 doi: http://dx.doi.org/10.15517/jnh7g404

MORE THAN A CENTURY LATER: FIRST MODERN RECORD OF *PTEROGLOSSA MACRANTHA* (ORCHIDACEAE: SPIRANTHINAE) IN ARGENTINA, WITH NOTES ON ITS MORPHOLOGY, DISTRIBUTION, HABITAT, AND CONSERVATION IMPLICATIONS

Javier E. Florentín[1,2,4,6], Nadia S. Delvescovo[1,4], Diego L. Salariato[4,5], Graciela Terada[1,3], Héctor A. Keller[1,4] & Eduardo A. Flachsland[1,3]

[1]Instituto de Botánica del Nordeste (CONICET-UNNE), Sargento Cabral 2131, c.c. 209, C.P. 3400, Corrientes, Argentina.

[2]Facultad de Ciencias Exactas, Naturales y Agrimensura, UNNE, Avenida Libertad 5470, CP 3400, Corrientes, Argentina.

[3]Cátedra Fisiología Vegetal, Facultad de Ciencias Agrarias (UNNE), Corrientes, Argentina.

[4]Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina.

[5]Instituto de Botánica Darwinion (CONICET-ANCEFYN), Labardén 200, B1642HYD San Isidro, Buenos Aires, Argentina.

[6]Author for correspondence: florentinjaviere@gmail.com

Abstract. *Pteroglossa macrantha* (Orchidaceae: Spiranthinae) was previously known in Argentina only from a historical collection made by Ekman in 1908 in the province of Misiones, with no subsequent records confirming its presence in the country. During recent botanical surveys in the province of Corrientes, a new population was discovered, representing the first modern record for Argentina after more than a century and one of the southernmost confirmed occurrences of the species in the country. Detailed morphological observations confirmed its identity and revealed slight variations in leaf proportions compared with specimens from Brazil and Paraguay. The plants of this species grow in seasonally flooded alluvial grasslands on sandy substrates near the Paraná River. The regional conservation assessment, based on IUCN criteria, indicates that *P. macrantha* could be considered Critically Endangered (CR) in Argentina due to its extremely small area of occupancy, its occurrence in a single locality, and ongoing habitat degradation. This finding highlights the importance of the riparian grasslands of Corrientes as biodiversity refuges and priority areas for the conservation of rare and threatened orchids of the Southern Cone.

Resumen. *Pteroglossa macrantha* (Orchidaceae: Spiranthinae) era conocida previamente en Argentina únicamente a partir de una colección histórica realizada por Ekman en 1908 en la provincia de Misiones, sin registros posteriores que confirmaran su presencia en el país. Durante recientes relevamientos botánicos en la provincia de Corrientes, se descubrió una nueva población, lo que representa el primer registro moderno para Argentina después de más de un siglo y uno de los registros confirmados más australes de la especie en el país. Las observaciones morfológicas detalladas confirmaron su identidad y revelaron ligeras variaciones en las proporciones foliares en comparación con ejemplares de Brasil y Paraguay. Plantas de esta especie crecen en pastizales aluviales estacionalmente inundables sobre sustratos arenosos cercanos al río Paraná. La evaluación regional de conservación, basada en los criterios de la UICN, indica que *P. macrantha* podría ser considerada En Peligro Crítico (CR) en Argentina, debido a su área de ocupación extremadamente reducida, su ocurrencia en una única localidad y la degradación continua de su hábitat. Este hallazgo resalta la importancia de los pastizales ribereños de Corrientes como refugios de biodiversidad y áreas prioritarias para la conservación de orquídeas raras y amenazadas del Cono Sur.

Keywords / Palabras clave: Corrientes Province, límite sur de distribución, Paraná River, pastizales ribereños, provincia de Corrientes, río Paraná, riparian grasslands, southern distribution limit

ORCID of the Author: JEF, NSD, DLS, GT, HAK, EAF
Received 19 January 2026; accepted for publication 3 April 2026. First published online: 14 April 2026.

Introduction. The subtribe Spiranthinae represents one of the most diverse lineages of terrestrial orchids, comprising approximately 40–42 genera and over 500 species (Chase *et al.*, 2015; Guimarães *et al.*, 2019; Salazar, 2003). Recent phylogenetic studies have confirmed its monophyly and recognized several major clades, including the so-called "Stenorrhynchos clade", which encompasses the genera *Buchtienia* Schltr., *Eltroplectris* Raf., *Espinhassoa* Salazar & J.A.N.Bat., *Lyroglossa* Schltr., *Mesadenella* Pabst & Garay, *Nothostele* Garay, *Pteroglossa* Schltr., *Sacoila* Raf., *Skeptrostachys* Garay, *Stenorrhynchos* Rich. ex Spreng., and *Thelyschista* Garay (Batista *et al.*, 2011; Salazar *et al.*, 2003, 2018, 2019).

Pteroglossa shares with the other genera of the "Stenorrhynchos clade" several distinctive floral characters, such as a short, robust, ventrally channeled column, usually a prominent spur, an elongated labellum claw, and a weakly tridentate rostellum (Damián & Salazar, 2017). The genus comprises approximately 11 species distributed from Mexico to Argentina (Buzatto *et al.*, 2014; Chase *et al.*, 2015). In this sense, *Pteroglossa* species are frequently associated with open environments and savannas, growing in moist grasslands or at forest edges (Buzatto *et al.*, 2014).

