#### BLOSSOMING LEGACIES: EIGHT NEW *LEPANTHES* (ORCHIDACEAE: PLEUROTHALLIDINAE) SPECIES FROM LOS FARALLONES DE CALI NATIONAL PARK NAMED IN HONOR OF COLOMBIAN WOMEN

# JUAN SEBASTIÁN MORENO,<sup>1,2,4,5</sup> ROBINSON GALINDO-TARAZONA,<sup>1</sup> MELISA ALEGRIA-VALENCIA,<sup>2</sup> MARIO ALEXEI SIERRA-ARIZA,<sup>3</sup> DANNY LEANDRO MORA-A.,<sup>1</sup> AND ALEJANDRO ZULUAGA TRÓCHEZ<sup>2,4</sup>

**Abstract.** Eight new species of *Lepanthes* from the Farallones National Natural Park in Colombia are described and illustrated. These species are morphologically compared with the most similar species to corroborate their identity. Additionally, each of the eight new species is dedicated to a Colombian woman who has made history in several fields in the country, especially in areas traditionally dominated by men. These women serve as a source of inspiration for future generations and highlight the importance of diversity and inclusion in science and conservation. The article aims not only to contribute to the taxonomic knowledge of Colombian flora, but also to emphasize the crucial role that women have played and continue to play in Colombian society and the world.

Keywords: Andes, Colombia, conservation, systematics, taxonomy, western Andes

**Resumen.** Se describen e ilustran ocho nuevas especies de *Lepanthes* del Parque Nacional Natural Farallones en Colombia. Estas especies se comparan morfológicamente con las especies más similares para corroborar su nueva identidad. Además, cada una de las ocho nuevas especies se dedica a una mujer colombiana que ha hecho historia en varios campos en el país, especialmente en áreas tradicionalmente dominadas por hombres. Estas mujeres sirven como fuente de inspiración para futuras generaciones y destacan la importancia de la diversidad y la inclusión en la ciencia y la conservación. El artículo tiene como objetivo no solo contribuir al conocimiento taxonómico de la flora colombiana, sino también enfatizar el papel crucial que las mujeres han desempeñado y continúan desempeñando en la sociedad colombiana y en el mundo.

Palabras claves: Andes, Colombia, conservación, cordillera occidental, sistemática, taxonomía

Colombia, a nation renowned for its biodiversity and cultural vibrancy, is facing several challenges in all aspects of society. Taxonomists are racing to describe this amazing biodiversity at the same time that many threats are extinguishing species and destroying their habitats. Plants like orchids are among the most endangered species in this context. One of the genera of orchids in Colombia is Lepanthes Sw., which was established by Swartz in 1799 (Swartz, 1799). The genus represents the second most species-rich orchid genus in tropical regions after Stelis Sw., boasting now more than 1196 species (Karremans et al., 2023) distributed from Mexico to Bolivia. Yet, when zooming into the species level, there's a noticeable geographical and elevational confinement that makes Lepanthes a highly restricted and endemic genus (Luer, 1996; Luer and Thoerle, 2012; Parra-Sánchez et al., 2023). Colombia harbors the highest diversity of Lepanthes in the neotropics, with 377 species accounting for 20% of the species within the Pleurothallidinae subtribe in Colombia, and it is the second most species-rich genus in the country after Stelis (Karremans et al., 2023).

Los Farallones de Cali National Natural Park is situated in the Western Mountain Range of the Andes, covering the southwestern region of the Valle del Cauca department. It falls under the governance of the municipalities of Cali, Jamundí, Dagua, and Buenaventura in Colombia (Fig. 1). Established as a protected region on 15 July 1968, its name is inspired by the mountain range's young rock structures. Spanning 196,364.9 hectares, it stands as the department's most extensive protected land area. The Park primarily aims to safeguard biodiversity, emphasizing its role in supplying goods and services essential for Valle del Cauca's growth (UAESPNN, 2023). Despite being located between two of the world's most diverse regions, the Andes and the Chocó biogeographic region, Los Farallones is one of the least explored parks in the country. Regarding orchid diversity, 819 species were previously recorded in all natural parks, with only 110 species in PNN Farallones. In 2020, a new study recorded 430 orchid species for Los Farallones National Park, representing 10% of the country's species (Galindo-Tarazona et al., 2020). Given its vast expanse, making it one of the largest parks in Colombia, and with much of its forests yet to be explored, new orchid species are uncovered annually (Galindo-Tarazona et al., 2021; Baquero et al., 2021; Wilson et al., 2022; Parra-Sánchez et al., 2023; Moreno et al., 2023).

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<sup>1</sup> Parques Nacionales Naturales de Colombia, Dirección Territorial Pacífico, Carrera 117 # 16B-00, Cali, Colombia.

<sup>2</sup>Departamento de Biología, Universidad del Valle, Calle 13 # 100-00, Cali, Colombia.

<sup>3</sup>Grupo de Investigación Schultes, Fundación Ecotonos, Cali, Colombia.

- <sup>4</sup> Grupo de Investigación Ecología y Diversidad Vegetal, Universidad del Valle, Calle 13 # 100-00, Cali, Colombia.
- <sup>5</sup>Corresponding author: semoreno113@gmail.com

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FIGURE 1. Sampling, type locations, and ecosystems of the eight new species of Lepanthes, National Natural Park Los Farallones de Cali.

2023

Colombia, in particular, has seen its women rise, consistently breaking barriers and shaping the nation's destiny. Over the past decade, the spotlight on women's rights has been pivotal, reflecting a global trend toward acknowledging and rectifying gender disparities. This decade has borne witness to a paradigm shift, where Colombian women have not only asserted their rights, but have also wielded significant influence in social, political, economic, and scientific spheres. However, the journey toward equality and recognition is far from complete. As we delve into the stories of these remarkable women, it is essential to acknowledge their struggles, celebrate their achievements, and support their ongoing pursuits. Just as our biodiversity thrives amid adversity and flourishes in diverse habitats, Colombian women have exhibited an unyielding spirit in the face of challenges. By intertwining the realms of botany and social advocacy, we hope to offer a unique perspective on the intertwined destinies of nature and humanity and the

The descriptions and drawings were prepared from living specimens, and flowers were preserved in 70% alcohol. Flowers were dissected, measured, and photographed using Celestron Handheld Digital Microscope Pro. Vegetative structures were measured from dried material and reproductive structures from spirit material. Digital images were taken with a Nikon D850, D750 and a Nikon 105mm f/2.8 macro lens. Sketches from living and preserved specimens were digitized, and the images were used for diagramming a draft composite template in Adobe Photoshop<sup>®</sup> CS6. A digital composite line drawing was

## **1. Lepanthes dianatrujilloana** J.S. Moreno, Gal.-Tar., Sierra-Ariza, & Zuluaga, *sp. nov*.

TYPE: COLOMBIA, Valle del Cauca, municipality of Dagua, corregimiento del Queremal, Cerro Tokio, Parque Nacional Natural Farallones, 1800 m, 23 January 2021, *R. Galindo-Tarazona, L. Clavijo, & A. Zuluaga 1552* (Holotype: CUVC). Fig. 2–4A.

Lepanthes dianatrujilloana is most similar to Lepanthes volvox Luer & R. Escobar, but it can be distinguished mainly by its setiform and thick lip, with a bilaminate, narrowly elliptic and flat blades, with narrowly obtuse apices and bases (vs. lip subcircular, glabrous, with abruptly acuminate apices and rounded bases), the very short and cuneate connectives with adnation to the column near the apex, forming a notably thick body (vs. broadly oblong connectives forming a broad, rounded body connected to the column base), the acute sinus with a triangular, slightly bifid pubescent appendix at the apex, (vs. a rounded sinus with a small, sigmoid, and pubescent oscillating bilobed appendix).

