DARWINIANA
NUEVA SERIE
www.ojs.darwin.edu.ar
ISSN 0011-6793 impresa - ISSN 1850-1699 en línea

DARWINIANA, nueva serie 13(1): 145-152. 2025
Versión de registro, efectivamente publicada el 10 de junio de 2025
DOI: 10.14522/darwiniana.2025.131.1266

GENTIANELLA TAYACAJENSIS (GENTIANACEAE), A NEW SPECIES FROM PERU

Susy J. Castillo[1,2], Hamilton Beltrán[3] & James S. Pringle[4†]

[1]*Departamento de Dicotiledóneas, División Botánica, Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Av. Arenales 1256, Lima 11, Perú;* susy.castillo@unmsm.edu.pe (author for correspondence).
[2]*Unidad de Posgrado, Facultad de Ciencias Biológicas, Universidad Nacional Mayor de San Marcos, Calle Germán Amezaga 375, Lima 01, Perú.*
[3]*Herbario San Marcos, Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Av. Arenales 1256, Lima 11, Perú.*
[4]*Royal Botanical Gardens, P.O. Box 399, Hamilton, Ontario, Canada L8N 3H8.*

Abstract. Castillo, S. J.; H. Beltrán & J. S. Pringle. 2025. *Gentianella tayacajensis* (Gentianaceae), a new species from Perú. *Darwiniana*, nueva serie 13(1): 145-152.

A new species from Peru, *Gentianella tayacajensis*, collected in the department of Huancavelica, Tayacaja province, is described and illustrated. It is morphologically close to *G. tristicha*, *G. graminea* and *G. oreosilene*, from which it is distinguished by presenting rotaceous corollas with narrowly oblanceolate coroline lobes, 18-22 mm long and 5-6.2 mm wide; also, by the presence of filiform trichomes with rounded protuberances inside the corolla. The morphological differences between the new species and related species are discussed and its geographic distribution is mapped.

Keywords. Andean; endemic; floral trichome; Swertiinae; taxonomy.

Resumen. Castillo, S. J.; H. Beltrán & J. S. Pringle. 2025. *Gentianella tayacajensis* (Gentianaceae), una nueva especie de Perú. *Darwiniana*, nueva serie 13(1): 145-152.

Se describe e ilustra a *Gentianella tayacajensis*, una nueva especie de Perú, colectada en el departamento de Huancavelica, provincia de Tayacaja. Es morfológicamente afín a *G. tristicha*, *G. graminea* y *G. oreosilene*, de las cuales se distingue por presentar corolas rotáceas con lóbulos corolinos angostamente oblanceolados, de 18-22 mm de largo y 5-6,2 mm de ancho; asimismo, por la presencia de tricomas filiformes con protuberancias redondeadas en el interior de la corola. Se discuten las diferencias morfológicas entre la nueva especie y las especies afines, asimismo se presenta un mapa con su distribución geográfica.

Palabras clave. Andes; endemismo; Swertiinae; taxonomía; tricomas florales.

INTRODUCTION

Gentianella Moench (Gentianaceae, Gentianeae, Swertiinae) is a genus of herbaceous plants with representatives on most continents, but it is exceptionally diverse in South America (Struwe et al., 2002; Pringle, 2014a). It is the second largest genus in Gentianaceae and has approximately 300 species of the 1736 that comprise the family (Struwe, 2014, Pringle, 2017b). Although *Gentianella* was long treated as a subgenus of *Gentiana*, it was gradually recognized as a distinct genus over the course of the 20th century, initially based primarily on morphological characteristics and later supported by molecular phylogenetic studies (Gillett, 1957; Fabris, 1960; Yuan & Küpfer, 1995; Struwe et al., 2002; Yang et al., 2016; Pringle, 2017b).