In Argentina, *Pteroglossa* is represented by five species, mainly distributed in the northeastern and northwestern regions of the country (POWO, 2026; Zuloaga *et al.*, 2025): *P. lurida* (M.N.Correa) Garay, *P. luteola* Garay, *P. rhombipetala* Garay, *P. roseoalba* (Rchb.f.) Salazar & M.W.Chase, and the focus species of the current study, *P. macrantha* (Rchb.f.) Schltr. Hitherto, in Argentina, *P. macrantha* was only known from a single record from the province of Misiones (Posadas, Loreto, San Ignacio), collected by Ekman in 1908, which is the holotype of *Stenorrhynchos regium* Kraenzl., considered here as a heterotypic synonym of *P. macrantha* according to Guimarães *et al.* (2019). Since then, no new collections or evidence had confirmed its presence in the country.

During recent surveys conducted as part of a project on endemic species of the province of Corrientes, a population of *P. macrantha* was found in a small area in the northwest of the province.

The current study aims to document the presence of *P. macrantha* in Argentina, which, together with a record in the Brazilian state of Rio Grande do Sul (Buzatto *et al.*, 2014), represents the southernmost portion of its distribution. A detailed morphological description, information on its ecological preferences, and an assessment of its local conservation status using the IUCN Red List categories and criteria, are provided.

Materials and methods. *Taxonomic treatment.*— The collected specimens, including both vegetative and reproductive structures, were preserved in FAA solution (Formol-alcohol-acetic acid: 5 mL formalin, 5 mL acetic acid, 90 mL 70% ethanol) and deposited in the CTES herbarium (herbarium acronym according to Thiers, 2026). Information on habitat, flowering period, and qualitative traits such as flower color was obtained from direct field observations and from living specimens collected in the field, which were subsequently cultivated and maintained under greenhouse conditions at the *Facultad de Ciencias Agrarias*, *Universidad Nacional Nordeste (UNNE)*, Corrientes, Argentina, for further observation.

Morphological analyses.— Morphological observations were conducted using both FAA-fixed and fresh material, examined under a Leica MZ6 stereomicroscope. Measurements were taken with a digital caliper. General terminology followed the recommendations of the International Association for Plant Taxonomy (IAPT, 1962) and Simpson (2010), whereas specific terminology was based on Salazar (2003) and Buzatto *et al.*, (2014), who addressed the comparative morphology of *Pteroglossa* and related genera within the subtribe Spiranthinae. The material used for micromorphological studies was derived from specimen *Florentín 389* (CTES).

Geographic distribution and conservation status.— Two expeditions were carried out in 2024 and 2025 in the locality where the species was recorded and in surrounding areas. Geographic coordinates were obtained using a Garmin eTrex 30x GPS. The conservation status of the species for Argentina (regional assessment) was evaluated following the categories and criteria of the IUCN Red List (IUCN, 2012) and its most recent guidelines (IUCN Standards and Petitions Committee, 2024). Regarding Criterion B (geographic range-IUCN 2012, 2024), in order to estimate the extent of occurrence (EOO) and area of occupancy (AOO), the

GeoCAT software (2026) was used, applying a 2 km grid (cell area = 4 km²) as recommended by the IUCN Standards and Petitions Committee (2024). In addition to Criterion B, the species was also evaluated under Criteria C and D; the former considers population size and observed or projected decline in the number of mature individuals, while the latter takes into account very small or restricted populations. Current and potential threats were identified through direct observations during field expeditions. Distribution maps were produced using Google Earth (2018) and QGIS (2018).

Taxonomic treatment

Pteroglossa macrantha (Rchb.f.) Schltr., *Beih. Bot. Centralbl.* 37(2): 450. 1920. Fig. 1–2.

≡ *Spiranthes macrantha* Rchb.f., *Linnaea* 19: 378. 1847 ≡ *Gyrostachys macrantha* (Rchb.f.) Kuntze, *Revis. Gen. Pl.* 2: 664. 1891 ≡ *Stenorrhynchos macranthum* (Rchb.f.) Cogn., *Fl. Bras.* 3(4): 176. 1893–1896. TYPE: Brazil. Minas Gerais: 1839, *Claussen s.n.* (holotype: G00428576 [digital image!]).

= *Spiranthes albescens* Barb.Rodr., *Gen. Spec. Orchid. Nov.* 1: 186. 1877 ≡ *Stenorrhynchos albescens* Barb.Rodr., *Gen. Spec. Orchid. Nov.* 1(Index): x. 1877. TYPE: Brazil. "Hab. *Dans la Serra de Caldas*, *Minas Geraes*", s.d., J. *Barbosa Rodrigues s.n.* [lost]; lectotype (designated by Buzatto *et al*. 2013: 616): Barbosa Rodrigues's original illustration at Biblioteca Barbosa Rodrigues, "Iconographie des Orchidées du Brésil" 1: tab. 52, cited as tab. 375 (then unpublished) in Barbosa Rodrigues (1877: 186), reproduced in Sprunger *et al.* (1996: 105).

= *Stenorrhynchos macranthum* f. *robustior* et *multiflora* Cogn., *Bull. Herb. Boiss.* 3(II): 931. 1903. TYPE: Paraguay. Amambay: "*in campo paludoso*, *in regione cursus superioris fluminis Apa*", December 1901–02, *Hassler 8265*; lectotype (designated by Guimarães *et al*. 2019: 112): G (00009409 [online image!]); isolectotypes: BM (000077495), MO-duplicates (101157383), MO-duplicates (103117938).