*Plant* epiphytic, caespitose, 6.1–11.9 cm tall. *Roots* slender, flexuous 0.4–0.7 mm in diameter. *Ramicauls* slender, 2.5–5.7 cm long, erect to suberect, enclosed by 5–10 lepanthiform sheaths, reducing in size towards the base, furrowed, with a dilated and ciliated ostia, acute. *Leaves* green to red adaxially to abaxially suberect, 2.8–4.1  $\times$  0.8–1.4 cm, coriaceous, multiveined, elliptic-lanceolate,

enduring bloom of Colombian women in a changing world.

This paper introduces eight newly discovered Lepanthes species from the Farallones de Cali National Park, each named in honor of a Colombian woman who has left an indelible mark on the nation's fabric. We aim to illuminate their stories, emphasizing the significance of women's rights and contributions in Colombia. In recent years, extensive debates have unfolded regarding the use of eponyms by taxonomists; some have even gone so far as to suggest that taxonomists should abstain from using eponyms altogether, arguing that they constitute a political act that contradicts principles of equality and representation (Guedes et al., 2023). However, we believe, as many other authors do, that eponyms hold particular significance in regions like the Global South, where their elimination could have adverse effects on scientific endeavors in the very region intended to benefit the most from such proposals (Jost et al., 2023; Pethiyagoda, 2023; Slabin, 2023).

#### MATERIALS AND METHODS

then made (lines and stippling) in Procreate illustration application for iPad 6th generation tablet computer (Bogarín et al., 2019). The new species were described following the botanical terminology by Beentje (2012) and Stearn (1992). All original descriptions of related species were consulted for detailed comparisons (Luer, 1996; Luer and Thoerle, 2012; Karremans et al., 2023). Specimens from the following herbaria, AMES, COL, CUVC, HUA, JAUM, JBB, VALLE, CAUP and MO (online), were consulted, and no additional material of the new species was found.

#### TAXONOMIC TREATMENT

acute, apex emarginate with an abaxial central apiculum, base cuneate contracted into a petiole 2.6-4.2 mm long. Inflorescence a congested, successively flowered raceme, 1.9-2.2 cm long, including the peduncle, borne on the abaxial side of the leaf by a filiform peduncle, 1.1-1.4 mm long; floral bract acuminate, 0.6-1.2 mm long; pedicel 0.6–0.7 mm long, terete. Ovary costate, 1.3–2.7 mm long. Flowers with sepals maroon and midveins maroonred; petals with the upper and lower lobe red and middle lobe orange; lip red-magenta and column purple. Dorsal sepal ovate, glabrous, acute, strongly reflexed,  $2.7-4.0 \times$ 1.9-3.0 mm long, 3-veined, connate to the lateral sepals for 0.6-1.1 mm. Lateral sepals ovate, glabrous, oblique, acute, short acuminate, longitudinally concave centrally  $2.3-3.3 \times 1.2-1.9$  mm, 2-veined, connate for 0.9-1.5 mm. Petals transversely trilobed, setiform, 1-veined, 1.1-1.6 × 1.7–2.4 mm, upper lobe linear, falcate; midlobe triangular, lower lobe short, narrowly triangular. *Lip* setiform, thick, bilaminate, blades narrowly elliptic, flat, with apices and bases narrowly obtuse  $1.0-1.2 \times 0.3-0.4$  mm, connectives very short, cuneate, body very thick, adnate to the column near the apex, sinus acute and appendix triangular, slightly bifid at the apex, pubescent. Column terete, up to 1 mm long, anther dorsal and stigma ventral, bilobed with elongated lobes that project beyond the anther. Anther cap not seen. Pollinia two, white, pyriform, 0.3 mm long.



FIGURE 2. Lepanthes dianatrujilloana J.S. Moreno, Gal.-Tar., Sierra-Ariza, & Zuluaga. A, habit and plant; B, flower; C, dissected perianth; D, lip, column and ovary; E, lip expanded; F, pollinia. Drawing by J. S. Moreno based on the holotype.



FIGURE 3. In-situ photographs of *Lepanthes dianatrujilloana* J.S. Moreno, Gal.-Tar., Sierra-Ariza, & Zuluaga. A, inflorescence and leaf; B, flower, front view; C, habit and plant. In-situ photographs by J. S. Moreno.

Additional specimens examined: COLOMBIA. Valle del Cauca: municipality of Cali, km 16, new road to Buenaventura, Bosque de niebla de San Antonio, buffer zone Parque Nacional Natural Farallones de Cali, June 2018, J. S. Moreno & A. L Erazo 355 (Paratype: CAUP). Municipality of Dagua, Corregimiento de San Jose' del Salado, Altos de San José del Salado, Finca Totogol, 1860 m, 20 Nov 2021, J. S. Moreno and A. L. Erazo 528 (CAUP).

Eponymy: The name of the new species honors Diana Trujillo Pomerantz, a distinguished Colombian aerospace engineer, who has notably contributed to numerous NASA missions. She garnered significant recognition for her pivotal role in the Mars Curiosity Rover mission, where she initially served as a flight engineer before later taking a leadership position overseeing a team of engineers. Furthermore, Ms. Trujillo played a critical role in the Mars 2020 mission, specifically with the Perseverance rover, which successfully landed on Martian soil in February 2021. As the flight director overseeing the rover's robotic arm operations, she spearheaded a series of groundbreaking initiatives. Notably, she facilitated NASA's inaugural Spanish-language broadcast for a Martian landing, a strategic endeavor aimed at fostering broader engagement within the Spanish-speaking scientific community and promoting inclusivity in space exploration. Finally, she stands as a beacon of inspiration, particularly for young women aspiring to forge careers in the STEM fields (Science, Technology, Engineering, and Mathematics).

Lepanthes dianatrujilloana is a small to medium-sized species characterized by its red, suberect, coriaceous, and multiveined elliptic-lanceolate leaves. The distinguishing feature of this species is its intricate lip structure, with setiform and thick, narrowly elliptic blades that are flat and exhibit narrowly obtuse apices and bases; the connectives are very short, cuneate, forming a significantly thick body with an acute sinus, and a triangular, slightly bifid, pubescent appendix. The most similar species is Lepanthes volvox (Fig. 4B), as mentioned above in the diagnosis. The new species also has shorter ramicauls, from 2.5 to 5.7 cm long, enclosed by 5 to 10 lepanthiform sheaths (vs. ramicauls spanning 12-17 cm, enclosed by 13-14 lepanthiform sheaths). It also has smaller leaves that are suberect, coriaceous, multiveined, 2.8-4.1 cm long and 0.8-1.4 cm wide, with elliptic-lanceolate shape (vs. erect, thinly coriaceous, ciliate, multiveined leaves measuring 7-9 cm long and 2.5-2.8 cm wide with an ovate, acute, and acuminate shape). In terms of floral structure, Lepanthes dianatrujilloana is distinguished from other species primarily by the unique characteristics of its very small flowers, the majority of which are cleistogamous (Fig. 3A). The sepals are ovate and glabrous, similar in size; the dorsal sepal is acute and strongly reflexed, measuring between 2.7 and 4.0 mm long and 1.9-3.0 mm wide, and the lateral sepals are 2.3-3.3 mm long and 1.2-1.9 mm wide (vs. translucent light rose sepals, and the dorsal sepal is triangular, acute, measuring 8 mm long and 4 mm wide, and the lateral sepals are 7.5 mm long and 6 mm wide). The petals of the new species are orange with red highlights, transversely trilobed, and setiform, measuring 1.1-1.6 mm long and 1.7-2.4 mm wide; the upper lobe is linear and falcate, the midlobe is triangular, and the lower lobe is short and narrowly triangular (vs. yellow, transversely bilobed, pubescent petals measuring 1.5 mm long and 6.5 mm wide, with the lobes being subequal, obliquely ovate basally with slender, attenuated apices). Finally, the pollinia are consistently positioned on either side of the stigmatic cavity, situated beneath the column lobes, establishing a distinctive floral morphology that sets it apart in the genus (Fig. 2D).