In Peru, 107 species have been reported; 83 of which (78%) are endemic (Castillo et al., 2006; Castillo & Pringle, 2018; Pringle, 2019, 2020). These species are distributed across a variety of Andean ecosystems and altitudinal gradients,

Original recibido el 6 de diciembre de 2024, aceptado el 24 de mayo de 2025
Editor Asociado: Fernando Biganzoli

including the humid and dry puna, the jalca, the páramo, and the high Andean and meso-Andean zones (Brako & Zarucchi, 1993; Castillo et al., 2006; León et al., 2006). Peruvian species are monocarpic or polycarpic herbs, ranging from 3 to over 100 cm in height. They possess opposite, sessile leaves, and their flowers are either solitary or arranged in cymose inflorescences with numerous flowers. The fruit is typically a capsule, with mostly spherical seeds (Macbride, 1959; Pringle 2017b).

In terms of conservation status, two species of *Gentianella* are officially listed as threatened according to Peruvian regulations (Decreto Supremo 043-2006-AG, 2006). Additionally, as of 2019, twelve species occurring in Peru are included in the IUCN Red List (IUCN, 2024).

As part of ongoing research on *Gentianella* in Peru, specimens with distinct morphological characteristics, not previously documented, were collected, analyzed, and reviewed for publication and official recognition. In this regard, the present work aims to record a new species collected in the province of Tayacaja, department of Huancavelica, Peru.

MATERIALS AND METHODS

The collections analyzed are part of a phylogenetic study of *Gentianella* from Peru. This research project was authorized by the Servicio Nacional Forestal y de Fauna Silvestre (SERFOR) and reviewed by the Bioethics Committee of the Facultad de Ciencias Biológicas, Universidad Nacional Mayor de San Marcos.

Botanical specimens were collected following standard methods for wild flora (Cerrate, 1969; Bridson & Forman, 1992). The holotype was deposited at the USM herbarium, while isotypes and paratypes were deposited at the HUT, MOL and USM herbaria (Thiers, 2024).

Observations and measurements of small plant structures were conducted using a millimetric scale under a stereo microscope (Leica S9i). The data obtained were recorded and systematized to elaborate the description of the new species. Photographs of floral structures were taken to assist in producing drawings that support the species description.

The identification of the new species was based on a thorough review of relevant literature and herbarium specimens. The literature consulted includes publications by Gilg (1906), Macbride (1959), Fabris (1955, 1958), Pringle (1981, 1986, 1993, 2008a, 2008b, 2011, 2012a, 2012b, 2014b, 2016, 2017a, 2017b, 2019, 2020), Pringle & Grant (2012), Pfanzelt et al. (2015), and Castillo & Pringle (2018). Specimens from the herbaria HUT, MOL, US, and USM, as well as digital repositories of the F and US herbaria, were consulted.

Morphologically similar species related to the new taxon were identified, and corresponding observations and measurements were conducted for comparative purposes. These data were used to compile a table of diagnostic characters. A distribution map of the new species and its related taxa was generated using the cartographic software QGIS v. 3.22.11-Białowieża (QGIS.org, 2024). Scientific names are cited following the International Plant Name Index (IPNI, 2024).

Preliminary assessment of the conservation status was carried out following the IUCN Red List criteria (IUCN, 2012). The area of occupancy (AOO) was estimated using the beta version of the GeoCAT tool (Bachman et al., 2011), employing the default cell size of 2 km.

RESULTS

Taxonomic Treatment

Gentianella tayacajensis S.J. Castillo, H. Beltrán & J.S. Pringle, **sp. nov.** TYPE: PERU. Huancavelica, Tayacaja, Pampas. Ladera al borde de la carretera PE35S, a 5 km de la ciudad de Pampas, matorral con gramíneas de porte alto, vegetación natural muy fragmentada, 12° 23’ 27” S, 74° 54’ 7” W, 3566 m a.s.l., 29-V-2022 (fl), *S. J. Castillo 1744* (holotype, USM, isotypes, MOL, HUT). Figs. 1 & 2.