= *Stenorrhynchos regium* Kraenzl., *Kongl. Svenska Vetensk. Acad. Handl.*, n.f., 46(10): 20. 1911 ≡ *Pteroglossa regia* (Kraenzl.) Schltr., *Beih. Bot. Centralbl.* 37(2): 451. 1920. TYPE: Argentina. Misiones: Posadas, "*Prope Loreto in clivo umbroso juxta viam*, *quae ad municipium San Ignacio fert*", 30 January 1908, *Ekman 425* (holotype: S-R 5922 5922 [online image!]).

Terrestrial *herbaceous* plant up to *ca.* 50 cm tall, including the inflorescence. *Roots* fleshy, cylindrical, often stipitate, covered with a fine lanuginose pubescence. *Leaves* arranged in a basal rosette, usually present during anthesis, 20–28 cm long, 3–6 cm wide, sessile, coriaceous, lanceolate, acute, with translucent margins; midvein and up to seven parallel secondary veins conspicuous, light green; outer leaves slightly attenuate at the base, inner ones more markedly attenuate. *Inflorescence ca.* 45 cm long, a raceme; scape terete, *ca.* 30 cm long, pubescent, partially covered by 6–9 tubular, acute bracts; rachis *ca.* 15 cm long, pubescent, bearing *ca.* 15 flowers; flowers opening almost simultaneously. *Floral bracts* 3–9 cm long, 1.5–2.0 cm wide, prominent, light green, glabrous, loosely concave, ovate, acuminate. *Flowers* 6.0–7.8 cm long, resupinate, fleshy, pale cream to yellowish; sepals densely pubescent on the outer surface. *Dorsal sepal* 28–39 mm long, 5–9 mm wide, slightly spreading and arched, free from the lateral sepals densely pubescent externally, with nine to ten conspicuous veins, lanceolate, acuminate, with entire margins. *Lateral sepals* up to 67 mm long, 6–10 mm wide, long-connate at their basal portions and adnate to the ovary, forming a short, conical, rounded spur, with four conspicuous veins, elliptic-lanceolate, falcate, acuminate, with entire margins. *Petals* 29–34 mm long, 5–10 mm wide, glabrous, with six and seven conspicuous veins, fusiform, acuminate, with entire margins. *Labellum* 30–42 mm long, 9–11 mm wide, trilobed; blade pubescent externally, glabrous toward the apex, basally adnate to the lateral sepals within the spur, margins adnate to the sides of the column, with *ca.* 30 conspicuous veins, long-unguiculate and narrowly canaliculate below the middle; lateral lobes semi-orbicular; midlobe ovate to obovate-spatulate, acute to rounded. *Column* 15.0–17.5 mm long, 6–10 mm wide, semi-terete, robust, pubescent; base prolonged into a long column foot; clinandrium membranous, with margins partially covered by the base of the anther. *Anther* with brown margins and a whitish central portion, thick, massive, ovate,

