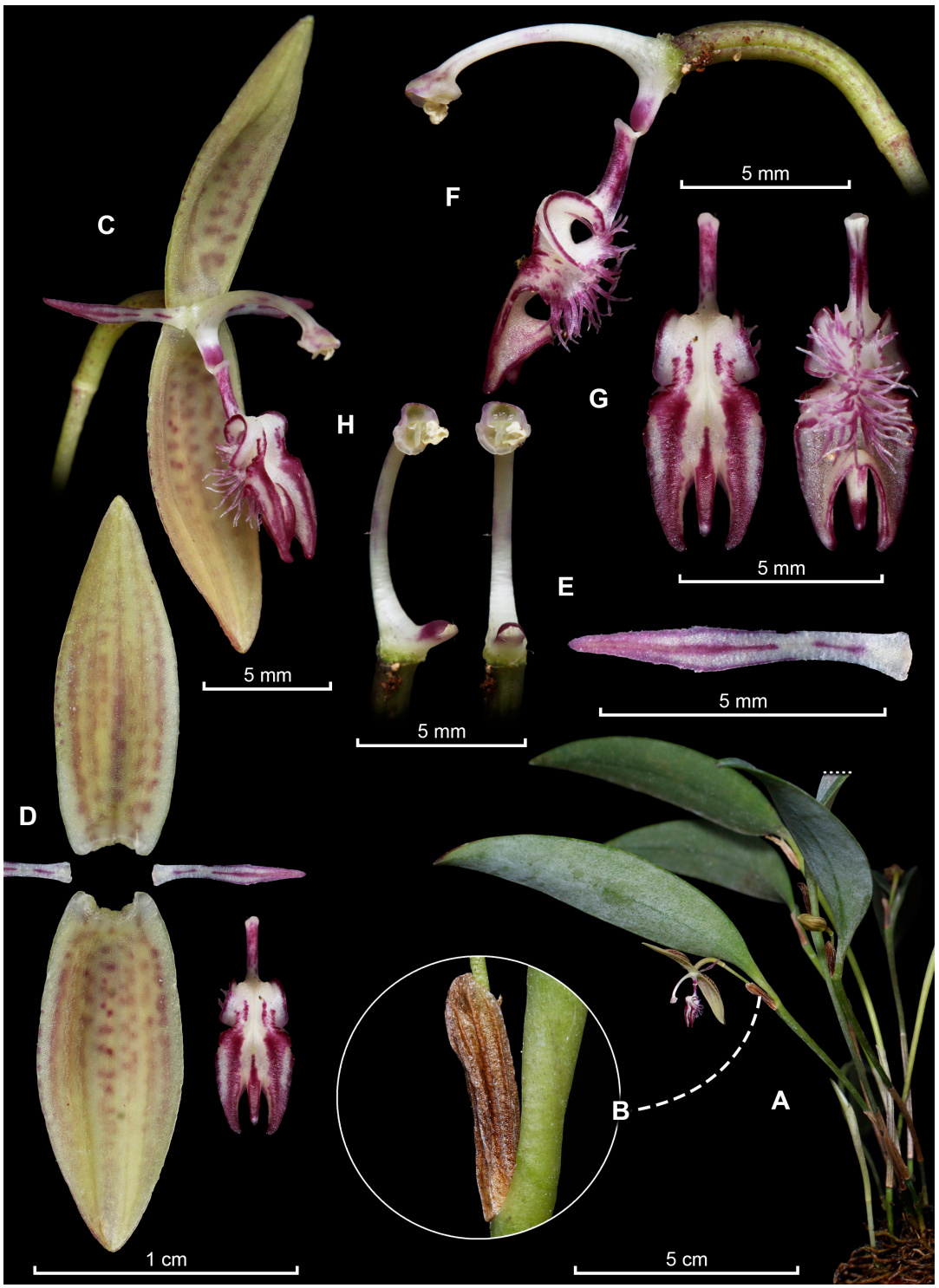

Figure 5. Lankester composite digital plate of *Pleurothallis gracilicolumna*. **A**. Habit. **B**. Spathaceous bract. **C**. Flower. **D**. Dissected perianth. **E**. Petal. **F**. Lip and column, lateral view. **G**. Lip. **H**. Column. LCDP by E. Restrepo.