Diagnosis. *Gentianella tayacajensis* sp. nov. is morphologically closer to *Gentianella tristicha* (Gilg) J.S. Pringle, *Gentianella graminea* (Kunth) Fabris and *Gentianella oreosilene* (Gilg) J.S. Pringle; but differs from *G. tristicha* in its opposite (vs. verticillate) leaves and narrowly obovate corolla lobes 18–22 mm long and 5–6.2 mm wide (vs. wide obovate, 13–19 mm long and 6–10 mm wide); from *G. graminea* in its lilac, rotate (vs. white, campanulate) corolla, and longer and narrower corolla lobes (vs. obovate, 10–14 mm long and 6–9.5 mm wide); from *G. oreosilene* in its pedicels 13–50 mm long (vs. 10–20 mm long), rotate (vs. campanulate) corolla, 26–31 mm long (vs. 15–17 mm long), and longer corolla lobes (vs. 11–12 long); and from all three species in presence of filiform adaxial corolla trichomes with rounded protuberances (vs. trichomes smooth in *G. graminea* and *G. tristicha*, absent in *G. oreosilene*).

Description. Polycarpic, hermaphroditic herb, 19–48 cm tall, with slender stems, narrow leaves, and a cespitose appearance at their base. Old branches semi-prostrate, 2.5–6 × 0.17–0.4 cm, with a rosette of leaves at their apex, with 30–52 nodes, with erect vegetative and flowering branches.

Flowering branches 13–21 × 0.1–0.2 cm, purplish red, with 6–10 nodes. Leaves sessile; blades 23–42 × 2.3–2.8 mm, narrowly oblanceolate to linear, acute at apex, green, herbaceous, papillose on margins, with main vein conspicuous and lateral veins inconspicuous, may be conduplicate; bases 1.7–3 × 3–4.5 mm, connate, with 3 conspicuous veins. Inflorescence cymose, racemiform, with (1–)2–6 flowers per peduncle. Bracts leaf-like; blades 11–44 × 1.3–3.3 mm, narrowly oblanceolate to lanceolate, acute at apex, green; bases 1–3.5 × 1.3–3 mm, connate, with colleters 2–3 mm long on adaxial side of base. Flowers 5-merous; pedicels 13–50 mm, erect. Calyx 9–12 mm, campanulate, green with purplish-red tints, herbaceous consistency; tube 3–4 mm, with colleters; lobes 5, 6–9 × 1.8–2.5 mm, 1.7–2.3 times as long as the tube, narrowly triangular, acute at apex, with papillae on margin; colleters 2–4 mm, fusiform. Corolla 22–31 mm, rotaceous, light lilac, membranous, with trichomes; tube 4.8–6.5 × 2.7–3 mm; lobes 5, 18–22 × 5–6 mm, 3.3–3.8 times as long as the tube, narrowly obovate, obtuse at the apex, with slightly sinuous edges, flat; nectaries 1–1.5 × 0.8–1 mm, obtriangular, 0.5–1 mm from inner base of tube (adaxial side), equal in number to the lobes; trichomes 1.5–3.5 mm, above the area of insertion of the stamens and below the sinus, filiform with protuberances, abundant. Androecium composed by 5 stamens, inserted 3–4.4 mm from the base of the tube; staminal filaments 10–12 × 1 mm, whitish; anthers 2.7–3.2 × 1.7 mm, oblong,