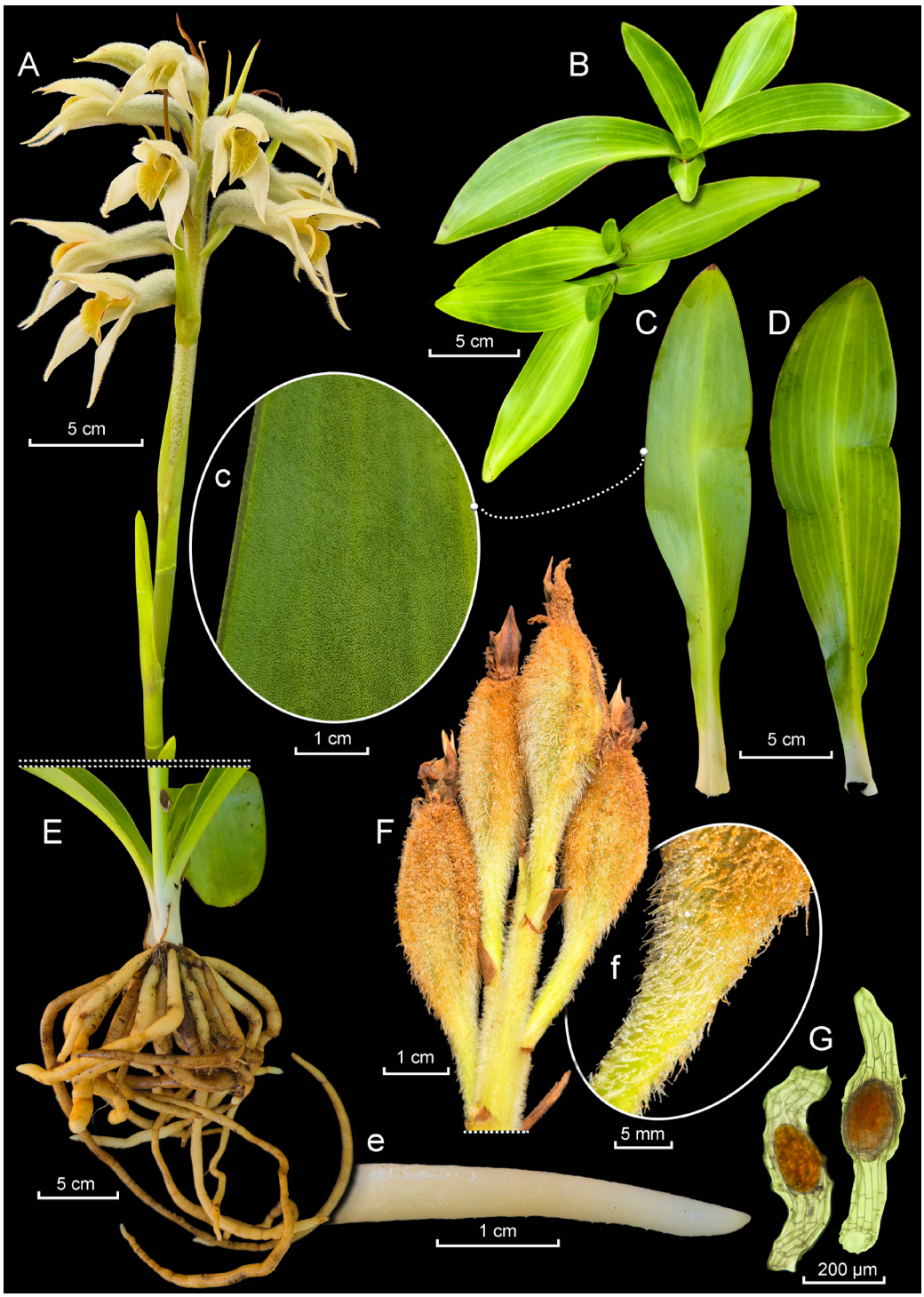

FIGURE 1. *Pteroglossa macrantha.* **A**. General aspect. **B**. Basal rosettes. **C**, **c**. Leaf abaxial surface, entire (C) and detail (c). **D**. Leaf adaxial surface. **E**, **e**. Leaves base, roots (E) and detail of root apex (e). **F**, **f**. Infructescence (F) and detail of fruit basal pubescence (f). **G**. Seeds. Photographs by J.E. Florentín based on *Florentín 389* (CTES).