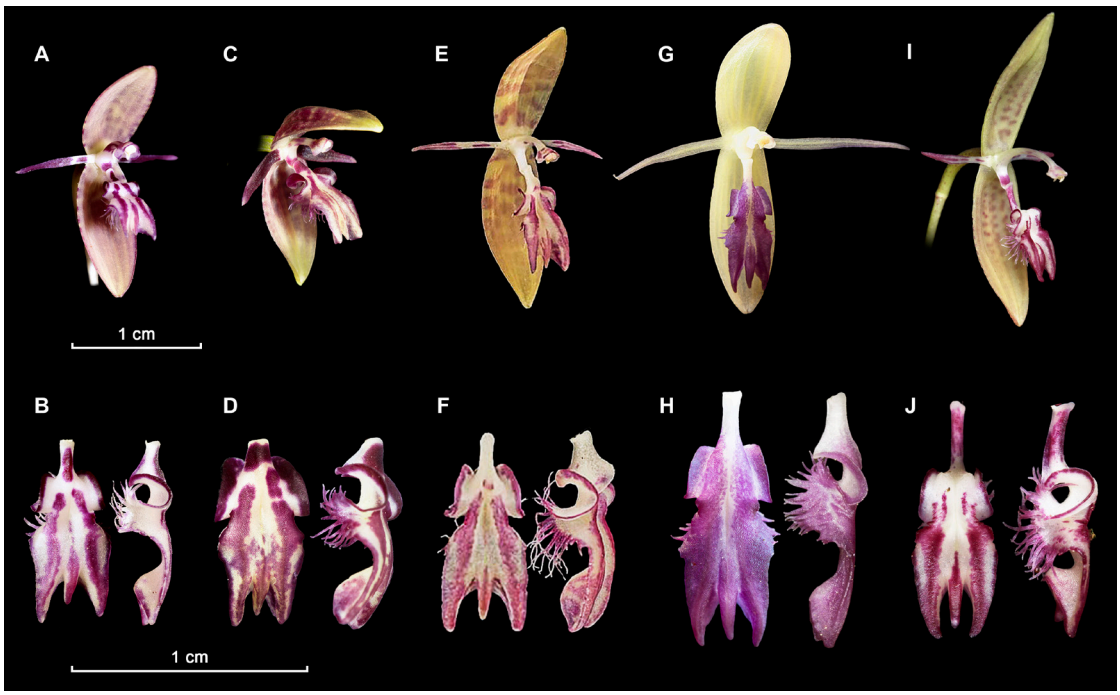

FIGURE 6. Comparison between flowers and labella of species belonging to the *Pleurothallis talpinaria* complex: *Pleurothallis vallejoi* (A, B), *Pleurothallis jostii* (C, D), *Pleurothallis trimeroglossa* (E, F), *Pleurothallis talpinaria* (G, H), and *Pleurothallis gracilicolumna* (I, J). Photographs by M. A. Sierra-Ariza (A, B), M. Wilson (C, D, G, H), A. Goicochea (E, F), and E. Restrepo (I, J). Plate by M. A. Sierra-Ariza and E. Restrepo.

tral one. The callus is minute, elongated, and barely perceptible, contrasting with the conspicuous dome-shaped or crest-like calli of related taxa, or its absence. Differentiating the members of this complex requires detailed analysis of lip morphology, particularly the shape and relative proportions of each part, which in some cases can be recognized by the percentage they occupy relative to the total lip length (Fig. 6, Table 1).

