

A NEW ALIEN ORCHID AMONG US: A RECORD OF *PONTHIEVA FERTILIS* (CRANICHIDINAE) IN THE BRAZILIAN ATLANTIC FOREST

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ABSTRACT. During a field expedition in the state of Paraná, southern Brazil, a population of *Ponthieva fertilis* was found growing in a ravine alongside a commercial *Pinus* plantation. *Ponthieva fertilis* is an Andean species, naturally occurring from Bolivia to Venezuela, and it is here recorded for the first time in Brazil. High fruiting rates were observed, highlighting its potential as an invasive exotic species. Additionally, a description, photographs, illustrations and comments on its ecological and distributional characteristics are provided to facilitate its recognition, given its “alien” status in Brazil.

RESUMO. Durante expedição de campo no Estado do Paraná, Sul do Brasil, foi encontrada uma população de *Ponthieva fertilis* vegetando em um barranco ao longo de um plantio comercial de *Pinus*. *Ponthieva fertilis* é uma espécie dos Andes, encontrada naturalmente da Bolívia até a Venezuela, sendo registrada pela primeira vez para o Brasil. Foram observadas altas taxas de frutificação, ressaltando seu potencial como exótica invasora. Adicionalmente, são fornecidas sua descrição, fotografias, ilustrações e comentários sobre suas características ecológicas e de distribuição, a fim de facilitar seu reconhecimento, visto seu *status* “alienígena” no Brasil.

KEYWORDS / PALAVRAS-CHAVE: Cranichideae, exotic, exótica, invasive, invasora, new record, novo registro, Paraná

Introduction. Orchidaceae is one of the taxonomically most diverse families of Angiosperms, with representatives distributed across nearly all regions of the world. The family exhibits a wide spectrum of growth habits, life forms, morphological adaptations and ecological strategies, enabling its taxa to colonise an extensive range of environments and ecological niches, thereby establishing Orchidaceae as a floristically significant component within plant communities (Dressler, 1993; Pessoa *et al.*, 2025; Pridgeon *et al.*, 1999).

Brazil, a vast country in South America, harbours 2659 species and 246 genera of Orchidaceae (Flora e Funga do Brasil, 2026). The Atlantic Forest

Domain is the richest in orchid diversity and also the most threatened and deforested among Brazilian vegetation formations (see Flora e Funga do Brasil, 2026; Pessoa *et al.*, 2025; Ribeiro *et al.*, 2009). Recognised as a biodiversity hotspot (Myers *et al.*, 2000), the Atlantic Forest, despite being one of the most extensively studied domains, continues to yield significant taxonomic novelties, including new distribution records and newly described species (e.g., Barberena & Gonzaga, 2016; Engels & Smidt, 2022; Engels *et al.*, 2023; Morales *et al.*, 2023, 2025; Pessoa *et al.*, 2016, 2025; Santos & Azevedo, 2022; Santos & Smidt, 2023, 2024; Sousa *et al.*, 2025). Despite this remarkable diversity and

Brazil's territorial dimensions, only five orchid species are currently regarded as naturalised (Flora e Funga do Brasil, 2026).

Human interventions significantly alter the composition of natural environments, both through the removal of the native vegetation cover and the introduction and management of exotic species for diverse purposes. Although many of these species are cultivated and depend on human management, some encounter favorable conditions for reproduction and dispersal, enabling them to colonize and occupy natural habitats. In numerous cases, such species replace native taxa and, under these circumstances, are classified as invasive alien species (Leão *et al.*, 2011; Moro *et al.*, 2012; Sampaio & Schmidt, 2013).

Although still scarcely investigated, documented cases show exotic orchids benefiting from novel environments, maintaining interactions with pollinators, and achieving reproductive success. Such success is highly variable, ranging from the spontaneous occurrence of a few epiphytic plants in urban arborization (e.g., Pemberton & Downing, 2025) to sporadic presence in natural habitats (e.g., Pemberton *et al.*, 2008) or frequent occurrence with wide distribution (e.g., Menini Neto *et al.*, 2011; Wetterer & Wetterer, 2022), thereby generating different types of impacts on native flora.