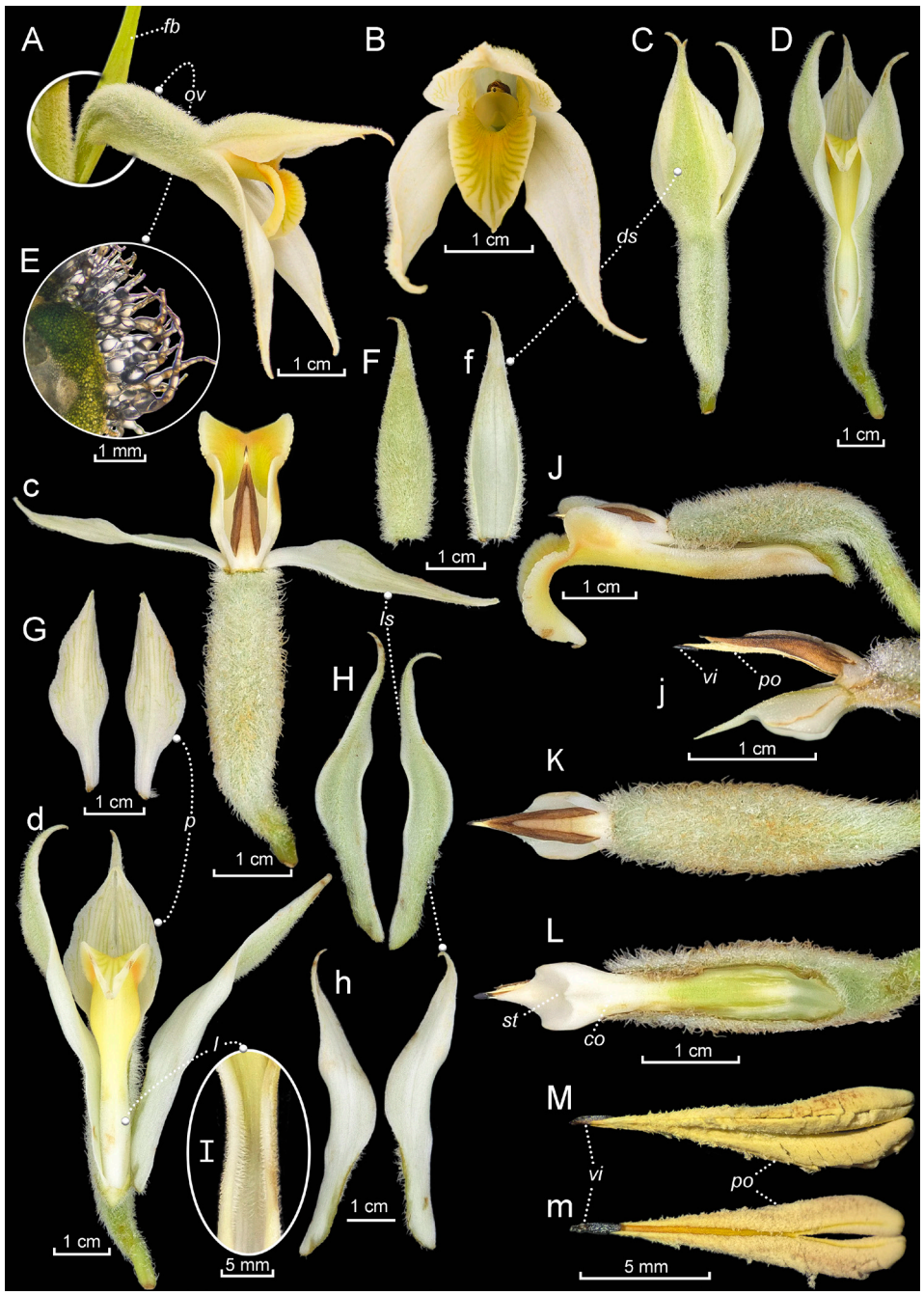

Figure 2. Flowers of *Pteroglossa macrantha*. **A**. Flower in lateral view. **B**. Flower in frontal view. **C**, **c**. Flower in dorsal view and detail with lateral sepals and petals removed (c). **D**, **d**. Flower in ventral view and detail showing base of labellum (d). **E**. Ovary's pubescence. **F**, **f**. Dorsal sepal on outer (F) and inner (f) side. **G**. Petals. **H**, **h**. Lateral sepals on outer (H) and inner (h) side. **I**. Labellum inner ornamentation. **J**, **j**. Ovary and column in lateral view and detail with labellum removed (j). **K**. Ovary and column in dorsal view. **L**. Ovary and column in ventral view. **M**, **m**. Pollinia in dorsal (M) and ventral (m) view. Abbreviations: *co*. column. *ds*. dorsal sepal. *fb*. floral bract. *l*. labellum. *ls*. lateral sepals. *ov*. ovary. *p*. petals. *po*. pollinium. *st*. stigma. *vi*. viscidium. Photographs by J.E. Florentín based on *Florentín 389* (CTES).

long-acuminate, with the filament completely adnate. *Pollinarium* 10–12 mm long, 2–3 mm wide, composed of two deeply bipartite, granular, narrowly clavate pollinia, with a ventro-apical, oval, dark gray to black viscidium. *Rostellum* remnant 2.0–2.5 mm long, narrowly triangular, rigid, faintly tridentate in the portion originally covered by the viscidium. *Stigma* slightly bilobed at the base. *Ovary* 23–31 mm long, 8–9 mm wide near the apex, densely pubescent. *Fruit* 5–6 cm long, 1.2–2.0 cm wide, ellipsoid, pubescent, light brown to orangish. *Seeds* 350–820 µm long, 80–140 µm wide, fusiform.

Phenology: Flowering and fruiting from October to February.

Distribution: *Pteroglossa macrantha* was previously known from Brazil (states of Distrito Federal, Goiás, Mato Grosso, Minas Gerais, and Rio Grande do Sul) and Paraguay (Amambay), and Venezuela. In Argentina, its historical record was limited to Misiones (San Ignacio) based on *Ekman 425* (Guimarães *et al.*, 2019). The populations recently identified in Corrientes province occur on sandy riverbanks along the Paraná River, near the city of Empedrado, representing the first modern confirmation of the species in Argentina (Fig. 3). However, according to POWO (2026), the species is also present in Bolivia and Colombia.

Ecology: The Corrientes populations inhabit alluvial grasslands on substrates composed of clay-silt and fine sand. The microhabitats of this species exhibit moderate drainage and direct sun exposure, conditions that appear to favor the presence of *P. macrantha*. Surrounding vegetation includes herbaceous species adapted to periodically inundated conditions, indicating the species tolerance to seasonal variations in soil moisture.

Conservation status in Argentina: The Empedrado locality harbors high biodiversity and supports extremely localized and fragmented populations of *P. macrantha*. The estimated extent of occurrence (EOO) was 0.012 km² and the area of occupancy (AOO), 4 km², using a 2 km grid, values that fall well below the thresholds for the Critically Endangered (CR) category (kml file available as supplementary material). However, this assessment is currently based on a single locality where the species has recently been recorded. Therefore, a more robust assessment of its conservation status should be conducted in the future. Despite extensive floristic studies and recent species inventories, *P. macrantha* has not been recorded in Misiones for over 100 years. Therefore, we have decided not to include this population in this vulnerability assessment until new records confirm its presence in that area. In Argentina the species meets criteria B1ab(iii)+B2ab(iii), as it is restricted to a single known site and its habitat is projected to undergo continued decline in both quality and extent. It also satisfies criterion C**,** as the known population is extremely small, with a very low number of mature individuals concentrated in a single locality, which increases its susceptibility to stochastic processes and anthropogenic impacts. Finally, it also meets criterion D, due to its very limited area of occupancy and severe spatial restriction.

Multiple threats affect the persistence of the species in the area, including urban expansion along the Paraná River, grazing pressure on natural grasslands, and alterations in the hydrological regime that influences the extent and duration of seasonal flooding. These factors collectively increase the vulnerability of the population and highlight the urgency of implementing *in situ* conservation measures, complemented by *ex situ* cultivation to safeguard the species in Argentina (Fig. 3).

Specimens examined: Argentina. Corrientes: Empedrado 7 km S de playa de Empedrado. En Barrancas del Paraná, 28 November 2011, *Flachsland & Escobar 175* (CTES); same data, 10 October 2025, *Florentín 389* (CTES).

Discussion. The discovery of *Pteroglossa macrantha* in Corrientes, Argentina, represents an important addition to the knowledge of the Argentine orchid flora. This record confirms the continued presence of the species in Argentina after more than a century without observations and underscores the importance of floristic surveys in poorly explored regions.