## **2.** Lepanthes dianauribeana Gal.-Tar., J.S. Moreno, Zuluaga, & Sierra-Ariza, *sp. nov*.

TYPE: COLOMBIA, Valle del Cauca, municipality of Dagua, corregimiento del Queremal, Cerro Tokio, predio sr. Alvaro, Parque Nacional Natural Farallones, 1800 m, 12 August 2020, *R. Galindo-Tarazona, L. Mamian & Vanessa Varón, & D. L. Mora 1595* (Holotype: CUVC). Fig. 5–7A.

Lepanthes dianauribeana is most similar to Lepanthes vestigialis Bogarín & Pupulin. It can be recognized by its completely reduced and vestigial petals, almost imperceptible (vs. ovate to suborbicular, extremely reduced), and, mainly, by having a triangular lip with a slightly concave base (vs. completely reduced and trichomatous).

Plant epiphytic, caespitose, 2.1-4.2 cm tall; roots slender, flexuous, filiform, 0.6 mm in diameter. Ramicauls slender, erect to suberect, 1.0-2.8 cm long, enclosed by 5-8 acuminate, furrowed lepanthiform sheaths, with a dilated and microscopically ciliate ostia. Leaves suffused with purple abaxially, horizontal, coriaceous, slightly conduplicate at the base, ovate-elliptic, acute,  $1.1-1.7 \times$ 0.6-0.8 cm, apex emarginate with an abaxial apiculum in the middle, base cuneate contracted into a petiole 1.2-2.9 mm long. Inflorescence up to 2 congested, distichous racemes, 3-19[-many], successively flowered, longer than the leaf, up to 1.9 cm long including the peduncle, distichous, flexuous, born on the adaxial surface of the leaf by a filiform, terete peduncle 6.5-8.6 mm long; floral bracts conical, acuminate, 0.83-1.00 mm long; pedicels terete, 0.75–1.06 mm long. Ovary terete, costate, 0.76 mm long. Flowers with sepals yellow-tawny; lip and column white to cream. Dorsal sepal repand along the margin, triangularlanceolate, convex, acute, 3-veined,  $2.0-2.9 \times 1.0-1.2$  mm, connate to the lateral sepals for 0.44 mm. Lateral sepals repand along the margins, triangular-lanceolate, oblique, acute, 2-veined,  $2.0-2.9 \times 0.9-1.2$  mm, connate for 0.5 mm. Petals extremely reduced, vestigial. Lip triangular, slightly concave at the base, 0.6 mm long, adnate to the base of the column. Column elongate, terete, 1.5-1.7 mm long, anther dorsal and stigma apical. Anther cap cordate, cucullate, 0.3 mm wide. Pollinia 2, yellow, pyriform, narrowly obovoid, 0.28 mm long.

**Eponymy:** The new species is named in honor of Diana Uribe Forero, a Colombian historian and philosopher, who has contributed immensely to the enrichment of historical and philosophical discourse through her insightful radio broadcasts and podcasts. Her dedication to weaving intricate narratives that bridge historical events with contemporary issues has fostered a deeper understanding and appreciation for the diverse cultural and historical landscapes that shape our world today. Moreover, this dedication serves as a



FIGURE 4. Comparison with the most similar species. A, *Lepanthes dianatrujilloana* J.S. Moreno, Gal.-Tar., Sierra-Ariza, & Zuluaga; B, *Lepanthes volvox* Luer & R. Escobar. Photographs by S.Vieira-Uribe.

beacon, illuminating the pivotal role that women play in the spheres of education, communication, and intellectual discourse. Through her work, Diana Uribe exemplifies the profound impact that women can have in shaping societal narratives and fostering a culture of knowledge and empathy. Her efforts resonate as a testament to the transformative power of women in roles traditionally dominated by men, showcasing the depth, nuance, and richness that a female perspective can bring to the table.

Lepanthes dianauribeana is a small-sized species, and might belong to a group of species, with triangular sepals with a long, conspicuous, and protruding column (Pupulin, et al., 2011; Moreno et al., 2017). Within this virtual group, there are several species that have either somewhat reduced or strongly reduced corollas, as can be observed in the comparison of nearly all of the species in the group (Moreno et al., 2017, Fig. 6 therein). In this case, *Lepanthes equusfrisiae* Pupulin & H. Medina (Fig. 7B) from Ecuador, which has broadly-ovate to suborbicular leaves (vs. narrowly ovateelliptic), 1-veined lateral sepals (vs. 2-veined lateral sepals), transversely reniform-suborbicular, rounded, concave petals (vs. completely reduced and vestigial petals), and a subspherical, broadly obtuse lip (vs. triangular lip). Finally, as mentioned in the diagnosis, *Lepanthes vestigialis* (Fig 7C) from Costa Rica is probably the most similar species, which has broadly-ovate to suborbicular leaves,  $8-11 \times 10-13$  mm (vs. ovate-elliptic and horizontal,  $1.1-1.7 \times 0.6-0.8$  cm), The petals of *Lepanthes dianauribeana* are extremely reduced and vestigial (vs. ovate to orbicular, less than 0.5 mm long, and trichomatous). Lastly, the lip in *Lepanthes vestigialis* is a vestigial, completely reduced lip forming an appendix, less than 0.5 mm long and trichomatous (vs. triangular and slightly concave at the base, with a length of 0.6 mm).

### **3. Lepanthes gloriagaleanoana** J.S. Moreno, E. Restrepo, & Zuluaga., *sp. nov*.

TYPE: COLOMBIA, Valle del Cauca, Cali, corregimiento Félidia, vereda El Diamante, Parque Nacional Natural Farallones de Cali, 2100 m, 22 June 2020, *R. Galindo-Tarazona, D. Haelterman, & J. C. Ruiz 1462* (Holotype: CUVC). Fig. 8–10A.

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FIGURE 5. Lepanthes dianauribeana Gal.-Tar., J.S. Moreno, & Sierra-Ariza. A, habit and plant; B, flower; C, dissected perianth; D, lip, column and ovary; E, anther cap and pollinia. Drawing by J. S. Moreno based on the holotype.



FIGURE 6. In-situ photographs of *Lepanthes dianauribeana* Gal.-Tar., J.S. Moreno, Zuluaga, & Sierra-Ariza. A, flower, lateral view; **B**, habit and plant; **C**, leaves and inflorescence. In-situ photographs by R. Galindo-Tarazona and J. S. Moreno.



FIGURE 7. Comparison with the most similar species. A, *Lepanthes dianauribeana* Gal.-Tar., J.S. Moreno, Zuluaga, & Sierra-Ariza; B, *Lepanthes equus-frisiae* Pupulin & H. Medina; C, *Lepanthes vestigialis* Bogarín & Pupulin. Photographs by J. S. Moreno (A) and F. Pupulin (B, C).

Lepanthes gloriagaleanoana is most similar to Lepanthes ortiziana O. Perez, E. Parra, & Kolan., but it differs from the latter by its purple sepals, suffused with yellow-green from the second vein to the inner margin in the lateral sepals,  $4.8-4.9 \times 5.5-5.6$  mm dorsal sepal and  $5.5-6.6 \times 3.2-3.9$  mm lateral sepals (vs. yellow-green,  $5.0 \times ca. 4.0$  mm dorsal sepal and lateral sepals  $5.0 \times 2.8$  mm), and by the lip with linear oblong blades, with the upper and lower ends obtuse,  $2.5 \times 0.9-1.1$  mm, with a short triangular, subacuminate appendix with pubescent vertices (vs. narrowly oblong blades with upper and lower ends narrowly rounded, obliquely, ca. 2.3 mm  $\times$  ca. 0.5 mm, with a small, triapiculate appendix with the central lobe microscopically pubescent).