Ecology.— Relatively little is known about pollination in *Pleurothallis* (Table 1 in Karremans & Díaz-Morales, 2019) and nothing at all so far about pollination in subgenus *Talpinaria*. Notably, the labellum of the species in the *P. talpinaria* species complex lack a glenion, so prominent in other groups such as *Pleurothallis* subsection *Macrophyllae-Fasciculatae*, that is hypothesized to provide a nectar-like reward, resulting in correct positioning of the pollinator below the column during pollinarium acquisition and subsequent deposition (Wilson *et al.*, 2016, 2018).

Neither has any nectar-like reward ever been observed by the authors on the lips of these species, either *in situ* or under cultivated conditions. Understanding that secretion may occur *in situ* under certain conditions, but has not yet been seen, the lip of four species was examined by scanning electron microscopy to determine whether any cellular differentiation typical of secretory tissue could be observed (Fig. 7). Of the four species examined, *P. talpinaria*, *P. gracilicolumna*, *P. jostii* and *P.* cf. *trimeroglossa*, there was no discernible cellular differentiation on the adaxial surfaces. Preliminarily we conclude, therefore, that species in the *P. talpinaria* species complex are non-rewarding and are probably deceit pollinated (Karremans, 2023; Karremans & Díaz-Morales, 2019).

In addition to the lack of a glenion, any observed nectar-like secretions, or any cellular differentiation on the adaxial surface of the labellum indicating potential for secretion, the most unusual characteristic of the labellum of the *P. talpinaria* species complex is that it is motile. The labellum of most *Pleurothallis* species is hinged at the attachment to the column base and, for example, in some species of subsection *Macrophyllae-Fasciculatae* Luer (2005), may

Table 1. Morphometric comparison and distribution of the *P. talpinaria* complex species. Measurements are given in milimeters (mm), based on the holotype, Wilson *et al.* (2017), and Wilson (2018).

	Pleurothallis gracilicolumna	***Pleurothallis jostii***	***Pleurothallis talpinaria***	***Pleurothallis trimeroglossa***	***Pleurothallis vallejoi***
Total flower length	28–30	16–19	23–27	22–24	19–24
Dorsal sepal	12.0–15.9 × 4.2–5.0	10.0–10.5 × 5.5–6.7	12.8–14.0 × 5.0–5.4	10.5–11.3 × 3.4–4.0	9.5–12.0 × 5.0–6.5
Synsepal	12.0–16.5 × 4–5	10 × 6.0–6.8	12.5–13.0 × 5.3–6.0	10.5–11.7 × 4.5–4.8	9.5–13.0 × 5–6
Petals	5.0–7.8 × 0.5	6–7 × 1.0–1.4	11–12 × 1.0	5.7–6.0 × 0.6	7–9 × 0.7–0.9
Lip size	8.2–10.0 × 3	7–8 × 3.3–3.9	11 × 4.0–4.2	7.0–8.5 × 2.8–3.0	7.2–8.0 × 3.0–3.5
Lip base	2.7–3.0 × 0.5	1.0 × 0.9	2.2 × 0.7	2.2 × 0.7	1.3–1.6 × 0.5–0.7
Basal auricles	2.1–2.3 × 0.4–0.6	2.9 × 1.1	2.5 × 0.6	2.0–2.3 × 0.4–0.6	1.7–2.0 × 0.6–0.8
Lateral lobes	2.1–2.4 × 3.5–3.8	1.9 × 2.3	2.5 × 2.8	1.8–2.1 × 1.1–1.3	1.7–2.0 × 1.2–1.5
Constriction (lateral + middle lobes)	2.8–3.0	2.8	2.6	1.8–2.0	2.0–2.5
Middle lobe	6.4–6.5 × 4.0–4.3	4.9 × 3.9	6.1 × 3.9	4.8–5.1	4.1–4.3 × 3.4–3.6
Lateral teeth	1.5–1.8 × 1.3–1.5	1.6 × 0.8	1.7 × 1.2	1.4–1.6 × 1.1–1.3	1.7–2.0 × 0.8–1.0
Central tooth	1.2–1.3 × 0.8–1.0	1.2 × 0.6	1.5 × 0.7	0.8–1.1 × 0.3–0.4	1.0–1.3 × 0.3–0.5
Sulcus	Deep	None	Moderate	Deep	Moderate
Column length	7.5–8.0	4.6–4.8	6.8	6	6.5–7.2 × 1.8–2.2
Distribution	Colombia	Ecuador?	Colombia, Venezuela	Bolivia, Ecuador, Perú	Colombia