The present study aims to report the first record in Brazil of the Andean *Ponthieva fertilis* (F.Lehm. & Kraenzl.) Salazar, providing data for its identification, and discuss its invasive potential in the country.

Material and methods. We collected and processed material following the protocol of Fidalgo & Bononi (1989) and deposited in the UPCB and EFC herbaria, with acronyms according to Thiers (2026). The confirmation of the material's identity was undertaken through the study of previously identified herbarium specimens (i.e., online database of K), as well as consultation of bibliographic sources (i.e., Pridgeon *et al.*, 2003; Szlachetko & Kolanowska, 2018). For terminology and concepts of exotic species, we adopted the definitions proposed by Moro *et al.* (2012). The description and illustration were prepared based on the examination of both fresh and herbarium-collected material. Morphological terminology followed Gonçalves & Lorenzi (2011).

TAXONOMIC TREATMENT

Ponthieva fertilis (F.Lehm. & Kraenzl.) Salazar in Ann. Bot. (Oxford) 104: 416. 2009. $\equiv$ *Goodyera fertilis* F.Lehm. & Kraenzl. in Bot. Jahrb. Syst. 26: 498. 1899. $\equiv$ *Cranichis fertilis* (F.Lehm. & Kraenzl.) Schltr. in Repert. Spec. Nov. Regni Veg. Beih. 8: 115. 1921. (Fig. 1–2).

$\equiv$ *Cranichis koehleri* Schltr. in Repert. Spec. Nov. Regni Veg. Beih. 9: 55. 1921.

$\equiv$ *Cranichis pycnantha* Schltr. in Repert. Spec. Nov. Regni Veg. Beih. 7: 62. 1920.

$\equiv$ *Ophrys parviflora* C.Presl in Reliq. Haenk. 1: 92. 1827. $\equiv$ *Exalaria parviflora* (C.Presl) Garay & G.A.Romero in Harvard Pap. Bot. 4: 480. 1999.

Terrestrial herb, 8–33 cm in total height. *Roots* 1–12 cm $\times$ 0.07–0.12 cm, cylindrical, sparsely pilose, brown to whitish. *Rhizome* compact, indistinct, ca. 5 mm long. *Leaves* 2.7–16.0 $\times$ 0.7–2.1 cm, 3 to 7 contemporaneous, elliptic, narrowly elliptic to narrowly oblanceolate, base attenuate and decurrent into the pseudopetiole, margin entire, apex obtuse to acute, glabrous, green. *Inflorescence* with peduncle 53–216 $\times$ 0.7–2.0 mm, covered by sheathing bracts. *Rachis* 1.0–9.4 $\times$ 0.7–2.0 cm, multiflorous, bearing 11–73 flowers; floral bract 2.5–3.0 $\times$ 1.0–1.2 mm, lanceolate to ovate, base obtuse to rounded, margin entire and ciliate, apex obtuse to acute, light green. *Tector trichomes* present on peduncle, rachis, bracteoles and flowers. *Flowers* non-resupinate; pedicel and ovary ca. 2.5 $\times$ 0.7 mm, oblanceoloid to ellipsoid, pilose, green. *Dorsal sepal* 2.0–2.2 $\times$ 1.0 mm, lanceolate to ovate, base cuneate to rounded, margin entire, apex obtuse to rounded, concave, glabrous to pilose at the apical region of the abaxial surface, white. *Lateral sepals* 2.0–2.2 $\times$ 1.25 mm, ovate, base rounded, margin entire, apex rounded and concave, pilose at the distal half of the abaxial surface, white. *Petals* 2.0–2.2 $\times$ 0.7 mm, elliptic, basioscopic margin auriculate, base cuneate to subrounded, margin entire, apex rounded, glabrous, white. *Labellum* 2.0–2.2 $\times$ 3.0 mm, transversely elliptic, cymbiform, trilobed, glabrous, white with light green striae; midlobe 0.5 $\times$ 0.5 mm, ovate to deltoid, obtuse; lateral lobes ca. 1.5 mm long, semi-orbicular. *Column* ca. 1.2 mm long; stigma bilobed; rostellum triangular, acute. *Anther cap* ca. 0.7 mm long, lanceolate-ovate, brown. *Pollinarium*