Plant epiphytic, caespitose, 9.2-11.8 cm tall; roots slender, flexuous, filiform, 0.68 mm in diameter. Ramicauls slender, suberect to pendent 7.1-8.8 cm long, enclosed by 8-10 acuminate, furrowed, minutely pubescent lepanthiform sheaths, with a wide markedly dilated and ciliate ostia. Immature leaves light green, mature leaves purplish-red, iridiscent adaxially, light green abaxially, microscopically pubescent adaxially, coriaceous abaxially, elliptical-ovate, concave, and sulcate, reticulate-veined, acute,  $5.5-6.5 \times$ 1.7-2.6 cm, apex emarginate with an abaxial apiculum in the middle, base broadly cuneate contracted into a petiole 1.1-1.7 mm long. Inflorescence a congested distichous raceme, up to 2, 6-17[-many] successively flowered, up to 2.5-3.5 cm long including the peduncle, loose, distichous, flexuous, held appressed to the adaxial concave surface of the leaf by a filiform, terete peduncle, 1.1–1.4 cm long; *floral bracts* conical, acuminate, minutely scabrous, 0.9–1.3 mm long; pedicels terete, 2.1-2.5 mm long. Ovary terete, costate, 3.48 mm long. Flowers dorsal sepal purplish red with margins green, lateral sepals purplish red from the second vein to the outer margin and yellow-green from the second vein

to the inner margin; petals bicolorous longitudinally, with the inner half dark red and the outer half yellow-green; lip magenta with margins dark red and apices green. Dorsal sepal short papillose along margin, broadly ovate, wider than long, acuminate, flat, 3-veined,  $4.8-4.9 \times 5.5-5.6$  mm, connate to the lateral sepals for 1.49 mm. Lateral sepals short papillose along the margins, broadly ovate, oblique, acuminate, flat, 2-veined,  $5.5-6.6 \times 3.2-3.9$  mm each, connate for 2.6 mm long. Petals transversally bilobed, microscopically pubescent,  $1.6-1.7 \times 3.7$  mm, 1-veined; upper lobe oblong, obtuse; lower lobe narrowly triangular, oblique, obtuse. Lip bilaminate, blades linear-oblong, upper ends obtuse and longer than the lower ends, slightly depressed in the middle toward the inner margins, apices uncinate, short ciliate,  $2.5 \times 0.9 - 1.1$  mm, supported by short cuneate connectives, body broad, adnate to the base of the column, sinus rounded with a short triangular, subacuminate appendix with pubescent vertices. Column terete, bilobed, 2.09 mm long, anther dorsal and stigma ventral. Anther cap cordate, cucullate, 0.62 mm wide. Pollinia 2, yellow, pyriform, narrowly obovoid, 0.3 mm long.

Additional specimen examined: COLOMBIA. Valle del Cauca: municipality of Cali, km 16, new road to Buenaventura, Bosque de niebla de San Antonio, buffer zone Parque Nacional Natural Farallones de Cali, 22October 2023, J. S. Moreno & A. L Erazo 358 (Paratype: CAUP).

**Eponymy:** The new species is named in honor of Gloria Galeano Garcés, a prolific Colombian botanist who dedicated her life to the study and conservation of the flora of Colombia, with a special focus on palms. She was a professor at Universidad Nacional de Colombia and also director of the Instituto de Ciencias Naturales. Her tireless dedication and significant contributions to the field have served as a source of inspiration, paving the way for



FIGURE 8. *Lepanthes gloriagaleanoana* J.S. Moreno, E. Restrepo, & Zuluaga. A, habit and plant; B, flower; C, dissected perianth; D, lip, column and ovary; E, lip expanded; F, anther cap and pollinia. Drawing by J. S. Moreno based on the holotype.



FIGURE 9. In-situ photographs of *Lepanthes gloriagaleanoana* J.S. Moreno, E. Restrepo, & Zuluaga. A, flower, front view; B, inflorescence; C, habit and plant. In-situ photographs by J. S. Moreno.



FIGURE 10. Comparison with the most similar species. A, *Lepanthes gloriagaleanoana* J.S. Moreno, E. Restrepo, & Zuluaga; B, *Lepanthes cincinnata* Luer & R. Escobar; C, *Lepanthes ortiziana* O. Perez, E. Parra, & Kolan. Photographs by J. S. Moreno.

future generations of botanists, and especially, for young women in science. Gloria is celebrated not only for her scientific excellence, but also for her role as a mentor and leader in the scientific community. Throughout her career, she demonstrated that passion and dedication are the true determinants of success in science, breaking barriers, and overcoming gender stereotypes.

Lepanthes gloriagaleanoana might belong to an informal group of species distributed across all three Andean Ranges in Colombia and Ecuador. This group, referred to as "manabina" and proposed by Baquero et al. (2021), includes species that exhibit shared morphological traits, such as deeply concave leaves with margins that recurve from slightly to strongly, and an adaxial surface ranging from microscopically to conspicuously pubescent. The group is also characterized by congested inflorescences with flowers located on the adaxial side of the leaves, accompanied by a synsepal varying from short- to long-caudate and a notably small, inconspicuous triangular appendix. From the "manabina" group, there are two species that are very similar: Lepanthes cincinnata Luer & R. Escobar (Fig. 10B) from Colombia, which has ovate sepals  $8 \times 5$  mm, with slender acuminate caudas (vs. broadly ovate sepals up to  $5.5 \times 5.6$  mm with no caudas); the lip is 2.5 mm long, with the upper and lower ends of the blades equal in size (vs. the lip 4.6 mm long, with the upper ends longer than the lower ends of the blades); and a tridentate appendix (vs. triangular with two pubescent vertices laterally). Finally, Lepanthes ortiziana (Fig. 10C) could be the most similar species to L. gloriagaleanoana as mentioned in the diagnosis, but also it can be distinguished and separate from the latter by its larger leaves,  $5.5-6.5 \times 1.7-2.6$  cm (vs. 2.8–ca.  $3.8 \times 1.5$ –ca. 2.0 cm), petals with an oblong-obtuse upper lobe and a narrowly triangular, oblique-obtuse lower lobe (vs. uncinate upper lobe with overlapping apices, and a triangular, slightly curved, acute lower lobe).

#### **4. Lepanthes laurarestrepoana** J.S. Moreno, Gal.-Tar., & Sierra-Ariza., *sp. nov*.

TYPE: COLOMBIA, Valle del Cauca, Cali, Minas del Socorro, Parque Nacional Natural Farallones de Cali, 3200 m, 29 June 2020, *R. Galindo-Tarazona, A. Fierro, G. Rodriguez, M. Espitia, & G. Marín 1470* (Holotype: CUVC). Fig. 11, 12, 14A.

Lepanthes laurarestrepoana is most similar to Lepanthes contingens Luer, but it can be distinguished from the latter by its transversally bilobed petals, with the upper lobe oblongovate, oblique, and rounded, noticeably broader than the lower lobe, which is slender, ovate-lanceolate, oblique, and acute (vs. transversely oblong petals, the upper lobe oblong and truncate, and the lower lobe smaller, triangular, and acute) and the lip with blades similar, but with a pubescent, short, and triangular appendix (vs. oblong and slender).