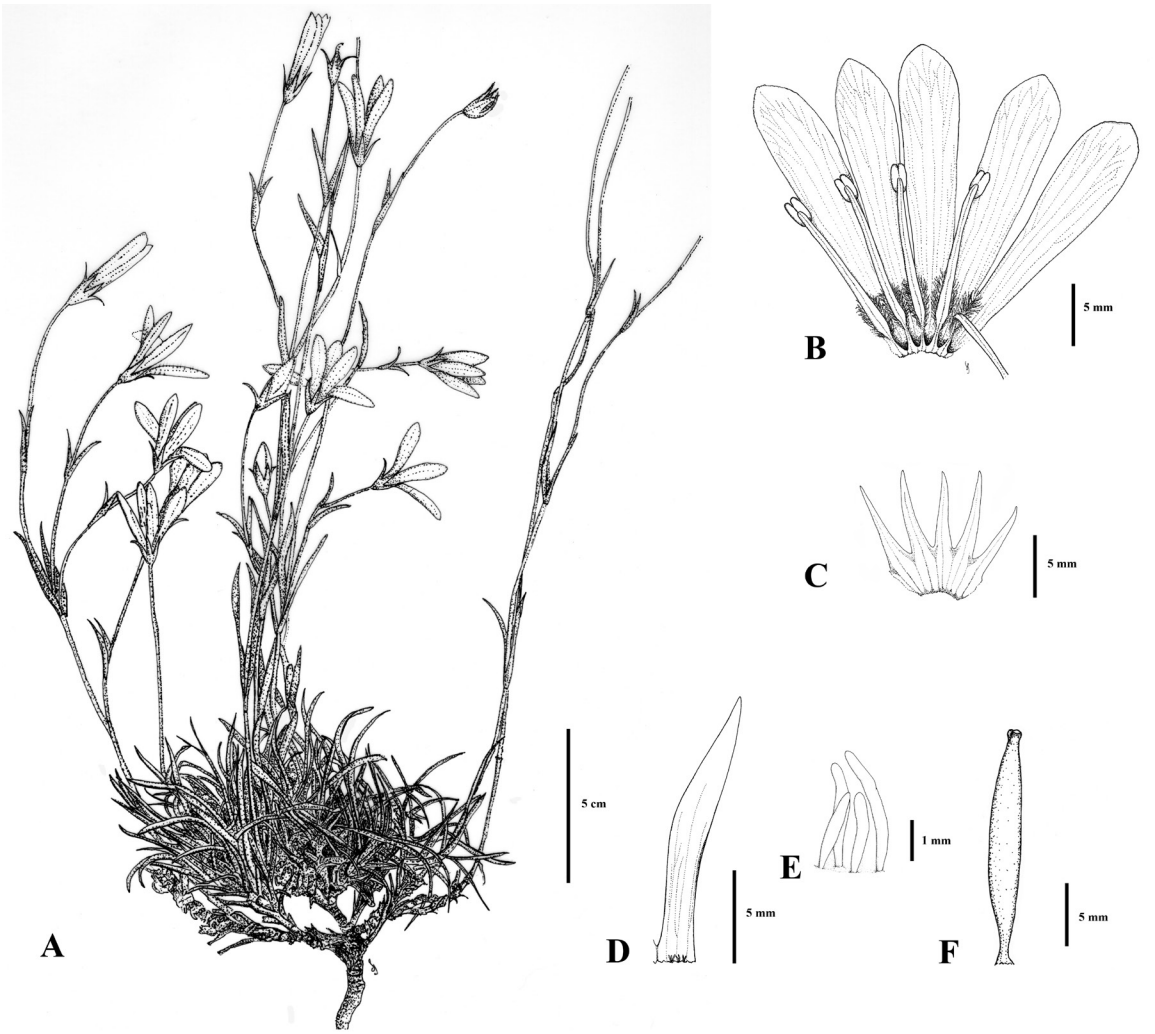

Fig. 1. *Gentianella tayacajensis*: **A,** plant habit; **B,** corolla and androecium; **C,** calyx; **D,** bract; **E,** bract colleters; **F,** ginoecium. Drawings by Susy J. Castillo.

versatile, purple. Gynoecium with stipe 1–4 mm at anthesis, greenish to purple; ovary 15–17 × 2–2.5 mm, ellipsoidal, purple; stigmatic lobes 2, 1–1.5 × 0.8–1.2 mm, ovate, curved outwards, purple, with papillae on inner surface. Capsule 16–19 × 2.5–3 mm, cylindrical, brown. Seeds 1 mm diam., spherical, light brown.

Etymology. The specific epithet "*tayacajensis"* refers to the province of Tayacaja in the department of Huancavelica, where the samples were collected.

Distribution and habitat. Endemic to Peru, growing in a patch of wild vegetation composed of tall grass and scrub vegetation, on mountain slopes near the town of Pampas (Tayacaja province, Huancavelica department), between 3560–3580 m a.s.l. (Fig. 2A).

Phenology. Flowering specimens have been collected in May. Fruiting specimens with some seeds have been collected in October.