be sufficiently loosely attached to depress from an elevated position to a depressed position, against the synsepal. However, in the *P. talpinaria* species complex, the connection between labellum and column is sufficiently loose that the lip is easily agitated by a small breeze or human breath. Whether this labellar motility plays any role in the hypothesized deceit pollination of the group, as it does in certain *Bulbophyllum* species for example (Borba & Semir, 1998), remains to be investigated. However, we do propose that given the open morphology of the flowers (Karremans & Díaz-Morales, 2019), rendering them accessible to visitors of various sizes, the lip may only remain in the 'horizontal' position for the pollinator, or smaller visitors, and become depressed by visitors of greater size and mass, thereby distancing them from the pollinarium.

An interesting addition to the possibility that these open flowers select the desired pollinator via labellum motility combined with distance of the labellum from the clinandrium, is the case of *P. trimeroglossa*. This species can be recognized by a pronounced

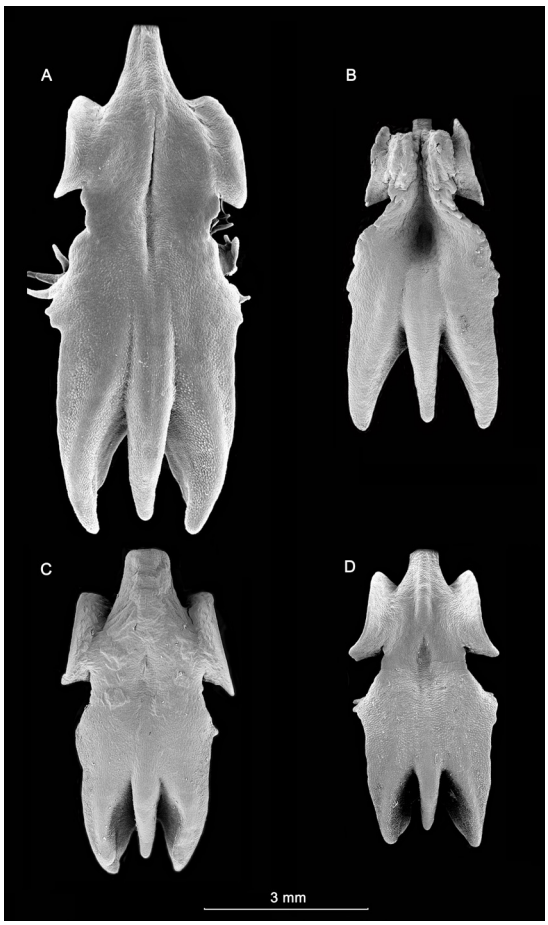

FIGURE 7. Scanning electron micrographs of labella of *P. talpinaria*-complex species illustrating absence of differentiated secretory tissue on the adaxial surfaces. **A**. *Pleurothallis talpinaria* PL0946. **B**. *Pleurothallis gracilicolumna* PL0942. **C**. *Pleurothallis jostii* PL0782. **D**. *Pleurothallis* cf. *trimeroglossa*. Scanning electron micrographs by Kehan Zhao. Composition by M. Wilson.

dome-shaped callus on the hypochile (lip base) below the column (Fig. 8). One obvious question presents itself – does this callus contribute in some manner to selecting fly species of the correct size for pollination? Further, since *P. trimeroglossa* seems to be variable in color across its geographic range and to display concomitant differences in height of the callus (Wilson *et al.*, 2017), could this be a mechanism for creating barriers to gene flow through selecting pollinators of different sizes, suggesting that what we call *P. trimeroglossa* is comprised of more than one species?