*Plant* epiphytic, caespitose, up to 9–10 cm tall; *roots* slender, flexuous, filiform, 0.5 mm in diameter. *Ramicauls* slender, suberect to pendent 1.8–6.5 cm long, enclosed by 5–12 acuminate, furrowed, and ciliate lepanthiform sheaths, with a wide markedly dilated and ciliate ostia. Immature *leaves* light green, mature leaves dark green iridescent adaxially, light green abaxially, microscopically pubescent



FIGURE 11. Lepanthes laurarestrepoana, J.S. Moreno, Gal.-Tar., & Sierra-Ariza. A, habit and plant; B, flower; C, dissected perianth; D, lip, column and ovary; E, lip expanded; F, anther cap and pollinia. Drawing by J. S. Moreno based on the holotype.



FIGURE 12. In-situ photographs of *Lepanthes laurarestrepoana*, J.S. Moreno, Gal.-Tar., & Sierra-Ariza. A, flower, 3/4 view; B, leaf and inflorescence; C, habit and plant. In-situ photographs by D. L. Mora (A, C) and R. Galindo-Tarazona (B).



FIGURE 13. Close up and lateral view of the appendage within the species of the informal group "*manabina*." Photograph of *Lepanthes* aff. *Troxis* by J. S. Moreno. The white arrow points to the appendage and the blue arrow points to the appendix.



FIGURE 14. Comparison with the most similar species. A, *Lepanthes laurarestrepoana* J.S. Moreno, Gal.-Tar., & Sierra-Ariza; B, *Lepanthes contingens* Luer; C, *Lepanthes troxis* Luer & R. Escobar. Photographs by R. Galindo-Tarazona (A) and J. S. Moreno (B, C).

adaxially, coriaceous abaxially, elliptical-ovate, concave, and sulcate, reticulate-veined, acute,  $4.32 \times 1.88$  cm, apex emarginate with an abaxial apiculum in the middle, base broadly cuneate contracted into a petiole up to 6.14 mm long. *Inflorescence* a distichous raceme of 18–26[-many] successively flowering, up to 2.55 cm long including the peduncle, distichous, flexuous, born at the adaxial surface of the leaf by a filiform, terete peduncle 1.19 mm long; *floral* bracts ovate-lanceolate, acuminate, minutely verrucose, 0.83-1.00 mm long; pedicels terete, 0.75-1.06 mm long. Ovary terete, costate, 1.71-2.14 mm long. Flowers with dorsal sepal red with the mid-vein and cauda orange, lateral sepals with the center red, margins cream and cauda orange; petals bicolorous longitudinally, the inner side red and the outer orange and lip red. Sepals caudate, papillose, carinate, margins with filiform papillae. Dorsal sepal ovatelanceolate,  $4.20-6.25 \times 2.04-3.09$  mm, connate to the lateral sepals for 0.94-1.15 mm, 3-veined. Lateral sepals ovate-lanceolate, oblique, 4.22-7.01 × 1.24-1.96 mm, connate for 0.86-2.45 mm, 2-veined. Petals transversally bilobed,  $0.79-0.80 \times 3.10-3.14$  mm, upper lobe oblongovate, oblique, rounded, broader than the lower lobe; lower lobe slender ovate-lanceolate, oblique, acute. Lip exhibited liquid droplets, possibly nectar, glabrous, bilaminate, 1.82- $2.01 \times 0.58-0.61$  mm; blades narrowly oblong, upper ends rounded, lower ends with a depression on the outer margin, forming an acute apiculum, connectives short, cuneate; body broad, connate to the base of the column by a long, slender claw; appendix short, strongly pilose, fleshy, triangular, rounded, curved upward when viewed from the side, in contact with a vermiform appendage from the stigma. Column slender, clavate, terete, 1.41–1.69 mm long; anther dorsal and stigma ventral. Anther cap cordate, cucullate, 0.7 mm wide. Pollinia 2, yellow, pyriform, narrowly obovoid, 0.9 mm long.

Eponymy: The new species honors Laura Restrepo Durán, a renowned Colombian writer and journalist. As a prominent female figure in the literary world, she has not only carved a successful career, but has also been a potent voice in advocating for political activism. Her work often transcends the realm of literature, reflecting her profound commitment to addressing various political and social conflicts that have occurred in Colombia and throughout Latin America. In addition to her literary endeavors, Laura has stood as a fervent defender of human rights, collaborating with several non-governmental organizations and groups dedicated to the promotion of human rights. Her steadfast commitment to the social and political issues of Colombia and Latin America is a notable constant in her body of work, marking her a significant female powerhouse in the literary and activist spheres.

Lepanthes laurarestrepoana might also belong to the group mentioned above in *L. gloriagaleanoana*, with its deeply concave leaves and slender ramicauls, but it has a feature that distinguishes it from the flowers of this group and could possibly be a subgroup within the "manabina" group. Additionally, it has a basal slender claw connate to the base of the column with an appendix, in contact with a vermiform appendage (Fig. 13) (a feature also found in

the "manabina" group and not described by Baquero et al., 2021). Two species share the same traits in the lip structure: *Lepanthes contingens* (Fig. 14B), a species distributed in Colombia and Ecuador, which was compared in the diagnosis, and *Lepanthes troxis* Luer & R. Escobar (Fig. 14C), characterized by its leaves with revolute and undulate margins (vs. margin entire), transversely bilobed petals with the upper lobe oblong, oblique, and the apex truncate and coarsely erose, the lower lobe triangular, acute (vs. the upper lobe oblong-ovate, oblique, rounded, broader than the lower lobe; the lower lobe slender ovate-lanceolate, oblique, acute) and the lip with similar shape but with a vermiform and ciliate appendix (vs. pubescent, short and triangular appendix).

#### **5.** Lepanthes margaritamarinoana Gal.-Tar., Zuluaga, J.S. Moreno, & Sierra-Ariza, *sp. nov*.

TYPE: COLOMBIA, Valle del Cauca, municipality of Dagua, corregimiento del Queremal, Cerro Tokio, predio sr. Alvaro, Parque Nacional Natural Farallones, 1852 m, 17 August 2020, *R. Galindo-Tarazona, L. Mamian & V. Varón, & D. L. Mora 1624* (Holotype: CUVC). Fig. 15–17A.

Lepanthes margaritamarinoana is most similar to Lepanthes gargantua Rchb.f., (Fig. 17B), but it can be recognized and separated from the latter by its medium size, up to 20 cm tall, including the ramicauls and leaves (vs. large size plants, up to 75 cm tall, including the ramicauls and leaves) and the glabrous, oblong, and slight tridentate appendix of the lip (vs. minutely ciliate and triangular).

*Plant* up to 37 cm tall, epiphytic, sympodial, caespitose; roots slender, 1.5 mm in diameter. Ramicauls erect, stout, up to 15 cm long, enclosed by 11-12 furrowed and scabrous lepanthiform sheaths, with a dilated ostia. Leaves erect, coriaceous, oblong-ovate, subacute, acuminate,  $4.5-8.5 \times$  $3.5 \times 6.5$  cm, rounded base contracted into a petiole 1.5 cm long. Inflorescence a distichous raceme of 34-49[-many] successively flowered, up to 4.59 cm including peduncle, born at the abaxial surface of the leaf by a filiform peduncle, 1.59-2.49 cm, 1 or 2 inflorescences per ramicaul; floral bracts ovate-lanceolate, acuminate, papyraceous, 0.7-0.8 mm long; pedicels terete 1.08-1.24 mm long. Ovary costate, 3.19-3.24 mm long. Flowers with sepals yellowbrown; petals bicolorous, with the apex of the upper lobe and the inner part remainder yellow; lip yellow with the margins red and the column purple. Sepals acute, papillose, carinate. Dorsal sepal broadly ovate, 4.53 × 5.05 mm, connate to the lateral sepals by 1.98-2.87 mm, 3-veined. Lateral sepals ovate to subtriangular, oblique, 3.59-4.09 × 2.81-3.17 mm, each 2-veined, connate for 1.78-1.97 mm, into a widely ovate synsepal. Petals microscopically pubescent, transversally bilobed,  $1.40-1.71 \times 3.82-3.99$ mm; upper lobe subelliptic, oblique, rounded, broader than the lower lobe; lower lobe slender, oblong-ovate to subtriangular, acute. Lip sub-horizontal, bilaminate; blades microscopically pubescent, slightly oblique in relation to the column axis, oblong-elliptic, upper end rounded, lower end thin, sharp, curved downward,  $1.10-1.97 \times 0.42-0.74$  mm, supported by wide, subquadrate and cuneate connectives; body broad, concave, adnate close to the base of the column,