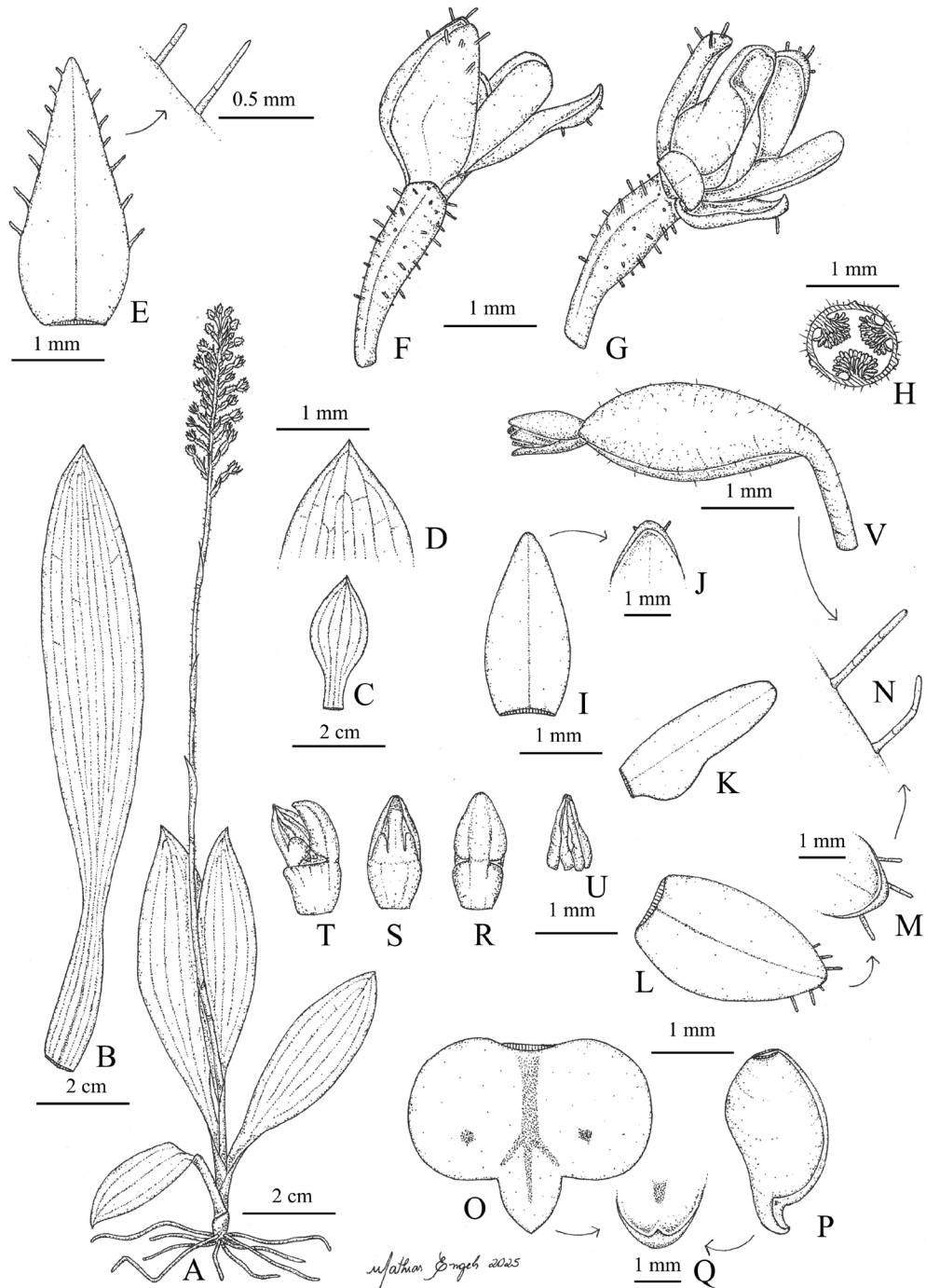


FIGURE 1. Line drawing of *Ponthieva fertilis*. A. Habit. B–C. Leaves. D. Leaf apex, detail. E. Floral bract. F. Flower, lateral view. G. Flower, diagonal view. H. Ovary and placentation, detail of cross-section. I. Dorsal sepal. J. Dorsal sepal apex, detail. K. Petal. L. Lateral sepal. M. Lateral sepal apex, detail. N. Trichomes of the flower, detail. O. Flattened lip. P. Lip, lateral view. Q. Lip apex, detail. R. Column, dorsal view. S. Column, lateral view. T. Column, diagonal view. U. Pollinarium. V. Immature fruit. Drawn by M. E. Engels, based on Engels *et al.* 13289.