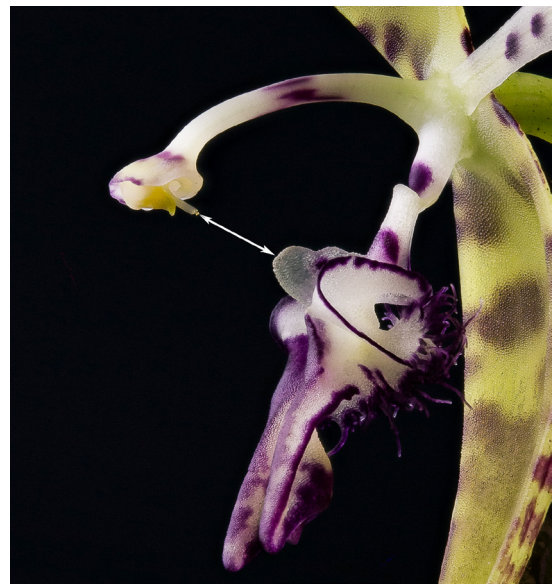

FIGURE 8. Flower of *Pleurothallis trimeroglossa* (lateral view) illustrating the distance between the dome-shaped callus on the hypochile and the viscidium of the pollinarium (double-headed arrow), a potential determinant of pollinator size. Photographs by G. Verhellen. Composition by M. Wilson.

To date, as far as the authors are aware, the only recorded *in situ* observation of an insect visitor and possible pollinator to a member of this species complex, in this case *P. talpinaria* itself, was a wood gnat (*Sylvicola* sp., Anisopodidae, Diptera) (Fig. 9). In this instance, the labellum can be observed to remain in the 'horizontal' or non-depressed position and the fly is positioned with its thorax directly below the clinandrium, appropriately positioned for contact with the pollinarium. Interestingly, when apparently in the correct orientation to interact with the pollinarium, the fly is in a head-up position, suggesting that it is not in the process of attempting to feed on nectar and has been deceived into visiting the flower. Of course, without direct observation of pollinarium acquisition and subsequent deposition under *in situ* conditions, on multiple occasions, we cannot conclude this species is the pollinator. However, the wood gnat does appear to interact with the flower of *P. talpinaria* in a manner indicative that it *could* be a pollinator of this species.

Several questions present themselves regarding pollination in the *P. talpinaria* species complex. Are Dipterans of family Anisopodidae pollinators of these

Figure 9. Flowers of *Pleurothallis talpinaria in situ* being visited by Diptera. **A–B**. A wood gnat (*Sylvicola* sp., *Anisopodidae*, Diptera), a potential pollinator of the species. **C**. Small flies visiting the lip and synsepal. Photographs by Nicolas Baresch Uribe (A, B) and Mateo Hernandez Schmidt (C). Composition by M. A. Sierra-Ariza.

flowers? If demonstrated, this would be the first example of a member of Anisopodidae pollinating *Pleurothallis* (Table 1 in Karremans & Díaz-Morales, 2019). Are these species exhibiting food deceit pollination? What flowers are being mimicked in this deceit pollination? What chemical or visual cues are the pollinators responding to?

Morphology.— In our description of *P. vallejoi*, we characterized the labellum morphology as a trilobed structure, which, in our opinion, provides a clearer understanding of its composition. In contrast to other publications on species of the *P. talpinaria* complex (Wilson, 2018; Wilson *et al.*, 2017), where it was described as a compound lip, we are aware that the label-

lar morphology of these species is difficult to interpret. Therefore, we recommend to consultation of Wilson (2018; Fig. 8), where each part of the lip is clearly labeled, with the following variations: instead of "hypochile" we use "labellum base", instead of "auriculate basal lobe" we use "basal auricles and lateral lobes", instead of "mesochile" and "epichile" we use "tridentate median lobe".