FIGURE 15. *Lepanthes margaritamarinoana*, Gal.-Tar., Zuluaga, J.S. Moreno, & Sierra-Ariza. **A**, habit and plant; **B**, flower; **C**, dissected perianth; **D**, lip, column and ovary; **E**, lip expanded; **F**, anther cap and pollinia. Drawing by J. S. Moreno based on the holotype.

sinus obtuse with the appendix oblong, slightly tridentate, obtuse. *Column* terete, up to 1.95 mm long, anther dorsal and stigma ventral. *Anther cap* elliptic, 0.43 mm wide, with two rounded corners at the base. *Pollinia* 2, yellow, pyriform, oblanceolate, 0.4 mm long.

**Eponymy:** The new species honors Margarita Marino de Botero, a prominent environmentalist and a pioneer in the defense of the environment in Colombia. As one of the first women in this field, her trajectory serves as a source of inspiration, demonstrating that women can lead and make significant contributions in areas traditionally dominated by men. Margarita has been a central figure in important commissions and international organizations, including the World Commission for the Environment and Development (Brundtland Commission) and the Commission for Education of the 21st Century of UNESCO. Her contributions on the Brundtland Commission were particularly notable, including ideas that helped define the

concept of "sustainable development" globally. Throughout her career, she has maintained a humble but passionate perspective, dedicating herself to building an environmental utopia and working towards a more sustainable future, emphasizing the urgency of a social movement that allows for a transition toward an economy that honors the Earth's natural boundaries. Her commitment and fervor for ecological causes highlight her belief in the relevance of learning to coexist with nature, fostering a more balanced and lasting connection with our habitat, especially inspiring other women to take on leadership roles in the protection and conservation of the environment.

Lepanthes margaritamarinoana resembles some species with large size plants with its erect ramicauls up to 60 cm long, with gray to white scabrous lepanthiform sheats, oblong to elliptical ovate leaves, large inflorescences up to 6 cm long, and yellow flowers. Among these species are Lepanthes caudatisepala C. Schweinf., Lepanthes profusa



FIGURE 16. In-situ photographs of *Lepanthes margaritamarinoana*, Gal.-Tar., Zuluaga, J.S. Moreno, & Sierra-Ariza. A, flower, front view; B, inflorescence. In-situ photographs by J. S. Moreno.

Luer & Hirtz, *Lepanthes pseudoprofusa* Damian & B.T. Larsen (Damian and Larsen, 2017. These three species can be easily distinguished from the new species by their appendices: whereas *L. caudatisepala*, *L. profusa*, and *L. pseudoprofusa* have biglandular appendices, the new species features a glabrous and oblong slightly tridentate appendix.

#### **6.** Lepanthes nidiagongorana Gal.-Tar., J.S. Moreno, Zuluaga, & Sierra-Ariza, *sp. nov*.

TYPE: COLOMBIA, Valle del Cauca, municipality of Dagua, corregimiento del Queremal, Cerro Tokio, predio sr. Álvaro, Parque Nacional Natural Farallones, 1852 m, 17 August 2020, *R. Galindo-Tarazona, L. Mamian & V. Varón, & D. L. Mora 1497.* Fig. 18–20A.

Lepanthes nidiagongorana is most similar to Lepanthes filamentosa Luer & Hirtz, but it differs from the latter mainly by its lip, which has narrowly oblong blades with the upper ends rounded, the lower ends acutely angled on the inner margin with a narrowly obtuse apex, and a short microscopically pubescent, semicircular, concave appendix (vs. the lobes auricular with the upper end above the column thickened to form an ill-defined lamina, the middle of the lower lobe falcate with broadly-rounded, incurved, overlapping apices, without an appendix).

Plant epiphytic, caespitose, 3.6-4.1 cm tall; roots slender, flexuous, filiform, 0.55 mm in diameter. Ramicauls erect, slender, 1.6-2.1 cm long, enclosed by 3-4 acuminate, minutely pubescent lepanthiform sheaths, with a dilated and ciliate ostia. Leaves dark-purple abaxially, horizontal, coriaceous, narrowly ovate, acute,  $1.73-1.97 \times 3.60-4.16$ cm, apex emarginate with an abaxial apiculum in the middle, base cuneate contracted into a petiole, 2.6-3.18 mm long. Inflorescence congested distichous racemes, up to 2, 7-21[many] successively flowered, up to 1.51-2.16 cm long including the peduncle, loose, slender, held appressed to the adaxial surface of the leaf by a filiform, terete peduncle, 7.02-8.95 cm long; floral bracts conical, acuminate, minutely scabrous, 0.38-0.48 mm long; pedicels terete, 0.86-1.21 mm long. Ovary terete, costate, 0.69 mm long. Flowers with the dorsal sepal pale yellow, the center purplish-red, lateral sepals cream; petals light-yellow; lip cream and column yellow. Dorsal sepal narrowly ovate, long-acuminate, acute, 3-veined,  $4.26-4.42 \times 0.97$  mm, connate to the lateral



FIGURE 17. Comparison with the most similar species. A, *Lepanthes margaritamarinoana*, Gal.-Tar., Zuluaga, J.S. Moreno, & Sierra-Ariza; B, *Lepanthes gargantua* Rchb.f. Photographs by J. S. Moreno.



FIGURE 18. *Lepanthes nidiagongorana* Gal.-Tar., J.S. Moreno, Zuluaga, & Sierra-Ariza. A, habit and plant; B, flower; C, dissected perianth; D, lip, column and ovary; E, lip expanded; F, anther cap and pollinia. Drawing by J. S. Moreno based on the holotype.

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FIGURE 19. In-situ photographs of *Lepanthes nidiagongorana* Gal.-Tar., J.S. Moreno, Zuluaga, & Sierra-Ariza. A, flower, 3/4 view; B, leaf and inflorescence; C, habit and plant. In-situ photographs by R. Galindo-Tarazona.

sepals for 1.39–2.65 mm. *Lateral sepals* narrowly ovate, acuminate, 2-veined,  $3.75-4.06 \times 0.72-0.88$  mm, connate for 0.92 mm. *Petals* microscopically pubescent, bifurcate, acute, upper lobe 2.47–2.55 mm long, lower lobe 1.98–2.14 mm long and 0.2–0.28 wide; both lobes linear, lower lobe falcate, acute, 3-veined. *Lip* microscopically pubescent, slightly depressed in the middle, bilaminate, blades narrowly oblong, upper end rounded, overlapping, lower end acutely angled on the inner margin with a narrowly obtuse apex, 1.19–1.42 × 0.39–0.48, supported by cuneate connectives; body broad, adnate to the base of the column, sinus rounded with a short microscopically pubescent, semicircular, concave appendix. *Column* terete, 0.82–1.24 mm long, anther dorsal and stigma ventral. *Anther cap* cordate, cucullate, 0.4 mm wide. *Pollinia* 2, yellow, pyriform, narrowly obvoid, 0.37 mm long.