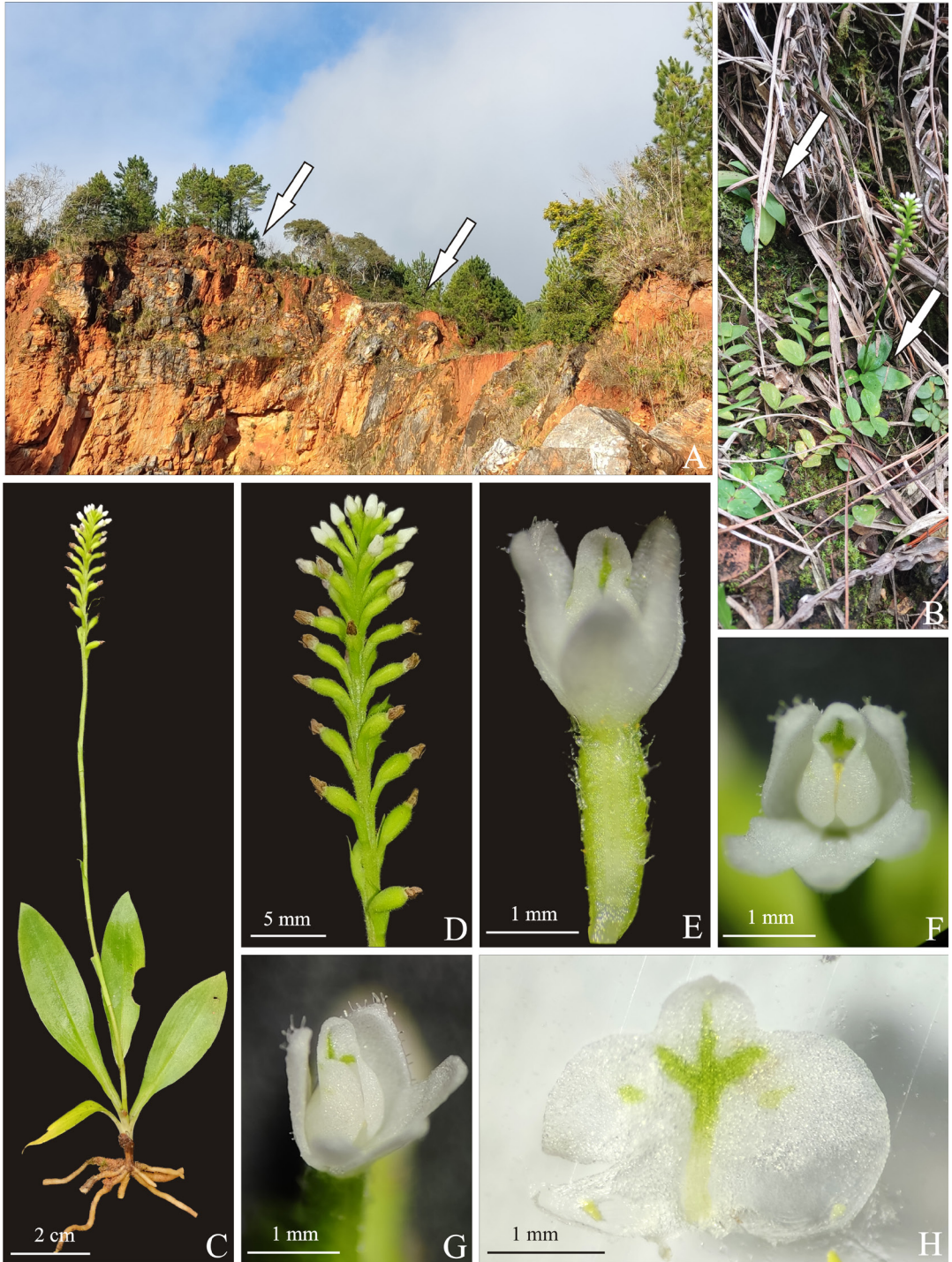


FIGURE 2. Photos of *Ponthieva fertilis*. **A.** Anthropogenic environment, with ravines and *Pinus* sp., arrows indicate where the orchid individuals were found. **B.** Habitat, arrows indicate the individuals. **C.** Habit. **D.** Inflorescence with buds, flowers and young fruits. **E.** Flower, dorsal view. **F.** Flower, frontal view. **G.** Flower, diagonal view. **H.** Flattened lip. Photos by M. E. Engels from Engels *et al.* 13289.

with four pollinia, 0.75 mm long, yellow; viscidium deltoid, brown. Immature *fruits* 5.0–7.0 × 2.0–2.5 mm, ellipsoid, pilose, green; perianth persistent, dry, pale-aceous.

EXAMINED MATERIAL: BRAZIL. Paraná: Tunas do Paraná, Atlantic Forest, Araucária Forest, fl. and fr., 04 July 2025, *Engels et al.* 13289 (EFC, UPCB).

DISTRIBUTION AND ECOLOGY: *Ponthieva fertilis* occurs naturally in the Andes, in Bolivia, Colombia, Ecuador, Peru and Venezuela (POWO, 2026), and it is reported here for the first time in Brazil as a naturalised exotic species. In the Andean region (natural occurrence), *P. fertilis* occurs in woodland or bushland on graminoid vegetation, rocky sandy areas near forest, or on cliffs over rivers, at elevations between 700 and 2400 m a.s.l. (Pridgeon *et al.