Acknowledgements. We would like to express our sincere gratitude to Eugenio Restrepo for allowing us to use his LCDP of *P. gracilicolumna*, and to Antonio Goicochea and Gerrit Verhellen for sharing their photographs of *P. trimeroglossa*. We also thank Kehan Zhao for providing the scanning electron micrographs, and Nicolás Baresch and Mateo Hernández Schmidt for their valuable photographs of the flower of *P. talpinaria* and its floral visitors. Additionally, we are grateful to Laura Ximena Castillo Balaguera, Jorge Arturo Romero Barrera, and Nicolle Milena Mendoza Beltrán for their participation and support during field outings and monitoring of this species in its natural habitat. Wilson thanks Colorado College for provision of greenhouse space, laboratory space and access to the scanning electron microscope. Finally, we thank the Universidad del Tolima for supporting this research through the collection permit granted under Resolution No. 000009 of the ANLA, and the TOLI Herbarium for accepting the deposit of the type specimen in their collection.

Funding. This work was carried out with personal funds.

Author contributions. MSA: Writing – Original draft, review & editing, Abstract, Keywords, Introduction, Materials and methods, Diagnosis, Description, Discussion, Conservation status, Morphological note**,** Acknowledgments, and Figures 1, 2, 3, 4, 6, and 9, as well as Table 1. JAD: Eponymy, Distribution, Habitat and Ecology, and Phenology. FT: Distribution, Habitat and Ecology. MW: Ecological discussion and Figures 7 and 8.

Conflict of interest. The authors confirm that they have no financial conflicts of interest or personal affiliations that could have influenced the findings presented in this paper.

Literature cited

Ackerman, J. D., & Collaborators. (2014). *Orchid flora of the Greater Antilles*. Botanical Garden Press.

Borba, E. L., & Semir, J. (1998). Wind-assisted fly pollination in three *Bulbophyllum* (Orchidaceae) species occurring in Brazilian "campos rupestres". *Lindleyana*, *13*, 203–218.

Catling, P. M. (1990). Auto-pollination in the Orchidaceae. In J. Arditti (Ed.), *Orchid Biology: Reviews and Perspectives V* (pp. 121–158). Timber Press.

Damián-Parizaca, A., Monteros, M. F., Coayla Rimachi, D., Walston, J., & Mitidieri-Rivera, N. (2025). A new species of *Pleurothallis* (Pleurothallidinae, Orchidaceae) from the historic sanctuary of Machupicchu, Perú. *PhytoKeys*, *254*, 29–40. https://doi.org/10.3897/phytokeys.254.142116

Dodson, C. H. (1962). The importance of pollination in the evolution of the orchids of tropical America. *American Orchid Society Bulletin*, *31*, 525–534.

Dodson, C. H. (1965). *Agentes de polinización y su influencia sobre la evolución en la familia Orquidacea*. Universidad Nacional Amazonia Peruana, Instituto General de Investigaciones.

Duque, O. (1993). Polinización en *Pleurothallis*. *Orquideología*, *19*, 55–69.

Harvard University. (2025). Harvard University Herbaria & Libraries. Retrieved from https://huh.harvard.edu [Accessed on 13.01.2025].

Karremans, A. P. (2016). *Genera Pleurothallidinarum*: An updated phylogenetic overview of Pleurothallidinae. *Lankesteriana*, *16*(2), 219–241.

Karremans, A. P. (2023). *Demystifying orchid pollination: Stories of sex, lies and obsession*. Kew Publishing.

Karremans, A. P., & Díaz-Morales, M. (2019). The Pleurothallidinae: Extremely high speciation driven by pollinator adaptation. In A. M. Pridgeon & A. R. Arosemena (Eds.), *Proceedings of the 22nd World Orchid Conference, vol. 1* (pp. 363–388). Guayaquil, Ecuador: Asociación Ecuatoriana de Orquideología.

Karremans, A. P., & Vieira-Uribe, S. (2020). *Pleurothallids: Neotropical Jewels, Volume I*. Imprenta Mariscal.

Karremans, A. P., Moreno, J. S., Gil-Amaya, K., Gutiérrez Morales, N., Espinosa, F., Mesa, S., Restrepo, E., Rincón-González, M., Serna, A., Sierra-Ariza, M., & Vieira-Uribe, S. (2023). Colombian *Orchidaceae*: A catalogue of the *Pleurothallidinae*. *Lankesteriana*, *23*(2), 181–400.