**Eponymy:** The new species is named in honor of Nidia Góngora, an influential singer-songwriter and founder of the musical band Canalón de Timbiquí, lead voice of Ondatropica, Pacifican Power, and co-founder of the musical project Quantic and Nidia Góngora from Colombia. Hailing from Santa Bárbara de Timbiquí, in the Cauca region, Nidia has devoted her life to promoting and preserving the traditional music of the Colombian Pacific and the

Afro-Colombian cultural heritage. As a pioneering female figure in a musical genre, Nidia serves as an inspiration for many, especially women aspiring to make a mark in various fields. Nidia sees music not just as an art form, but also as a means to keep culture and tradition alive. Her role as a woman in the music industry amplifies the significance of this dedication, highlighting the importance of female representation and leadership in all sectors. She aims to ensure that future generations can experience and appreciate the cultural richness of her native region by weaving bridges between the traditional music of her land and other genres around the world.

Lepanthes nidiagonogorana is a new species that can be recognized easily by the combination of: medium size plants with the inflorescences held appressed to the adaxial surface of the leaf, surpassing the leaf and flowering close to the apex; narrowly ovate and long acuminate sepals with transversely bilobed linear petals; and a short semi-circular concave appendix. Only one species from Colombia and Ecuador, *Lepanthes filamentosa* (Fig. 20B), has similar sepals and petals. The new species can be recognized from the latter mainly by its medium-size plants, for *Lepanthes*, up to 3 cm tall (vs. minute-size plants, 4–10 mm long),



FIGURE 20. Comparison with the most similar species. A, *Lepanthes nidiagongorana* Gal.-Tar., J.S. Moreno, Zuluaga, & Sierra-Ariza; B, *Lepanthes filamentosa* Luer & Hirtz. Photographs by R. Galindo-Tarazona (A) and J. S. Moreno (B).

narrowly ovate leaves,  $1.73-1.97 \times 3.6-4.16$  cm (vs. small, elliptical leaves,  $3-7 \times 2.5-5.0$  mm), loose and slender inflorescences held appressed to the adaxial surface of the leaf by a filiform, terete peduncle, 1.1-1.4 cm long (vs. erect to suberect inflorescences that surpass the flowers vertically or horizontally with the peduncle up to 1.8 cm long), the linear petals (vs. filiform), and the lip as mentioned above in the diagnosis.

#### **7. Lepanthes nubiamuñozana** J.S. Moreno, Gal.-Tar., & Zuluaga *sp. nov*.

TYPE: COLOMBIA, Valle del Cauca, Cali, Minas del Socorro, Parque Nacional Natural Farallones de Cali, 3390 m, 28 June 2020, *R. Galindo-Tarazona, A. Fierro, G. Rodriguez, M. Espitia, & G. Marín 1474* (Holotype: CUVC). Fig. 21–23A.

Lepanthes nubiamuñozana is most similar to Lepanthes kokonuko J.S. Moreno & Pisso-Florez, but it differs from the latter mainly by its ovoid lip blades (vs. ovatelanceolate) and an obtuse, pubescent, and slightly bifid appendix (vs. bipartite appendix composed of two linear, clavate processes).

Plant epiphytic, caespitose, 9.2-11.8 cm tall; roots slender, flexuous, filiform, 0.68 mm in diameter. Ramicauls erect to suberect, slender, 7.1-8.8 cm long, enclosed by 4-5 acuminate, minutely pubescent lepanthiform sheaths, with a dilated and minutely ciliate ostia. Leaves erect, coriaceous, lanceolate, acute,  $5.5-6.5 \times 1.7-2.6$  cm, apex emarginate with an abaxial apiculum in the middle, base cuneate contracted into a petiole, 1.1-1.7 mm long. Inflorescence congested, pendant, distichous raceme, 18-22[-many], successively flowered, up to 2.5–3.5 cm long including the peduncle, loose, distichous, slender, held appressed to the adaxial surface of the leaf by a filiform, terete peduncle, 1.1-1.4 cm long; *floral bracts* conical, acuminate, minutely scabrous, 0.9-1.3 mm long; pedicels terete, 2.1-2.5 mm long. Ovary terete, costate, 3.48 mm long. Flower with sepals yellow with the center orange-yellow, petals with the upper lobe orange to red, lower lobe orange; lip orange suffused with red and the column purple. Dorsal sepal narrowly ovate, acute, 3-veined, 4.8-4.9 × 5.5-5.6 mm, connate to the lateral sepals for 1.49 mm. Lateral sepals minutely pubescent, narrowly ovate, oblique, acute, strongly revolute in natural position, 2-veined, 5.5-6.6 × 3.2-3.9 mm, connate for 2.6 mm. Petals microscopically pubescent, transversely bilobed, acute, 1-veined,  $1.6-1.7 \times 3.7$  mm; lobes subequal, triangular, obtuse, sometimes acuminate in the upper lobe. Lip minutely pubescent, ovoid, bilaminate, blades narrowly oblong, upper and lower ends rounded, the lower lobe with the apices narrowly obtuse,  $2.5 \times 0.9-1.1$ mm, supported by cuneate connectives; body broad, adnate to the base of the column, sinus broad with a short, obtuse, pubescent, and slightly bifid appendix. Column terete, 2.09 mm long, anther dorsal and stigma ventral. Anther cap cordate, cucullate, 0.62 mm wide. Pollinia 2, yellow, pyriform, narrowly obovoid, 0.3 mm long.

**Eponymy:** The new species honors Nubia Amparo Muñoz Calero, a renowned Colombian medical scientist who has been a cornerstone in epidemiological research. She was nominated for the Nobel Prize in 2008 by the International Epidemiological Association, due to her groundbreaking advancements in the study of a vaccine against the human papillomavirus (HPV). Her work has not only had a significant impact on global public health, particularly in preventing cervical cancer among women, but has also earned her the Order of Boyacá in 2011, which is the highest honor that the Colombian Government awards to distinguished citizens for their service to the country and stands as a testament to the transformative impact of her work. Nubia Muñoz serves as a role model for female scientists in Colombia, demonstrating that women's leadership in science can lead to significant, life-saving advancements.

Lepanthes nubiamuñozana is a new species that can be easily recognized by its lanceolate leaves and its racemose, loose, and long pendant inflorescences. It is probably related to the other racemose species: Lepanthes biloba Luer & R. Escobar, Lepanthes guanacasensis Luer & R. Escobar, Lepanthes kokonuko J.S. Moreno & Pisso-Florez, Lepanthes muscula Luer & R. Escobar and Lepanthes osiris Luer & R. Escobar (Luer and Thoerle, 2012; Moreno et al., 2020). But the most similar species is undoubtedly Lepanthes kokonuko (Fig. 23B), which shares strongly revolute lateral sepals with the new species, but differs by its elliptical leaves (vs. lanceolate), transversely bilobed petals with the upper lobe narrowly triangular and recurved and the lower lobe shorter than the upper lobe, ovate to triangular and slightly falcate (vs. the petals with the lobes similar in size and triangular), and a bilaminate lip as compared in the diagnosis.

#### **8. Lepanthes paolaalzateana** Gal.-Tar., J.S. Moreno, & Zuluaga *sp. nov*.

TYPE: COLOMBIA, Valle del Cauca, Cali, Minas del Socorro, Parque Nacional Natural Farallones de Cali, 3200 m, 29 June 2020, *R. Galindo-Tarazona, A. Fierro, G. Rodriguez, M. Espitia, & G. Marín 1477* (Holotype: CUVC). Fig. 24–26A.

Lepanthes paolaalzateana is most similar to Lepanthes microprosartima Tobar & M.J. Gavil., but the new species can be distinguished by its petals with a lanceolate, falcate, caudate, upper lobe that is longer than the lower lobe and an ovate-lanceolate, strongly falcate, caudate lower lobe (vs. a narrowly triangular upper lobe with revolute margins and a broadly triangular and obtuse lower lobe), and a narrowly oblong-ovate lip (vs. ovate) with a short appendix with a minute apiculum in the middle (vs. oblong-lanceolate).