*, 2003). In Brazil, it was recorded in the municipality of Tunas do Paraná, Paraná State, within the Vale do Ribeira region. This area lies within the Araucaria Forest (Mixed Ombrophilous Forest – Atlantic Forest Domain) and is characterised by gently to strongly undulating relief, with silviculture as a significant land use. The species was found growing terrestrially in an open site, on the slope of a commercial *Pinus* L. (Pinaceae) plantation at approximately 900 m a.s.l., forming a considerable population (estimated to comprise at least 400 individuals).

In the Andes, *P. fertilis* has been recorded in flower and fruit between March and December. In Brazil, it was found in flower and fruit in July.

TAXONOMIC NOTES: *Ponthieva* R.Br. is an American genus with about 76 species (POWO, 2026). Its flowers are usually quite distinctive and differ from other genera by their non-resupinate flowers, clawed petals, and a lip usually attached to the column through a claw, usually trilobed and much smaller than the petals and sepals (Meneguzzo, 2020). *Ponthieva fertilis* can be distinguished from *P. phaenoleuca* (Barb.Rodr.) Cogn., the only congener species occurring in Brazil as a native species, by the following combination of characters: multiflorous, dense inflorescences (vs. pauciflorous, lax); small flowers (4.0–5.0 mm in diameter vs. 7.0–9.0 mm); petals with a reduced basioscopic auricle (vs. developed); and the morphology of the labellum, which is non-unguiculate (vs. unguiculate).