Karsten, G. K. W. H. (1859). *Florae Columbiae terrarumque adjacentium specimina selecta in peregrinatione duodecim annorum observata delineavit et descripsit* (pp. 153–155). Typis Fratum Unger.

Luer, C. A. (1986). *Icones Pleurothallidinarum* III: Systematics of *Pleurothallis*. *Monographs in Systematic Botany from Missouri Botanical Garden*, *20*, 1–109.

Luer, C. A. (1988). A revision of some sections of subgenus *Pleurothallis*. *Lindleyana*, *3*(3), 133–149.

Luer, C. A. (1998). *Icones Pleurothallidinarum* XVII. Systematics of subgen. *Pleurothallis* sect. *Abortivae,* sect. *Truncatae,* sect. *Pleurothallis*, subsect. *Acroniae*, subsect. *Pleurothallis*, subgen. *Dracontia,* subgen. *Unciferia*. *Monographs in Systematic Botany from Missouri Botanical Garden*, *72*, 1–122.

Luer, C. A. (2004). *Icones Pleurothallidinarum* XXVI. *Pleurothallis* subgenus *Acianthera* and three allied subgenera. A second century of new species of *Stelis* of Ecuador. *Epibator, Ophidion, Zootrophion*. *Monographs in Systematic Botany from the Missouri Botanical Garden*, *95*, 1–265.

Luer C.A. (2005). *Icones Pleurothallidinarum* XXVII. *Dryadella* and *Acronia* sect. *Macrophyllaceae-Fasciculatae*. *Monographs in Systematic Botany*, *103*, 1–311.

Moreno, J. S., Galindo-Tarazona, R., Alegría-Valencia, M., Wilson, M., & Zuluaga Tróchez, A. (2023). A new species of *Pleurothallis* (Pleurothallidinae) from the southwestern Andes of Colombia in the National Natural Park Farallones de Cali. *Lankesteriana*, *23*(2), 401–407.

Pridgeon, A. M. (2005). *Pleurothallis*. In: A. M. Pridgeon, P. Cribb, M.W. Chase, & F. N. Rasmussen (Eds.), *Genera Orchidacearum, volume 4, Epidendroideae (part 1)* (pp. 385–390). Oxford: Oxford University Press.

Pridgeon, A. M., Solano, R., & Chase, M. W. (2001). Phylogenetic relationships in *Pleurothallidinae* (Orchidaceae): Combined evidence from nuclear and plastid DNA sequences. *American Journal of Botany*, *88*, 2286–2308.

Pupulin, F., Aguilar, J., Belfort-Oconitrillo, N., Díaz-Morales, M., & Bogarín, D. (2021). *Florae Costaricensis subtribui Pleurothallidinis (Orchidaceae) Prodromus II*: Systematics of the *Pleurothallis cardiothallis* and *P. phyllocardia* groups, and other related groups of *Pleurothallis* with large vegetative habit. *Harvard Papers in Botany*, *26*(1), 203–295. https://doi.org/10.3100/hpib.v26iss1.2021.n14

The Kew Data Portal. (2025). Royal Botanic Gardens, Kew. Retrieved from http://www.data.kew.org [Accessed on 13.01.2025]

Reichenbach, H. G. (1886). Orchideae describuntur. *Flora*, *69*(35), 547–562.

Schlechter, F. R. R. (1921). *Pleurothallis trimeroglossa* Schltr. *Repertorium Specierum Novarum Regni Vegetabilis Beih*, 9, 78.

Schweinfurth, C. (1942). Orchidaceae Peruvianae. *Botanical Museum Leaflets, Harvard University*, *10*, 173–216.