The populations identified in Corrientes inhabit marginal alluvial environments along the Paraná River, characterized by seasonally high moisture and sandy soils with a considerable drainage. These habitats are comparable to those described for the species in Paraguay and southern Brazil (Buzatto *et al.*, 2014), suggesting similar ecological conditions throughout its

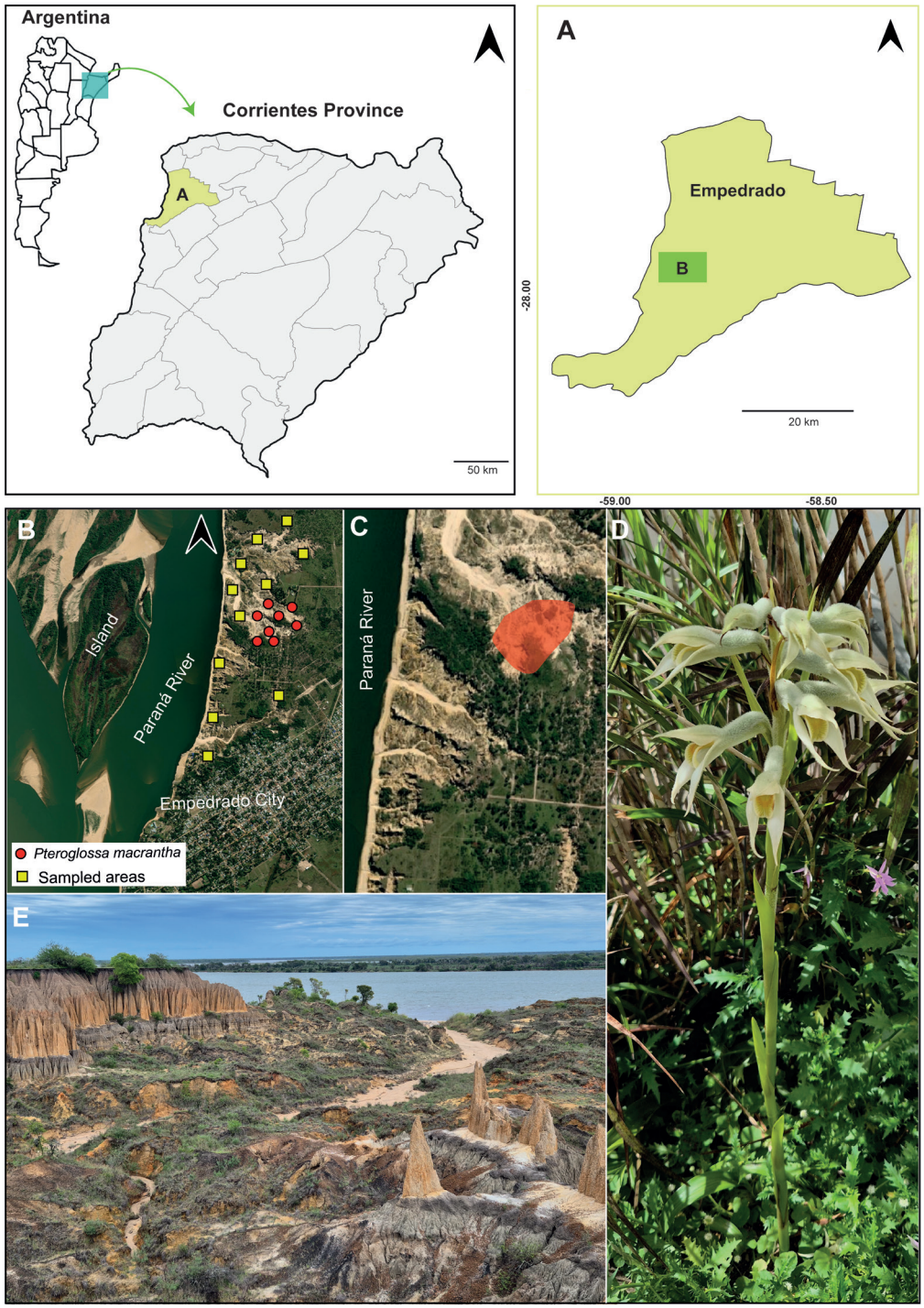

Figure 3. Distribution, conservation, and ecology of *Pteroglossa macrantha*. **A**. Location of Empedrado, Corrientes, Argentina. **B**. Satellite image of the study area showing the distribution of *P. macrantha* (red circles) and other sampled sites where the species was not located (yellow square). **C**. Detail of the study area showing the polygon of *P. macrantha* distribution. **D**. Flowering plant in cultivation. **E**. Habitat, ravines of Empedrado. Photographs by J.E. Florentín.

southern distribution. However, the species restricted extent of occurrence and the lack of additional records indicate a very limited distribution in Argentina.

Morphological characteristics of the Corrientes populations are consistent with the diagnostic features of *P. macrantha* as described by Buzatto *et al.* (2014) for Rio Grande do Sul. Plants from Corrientes are slightly taller (up to *ca.* 50 cm) and have narrower leaves (3–6 cm wide in Corrientes *vs.* 5–8 cm). The inflorescence is similar in size but tends to be somewhat laxer and may bear slightly more floral bracts (6–9 in Corrientes *vs.* 6–7). The flowers correspond closely to those reported for the species, though the Corrientes specimens show broader sepals (up to 10 mm), slightly wider petals (up to 10 mm), and a larger labellum (30–42 mm long). The rostellum and pollinarium are also comparatively larger, and the viscidium is dark gray to black rather than grey. These differences are considered quantitative variations within the species and provide additional information on its morphological variety.

Despite extensive floristic surveys in historical localities of Misiones, including areas near Ekman's 1908 collection sites such as Parque Provincial Teyú Cuaré (Misiones province) and its surroundings (Biganzoli & Múlgura, 2004), as well as recent inventories conducted by the Ministerio de Ecología de Misiones (2022), *P. macrantha* has not been recorded in the province. These localities are situated within the same general region as the original records and include habitats with some similarities to those occupied by the Corrientes population, such as seasonally moist grasslands and riverine sandy soils. However, despite these potentially suitable conditions, the species has not been detected in recent surveys, suggesting that it may be extremely rare in Misiones, locally extirpated, or restricted to microhabitats that have not been adequately sampled. This underscores the significance of the population discovered in Corrientes as the first modern and southernmost record of *P. macrantha* in Argentina, highlighting the conservation importance of the Paraná River sandbanks and alluvial grasslands for ensuring the persistence of this critically rare orchid.