Discussion. The plants examined showed a notably high fruit set (Fig. 2B–D). Although the flowers reach anthesis and allow for cross-pollination, manipulation of the flowers revealed the occurrence of spontaneous self-pollination (i.e., upon dissecting the flower and removing the pollinarium, part of the pollinia was found adhering to the margin of the stigmatic lobes), resulting in elevated fruiting rates and reinforcing the invasive potential of the species. Given the presence of a well-established and reproducing population, the species may be regarded as a “naturalised exotic”. However, owing to its high fruiting rates and the production of minute seeds dispersed by wind, there exists the possibility of colonization and occupation of new sites, both nearby and more distant, indicating the potential for the species to become an “invasive exotic”.

We believe that *P. fertilis* may, in the future, be found occupying other anthropogenic environments (as observed in the recorded population), given that ecosystems in the Atlantic Forest domain are severely fragmented and degraded (Ribeiro *et al.*, 2009). In addition, owing to the ecological characteristics of the species, it also has the potential to invade open natural ecosystems (i.e., native grasslands, vegetational refuges, and rocky fields). *In situ* observations revealed that winter frosts had damaged part of the population. Nevertheless, despite these injuries, the individuals survived, suggesting that frost is not a climatic limiting factor for the species’ establishment in subtropical regions of the Atlantic Forest. This is the first record of *P. fertilis* for Brazil, with no other records or citations of the species reported from other localities within the national territory to date (i.e., Centro de Referência em Informação Ambiental [CRIA], 2026; Flora e Funga do Brasil, 2026; Jabot, 2026).

Exotic species with the potential to reproduce and establish in new environments have been observed across different plant groups worldwide, and today 16,429 taxa are recognised as “alien” species outside the original distribution (Davis *et al.*, 2025). In Brazil, there are exotic species ranging from gymnosperms (*Pinus taeda* L. – Pinaceae, Falleiros *et al.*, 2011); monocotyledons (various grasses – Poaceae, Horowitz *et al.*, 2013; *Hedychium coronarium* J.Koenig – Zingiberaceae, Pereira *et al.*, 2024; Pupin & Mendes, 2020; Santos *et al.*, 2005); to eudicotyledons (*Crotalaria retusa* L. – Fabaceae, Santana & Figueiredo,

2019; *Darcya vandellioides* (Benth.) Scatigna – Plantaginaceae, Koch *et al.*, 2025; *Ligustrum lucidum* W.T.Aiton – Oleaceae, Nunes *et al.*, 2018; Oliveira *et al.*, 2016). These species compete and behave differently, ranging from secondary anthropogenic environments (e.g., lawns, peridomiliary areas) to preserved natural habitats (e.g., forests and grasslands, including conservation units).

Although several records document exotic orchid species establishing in natural environments, research on their occurrence remains incipient (Grenié *et al.*, 2025). Nevertheless, some studies have examined new occurrences and their autecology (Menini Neto *et al.*, 2011; Pemberton & Downing, 2025; Pemberton *et al.*, 2008; Wetterer & Wetterer, 2022), their inclusion in floras (Engels *et al.*, 2016), or listings focused on exotic species within specific areas (Horowitz *et al.*, 2013; Silva Machado *et al.*, 2020).

However, some species have been more thoroughly investigated, and their histories of occupation and invasion are better understood. This is the case for *Oeceoclades maculata* (Lindl.) Lindl. (= *Eulophia maculata* (Lindl.) Rchb.f.) (see Wetterer & Wetterer, 2022) and *Zeuxine strateumatica* (L.) Schltr. (see Martín *et al.*, 2024; Menini Neto *et al.*, 2011), both Old

World species that are now widely distributed in the New World.

In this context, documenting this new distribution record contributes to knowledge of the alien orchid flora by including *P. fertilis* among the species recorded in Brazil.

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