Sierra-Ariza, M. A. (2023). Two new species of *Pleurothallis* (Pleurothallidinae) subsection *Macrophyllae-Fasciculatae* from the Central Andes of Colombia. *Lankesteriana*, *23*(1), 35–44. https://doi.org/10.15517/lank.v23i1.54321

Sierra-Ariza, M. A. (2024). *Pleurothallis cop-biodiversitatis* (Pleurothallidinae), a new species from Colombia. *Lankesteriana*, *24*(3), 259–265. https://doi.org/10.15517/lank.v24i3.61038

Sierra-Ariza, M. A., Rincón-González, M., Wilson, M., & Villanueva, B. (2022). Una nueva especie de *Pleurothallis* (Pleurothallidinae) subsección *Macrophyllae-Fasciculatae* para la región Andina colombiana. *Lankesteriana*, *22*(1), 25–35. http://dx.doi.org/10.15517/lank.v22i1.50823

Wilson, M. (2018). *Pleurothallis gracilicolumna* (Orchidaceae, Pleurothallidinae), a new species from Colombia related to *P. talpinaria, P. trimeroglossa*, and *P. jostii*. *Orquideología*, *35*(1), 31–51.

Wilson, M., Baquero R., L., Driessen, W., Dupree, K., Gil, K., Portilla, J., & Salas Guerrero, M. (2017). A clarification of the distinction between *Pleurothallis talpinaria* and *Pleurothallis trimeroglossa* (Orchidaceae: Pleurothallidinae) and an allied new species from Ecuador. *Lankesteriana*, *17*(2), 133–151. http://dx.doi.org/10.15517/lank.v17i2.29803

Wilson, M., Baquero R., L., Dupree, K., Jiménez, M. M., LeBlanc, C. M., Merino, G., Portilla, J., Salas Guerrero, M., Tobar Suárez, F., & Werner, J. D. (2016). Three new species of *Pleurothallis* (Pleurothallidinae; Orchidaceae) in subsection *Macrophyllae-Fasciculatae* from northern South America. *Lankesteriana*, *16*(3), 349–366. https://doi.org/10.15517/lank.v16i3.27314

Wilson, M., Belle, C., Dang, A., Hannan, P., Kellogg, L., Kenyon, C., Low, H., Mochizuki, A., Nguyen, A., Sheade, N., Shan, L., Shum, A., Stayton, T., Volz, C., Vosburgh, B., Wellman, H., & Woolley, M. A. (2013). A preliminary phylogenetic analysis of *Pleurothallis* sensu lato based upon nuclear and plastid sequences. *Lankesteriana*, *13*(1–2), 139. http://dx.doi.org/10.15517/lank.v0i0.11568

Wilson, M., Belle, C., Dang, A., Hannan, P., Kenyon, C., Low, H., Stayton, T., & Woolley, M. A. (2011). A phylogenetic analysis of the genus *Pleurothallis*, with emphasis on *Pleurothallis* subsection *Macrophyllae-Fasciculatae*, using nuclear ITS and chloroplast DNA sequencing. *Lankesteriana*, *11*(3), 369. http://dx.doi.org/10.15517/lank.v11i3.18304

Wilson, M., Larsen, B., Moreno, J. S., Ward, R., Riksen, J., Piña, L., Sierra-Ariza, M. A., Jiménez, M., Rincón-González, M., Galindo-Tarazona, R., Garzón, H., & Haelterman, D. (2022). New species of *Pleurothallis* (Orchidaceae: Pleurothallidinae), a new country record, and labellar morphology in the *P. cardiostola–P. lilijae* complex of subsection *Macrophyllae-Fasciculatae*. *Harvard Papers in Botany*, *27*(2), 187–220. https://doi.org/10.3100/hpib.v27iss2.2022.n10

Wilson, M., Zhao, K., Hampson, H., Frank, G., Romelroux, K., Jiménez, M. M., Tobar, F., Larsen, B., & Perez, A. (2018). A new species of *Pleurothallis* (Orchidaceae: Pleurothallidinae) in subsection *Macrophyllae-Fasciculatae* with a unique, highly reduced, morphologically distinct labellum. *Lankesteriana*, *18*(3), 217–230. https://doi.org/10.15517/lank.v18i3.35495