At a broader scale, this finding underlines the importance of riverine grasslands and sandbanks as critical habitats for the conservation of rare and threatened Neotropical orchids. Other notable examples include two endemic species from Corrientes Province (Florentín *et al.*, 2025), *Pteroglossa luteola* Garay (Garay, 1980) and *Skeptrostachys correana* Szlach. (Szlachetko, 1996), both restricted to open, moist environments associated with fluvial dynamics. Likewise, *Malaxis irmae* Radins & Salazar, known from only a few records in riverine habitats of Misiones and Uruguay (Radins *et al.*, 2014), represents another remarkable example of highly specialized and poorly documented species in these environments.

Taken together, these cases highlight that remnant populations of species considered extremely rare, locally extirpated, or unrecorded for more than a century may still persist in specific and underexplored microhabitats. Accordingly, our results reinforce the need to continue systematic floristic surveys in northeastern Argentina, with particular emphasis on riverine environments, in order to detect, document, and conserve these vulnerable orchid populations.

Supplementary material. KML file (https://figshare.com/s/3eff463171536306bfd5) with occurrence data of *P. macrantha* in Argentina used for EOO and AOO calculations.

Acknowledgments. We thank the curators and staff of the S and CTES herbaria for their valuable collaboration and assistance during the development of this study. JEF and NSD are grateful to *Consejo Nacional de Investigaciones Científicas y Técnicas* (CONICET) for the grants that supported this research. This work was partially funded by *Universidad Nacional del Nordeste (UNNE)* through projects PI 20P002 and PINOV 24PN04. We also thank Walter Medina and Bruno Olmedo for their help during fieldwork, and Silvia Romero for her assistance with the CTES herbarium collections.

Author contribution. JEF and EAF conceived the study, designed the research strategy, and carried out the fieldwork and specimen documentation. JEF and NSD performed the morphological analyses and prepared the description and illustrations. JEF wrote the first draft of the manuscript, interpreted the results, and integrated the taxonomic conclusions. NSD and DLS provided critical revisions, contributed to the discussion and interpretation of data, and improved the final version of the manuscript. JEF supervised the overall study and contributed to the final editing and approval of the paper.

Funding. This research was supported by the *Universidad Nacional del Nordeste (UNNE)*, *Secretaría General de Ciencia y Técnica (SGCyT)*, through the project *"Estrategias de conservación para la flora vascular endémica de Corrientes*, *Argentina"* (Proyectos de Investigación de Nóveles Investigadores, PINOV, Code 24PN04, Resolution RES-2025-287-CS#UNNE).

Conflict of interest. The authors declare no competing interests.

Literature cited

Barbosa Rodrigues, J. (1877). *Spiranthes albescens* Barb.Rodr. *Stenorrhynchos albescens* (Barb.Rodr.) Barb.Rodr. *Genera et species orchidearum novarum*, 1, 186. Retrieved from https://www.biodiversitylibrary.org/item/10519#page/189/mode/1up [Accessed in March, 2026].

Batista, J. A. N., Meneguzzo, T. E. C., Salazar, G. A., Bianchetti, L. de B., Ramalho, A. J., & De Bem Bianchetti, L. (2011). Phylogenetic placement, taxonomic revision, and a new species of *Nothostele* (Orchidaceae), an enigmatic genus endemic to the cerrado of central Brazil. *Botanical Journal of the Linnean Society*, 165, 348–363. https://doi.org/10.1111/j.1095-8339.2011.01113.x

Biganzoli, F., & Múlgura de Romero, M. E. (2004). Inventario florístico del Parque Provincial Teyú Cuaré y alrededores (Misiones, Argentina). *Darwiniana*, 42(1–4), 1–24. Retrieved from https://www.scielo.org.ar/scielo.php?script=sci_arttext&pid=S0011-67932004000100001&lng=es&nrm=iso [Accessed in March, 2026].

Buzatto, C. R., Singer, R. B., & Bordignon, S. A. (2014). Taxonomic notes on *Lyroglossa* and *Pteroglossa* (Orchidaceae: Spiranthinae): two new generic records for the flora of Rio Grande do Sul. *Anais da Academia Brasileira de Ciências*, 86(2), 821–828. https://doi.org/10.1590/0001-3765201420130257

Buzatto, C. R., Singer, R. B., Romero-González, G. A., van den Berg, C., & Salazar, G. A. (2013). Typifications and taxonomic notes in species of Brazilian Goodyerinae and Spiranthinae (Orchidaceae) described by José Vellozo and Barbosa Rodrigues. *Taxon*, 62(3), 609–621. https://doi.org/10.12705/623.10

Chase, M. W., Cameron, K. M., Freudenstein, J. A., Pridgeon, A. M., Salazar, G., van den Berg, C., & Schuiteman, A. (2015). An updated classification of Orchidaceae. *Botanical Journal of the Linnean Society*, 177, 151–174. https://doi.org/10.1111/boj.12234

Damián, A., & Salazar, G. A. (2017). A new species and first record of the genus *Pteroglossa* (Orchidaceae, Spiranthinae) from Peru. *Phytotaxa*, 311(3), 235–244. https://doi.org/10.11646/phytotaxa.311.3.3

Florentín, J. E., Vallejos, C., Salas, R. M., Medina, W. A., & Salariato, D. (2025). Riqueza y Distribución de plantas vasculares endémicas de la provincia de Corrientes, Argentina. *Bonplandia*, 34(1), 25–40. http://dx.doi.org/10.30972/bon.3417928

Garay, L. A. (1980). A Generic Revision of the Spiranthinae. *Botanical Museum Leaflets, Harvard University*, 28(4), 277–425.