*Plant* epiphytic, caespitose, 13.4–19.1 cm tall; *roots* slender, flexuous, filiform, 0.7–1.0 mm in diameter. *Ramicauls* horizontal to pendent, slender, 9.0–12.3 cm long, enclosed by 9–10 acuminate, minutely ciliate lepanthiform sheaths, with a dilated and ciliate ostia. *Leaves* spreading, on the adaxial surface dark green, glossy, on the abaxial surface dark purple, thick and coriaceous, with pronounced margins, ovate-lanceolate, acuminate  $4.2-5.3 \times 1.00-1.27$  cm, apex emarginate with an abaxial apiculum in the middle, base cuneate contracted into a petiole, 1.1-3.1mm long.



FIGURE 21. Lepanthes nubiamuñozana J.S. Moreno, Gal.-Tar., & Zuluaga. A, habit and plant; B, flower; C, dissected perianth; D, lip, column and ovary; E, lip expanded; F, pollinia and anther cap. Drawing by J. S. Moreno based on the holotype.

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FIGURE 22. In-situ photographs of *Lepanthes nubiamuñozana* J.S. Moreno, Gal.-Tar., & Zuluaga. A, flower, 3/4 view; B, habit, plant, and inflorescence; C, inflorescence. In-situ photographs by A. Zuluaga.

Inflorescence congested, distichous raceme, 10–18[-many] successively flowered, up to 2.5–7.3 cm long including the peduncle, loose, distichous, slender, held appressed to the abaxial surface of the leaf by a filiform, terete peduncle, 1.5-1.8 cm long; floral bracts ovate, acuminate, papyraceous, 0.7-1.1 mm long; pedicels terete, 0.5-0.8 mm long. Ovary terete, costate, 2.9 mm long. Flowers with dorsal sepal light-yellow, lateral sepals bicolorous longitudinally with the inner half purple-red and the outer half light yellow; petals bicolorous longitudinally with the inner half red and the outer half yellow, apex of the upper lobe red, lip redorange with margins purple-red and column purple. Dorsal sepal ovate to subtriangular, carinate, acute, 3-veined, 5.9- $8.1 \times 3.6$ –4.9 mm, connate to the lateral sepals for 1.7–2.4mm. Lateral sepals minutely pubescent, elliptic-lanceolate, oblique, carinate, short-papillate along the margins, 2-veined,  $5.2-7.4 \times 2.4-3.3$  mm, connate for 2.7-4.0 mm.

*Petals* microscopically pubescent, transversely bilobed, 1-veined,  $5.6-8.7 \times 1.1-1.7$  mm; upper lobe lanceolate, falcate, caudate, longer than the lower lobe; lower lobe ovate-lanceolate, strongly falcate, caudate. *Lip* minutely pubescent, slightly oblique in relation to the column axis, with ciliated margin, bilaminate, blades narrowly oblongovate, both lobes with rounded ends,  $1.5-3.2 \times 0.4-1.0$  mm, supported by wide, subquadrate, cuneate connectives; body broad, adnate to the base of the column, appendix short, strongly pilose, with a minute apiculum in the middle. *Column* terete, 2.1–3.8 mm long, anther dorsal and stigma ventral. *Anther cap* not seen. *Pollinia* not seen.

**Eponymy:** The new species honors Paola Alzate, a park ranger and an environmental leader in the National Natura Park Los Farallones de Cali. She has worked in the institution for more than fourteen years in topics related to conservation and protection of the natural resources within



FIGURE 23. Comparison with the most similar species. **A**, *Lepanthes nubiamuñozana* J.S. Moreno, Gal.-Tar., & Zuluaga; **B**, *Lepanthes kokonuko* J.S. Moreno & Pisso-Florez. Photographs by A. Zuluaga (A) and J. S. Moreno (B).



FIGURE 24. Lepanthes paolaalzateana Gal.-Tar., J.S. Moreno, & Zuluaga. A, habit and plant; B, flower; C, dissected perianth; D, lip, column and ovary; E, lip expanded. Drawing by J. S. Moreno based on the holotype.



FIGURE 25. In-situ photographs of *Lepanthes paolaalzateana* Gal.-Tar., J.S. Moreno, & Zuluaga. A, flower, 3/4 view; B, flower, lateral view; C, habit and plant. In-situ photographs by R. Galindo-Tarazona.



FIGURE 26. Comparison with the most similar species. **A**, *Lepanthes paolaalzateana* Gal.-Tar., J.S. Moreno, & Zuluaga; **B**, *Lepanthes dunstervilleorum* Foldats; **C**, *Lepanthes microprosartima* Tobar & M.J. Gavil. Photographs by R. Galindo-Tarazona (A), J. S. Moreno (B) and Francisco Tobar (C).

the park. Her empirical knowledge of plants and animals lead her to fall in love with orchids. Paola has carried out several projects related to the establishment of orchid nurseries in the department of Valle del Cauca.

Lepanthes paolaalzateana is a new species that can be easily identify by its strongly falcate lobes of the petals with the upper lobe much longer than the lower, as stated in the diagnosis. The most similar species are Lepanthes dunstervilleorum Foldats (Fig. 26B), Lepanthes mirador Luer & Hirtz, and Lepanthes microprosartima (Fig. 26C) (Tobar et al., 2021). It can be distinguished from Lepanthes dunstervilleorum by its petals with the upper lobe lanceolate, falcate and the lower lobe ovate-lanceolate. strongly falcate (vs. the upper lobe oblong with the apex variable from rounded to contracted on the medial half and the lower lobe obtuse triangular). Also, the blades of the lip in *L. paolaalzateana* are narrowly oblong-ovate (vs. oblong) with a short appendix, with an apiculum in the middle (vs. more or less oblong with modifications). It is different from Lepanthes mirador, which has oblong blades in the lip (vs. narrowly oblong-ovate) and an oblong appendix with a bilobed apical segment. Lepanthes microprosartima is undoubtedly the most similar species by sharing similar flowers superficially, but L. microprosartima is a larger, terrestrial, prolific plant up to 40 cm tall (vs. epiphytic and caespitose, with plants up to 19 cm tall) with ramicauls that can reach 25 cm long (vs. up to 12.3 cm long). The leaves of *L*. microprosartima are oblong-ovate, up to 9.4 cm long (vs. ovate-lanceolate, up to 5.3 cm long); the petals and lip are compared above in the diagnosis.

**Habitat and ecology:** Lepanthes dianatrujilloana, L. dianauribeana, L. margaritamarinoana, and L. nidiagongorana were found in Cerro Tokio, Queremal, Valle del Cauca, in secondary forests along the road in secondary premontane to montane rainforest transition. The forest is constantly under the influence of clouds that create a humid environment that is ideal for bryophytes. The canopy is low, less than 15 m, and the understory is dominated by Araceae and Cyclanthaceae. Lepanthes gloriagaleanoana was found in cloud forests inside secondary forests growing next to Lepanthes speciosa Luer & Hirtz and Dracula chimaera (Rchb.f.) Luer. Lepanthes laurarestrepoana, L. nubiamuñozana, and L. paolaalzateana were found growing on dense sub-paramo vegetation, with shrubs and small trees less than 4 m.

**Conservation status:** Most of the eight new species are known only from their type locality and some of them from one more locality but nonetheless located in the buffer zone of the National Natural Park. Due to their position within the park, and assuming their constant protection, the IUCN classification is data deficient (DD), because we lack adequate distribution and population information to make an assessment (IUCN Standards and Petitions Subcommittee, 2017; IUCN, 2023).

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