GeoCAT. (2026). *Geospatial Conservation Assessment Tool*. Retrieved from https://geocat.iucnredlist.org/ [Accessed in March, 2026].

Google Earth. (2018). Google Earth Pro [Software]. Retrived from https://www.google.com.ar/intl/es/earth/ [Accessed in March, 2026]

Guimarães, L. R. S., Salazar, G. A., & de Barros, F. (2019). Lectotypifications and taxonomic notes in the *Stenorrhynchos* clade (Spiranthinae, Orchidaceae). *Phytotaxa*, 394(1), 111–117. https://doi.org/10.11646/phytotaxa.394.1.9

International Association for Plant Taxonomy (IAPT). (1962). II. Terminology of simple symmetrical plane shapes (chart 1). Systematics Association Committee for Descriptive Biological Terminology. *Taxon*, 11, 145–156. https://doi.org/10.2307/1216718

International Union for Conservation of Nature (IUCN). (2012). *The IUCN Red List categories and criteria* (2nd ed., version 3.1). Gland, Switzerland; Cambridge, UK.

IUCN Standards and Petitions Committee. (2024). *Guidelines for Using the IUCN Red List Categories and Criteria* (Version 16). Retrieved from https://www.iucnredlist.org/documents/RedListGuidelines.pdf [Accessed in March, 2026].

Ministerio de Ecología de Misiones. (2022). Relevamiento de especies nativas en el Parque Provincial Teyú Cuaré. Retrieved from https://ecologia.misiones.gob.ar/ [Accessed in March, 2026]

POWO. (2026). *Plants of the World Online*. Royal Botanic Gardens, Kew. Retrieved from https://powo.science.kew.org/ [Accessed in March, 2026]

QGIS Development Team. (2018). *QGIS Geographic Information System* [Software]. Retrieved from https://www.qgis.org/ [Accessed in March, 2026]

Radins, J. A., Salazar, G. A., Cabrera, L. I., Jiménez-Machado, R., & Batista, J. A. N. (2014). A new paludicolous species of *Malaxis* (Orchidaceae) from Argentina and Uruguay. *Phytotaxa*, 175(3), 121–132. https://doi.org/10.11646/phytotaxa.175.3.1

Salazar, G. A. (2003). Spiranthinae. In: A. M. Pridgeon, P. J. Cribb, M. W. Chase, & F. Rasmussen (Eds.), *Genera Orchidacearum, vol. 3*: Orchidoideae part 2, Vanilloideae (pp. 164–278). Oxford: Oxford University.

Salazar, G. A., Chase, M. W., Soto Arenas, M. A., & Ingrouille, M. (2003). Phylogenetics of Cranichideae with emphasis on Spiranthinae (Orchidaceae, Orchidoideae): evidence from plastid and nuclear DNA sequences. *American Journal of Botany*, 90, 777–795. https://doi.org/10.3732/ajb.90.5.777

Salazar, G. A., Batista, J. A. N., Cabrera, L. I., van den Berg, C., Whitten, W. M., Smidt, E. C., Buzatto, C. R., Singer, R. B., Gerlach, G., Jiménez-Machorro, R., Radins, J. A., Insaurralde, I. S., Guimarães, L. R. S., Barros, F. de, Tobar, F., Linares, J. L., Mújica, E., Dressler, R. L., Blanco, M. A., Hágsater, E., & Chase, M. W. (2018). Phylogenetic systematics of subtribe Spiranthinae (Orchidaceae: Orchidoideae: Cranichideae) based on nuclear and plastid DNA sequences of a nearly complete generic sample. *Botanical Journal of the Linnean Society*, 186(3), 273–303. https://doi.org/10.1093/botlinnean/box096

Salazar, G. A., Batista, J. A. M., Meneguzzo, T. E. C., Cabrera, L. I., Figueroa, C., Calvillo-Canadell, L., do Vale, A., & Jiménez-Machorro, R. (2019). Polyphyly of Mesadenus (Orchidaceae, Spiranthinae) and a New Genus from the Espinhaço Range, Southeastern Brazil. *Systematic Botany*, 44(2), 282–296. https://doi.org/10.1600/036364419X15562054132974

Simpson, M. G. (2010). *Plant systematics* (2nd ed.). Oxford, UK: Academic Press. https://doi.org/10.1016/B978-0-12-374380-0.50001-4

Sprunger, S., Cribb, P.J. & Toscano de Brito, A.L.V. (1996). *João Barbosa Rodrigues: Iconographie des orchidées du Brésil, vol. 1, The illustrations*. Basle: Reinhardt.

Szlachetko, D. L. (1996). Studies on *Spiranthinae (Orchidaceae)*. *Fragmenta Floristica et Geobotanica*, 41(2), 845–863.

Thiers, B. (2026). Index Herbariorum: a global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. https://doi.org/10.3897/biss.2.26440

Zuloaga, F. O., Zanotti, C. A., & Salariato, D. L. (2025). Actualización del Catálogo de Plantas Vasculares del Cono Sur II. *Darwiniana nueva serie*, 13, 189–244. https://doi.org/10.14522/darwiniana.2025.131.1301 [accessed in March, 2026].