Preliminary conservation assessment. *Gentianella tayacajensis* has an area of occupation (AOO) of 4 km^2, it is only known from one locality where the main threat is habitat fragmentation and transformation to agricultural areas. The quality of the habitat is also altered by the proximity to roads. Considering the AOO, the reduced number of localities and the decline in habitat quality, *Gentianella tayacajensis* is preliminarily categorized as Critically Endangered (CR), according to criteria B 2ab(iii, iv) of the IUCN Red List (2012).

Additional specimens examined

Gentianella tayacajensis. PERU. **Huancavelica**. Tayacaja, Pampas, Camino a Pampas, carretera PE-35S, km 32, 3569 m a.s.l., 03-X-2022 (fr), *S. J. Castillo & M. Mendoza 1777* (paratypes MOL, USM).

Gentianella graminea. PERU. **Cajamarca**. Cajamarca, La Encañada, San Pedro de Lipiac, 3783 m a.s.l., 07-IX-2010 (fl), *H. Beltrán 6931* (USM); Celendín, Sucre, Carretera de Cajamarca a Celendín, desvío hacia Sendamal, 3541 m s. m., 12-VI-2022 (fl), *S. J. Castillo, R. Gonzáles & M. Mendoza 1775* (USM); Celendín, Jalca de Kumulka, Celendín Cajamarca road, 51 km from Celendín, 3600 m s. m., 28-V-1984 (fl), *D. N. Smith & J. Cabanillas 7341* (USM); Celendín, Cajamarca–Celendín road, jalca de Kumulka, 3500 m a.s.l., 15-VII-1983 (fl), *D. N. Smith & I. Sánchez 4267* (HAM, USM).

Gentianella oreosilene. PERU. **Amazonas**. Chachapoyas, open cold swamp on summit of Cerros de Calla-Calla, between Leimebamba – Balsas road pass and the camino de herradura (2 hours walk south), 3500–3750 m s. m., 8-VIII-1962 (fl), *J. J. Wurdack 1198* (US, USM); Chachapoyas, vertientes orientales del valle del Marañón, encima de Balsas, 3400 m s. m., *A. Weberbauer 4288* (isotipo USM).

Gentianella tristicha. PERU. **Ancash**. Carhuaz, Huascaran National Park, Quebrada Ulta, on road to Ulta Pass, 77º 31' W, 9º 07' S, 4400–4600 m a.s.l., 29-VII-1985 (fl), *D. N. Smith 11355* (HUT, USM); Carlos F. Fitzcarrald, [San Luis], Road from San Luis to Huari before Laguna Huachococha and near Laguna Huachococha, 4000–4500 m a.s.l., 13-III-2001 (fl), *M. Weigend, K. Weigend, M. Binder & E. Rodríguez 5123* (HUT); Huaraz, Huascaran National Park, Quebrada Llaca, 9° 28' S, 77° 28' W, 4100 m a.s.l., 05-II-1985 (fl), *D. Smith et al. 9024* (HAM, HUT, USM); Huaraz, Cordillera Blanca entre Pichiu y Recuay, 4000 m a.s.l., *A. Weberbauer 2933* (isotypes MOL & USM); Huari, San Marcos, Compañía Minera Antamina. Botadero este, 4335 m a.s.l., 14-VIII-2011 (fl), *H. Beltrán, M. Suni, M. Morales & G. Vadillo 7337* (USM); Yungay, Huascaran National Park, Llanganuco sector, Quebrada Ancosh, 9° 03" S, 77° 35' W, 4510 m s. m., 31-XII-1984 (fl), *D. N. Smith & K. Goodwin 8906* (HUT, USM); Yungay, Huascaran National Park, between Lake Llanganuco and Portachuelo, 9° 3' S, 77° 33' W, 4420–4620 m s. m., 16-VII-1984 (fl), *D. N. Smith 8267* (USM).

DISCUSSIONS

Gentianella tayacajensis is morphologically closer to *Gentianella tristicha*, *Gentianella graminea* and *Gentianella oreosilene*. All these species are approximately 18–48 cm tall when flowering, and are branched from the base, so they do not have a single basal rosette, but instead have short semi-prostrate branches that give rise to other vegetative and flowering branches. The leaves are closer together at the base due to the short internodes, which gives it a cespitose appearance (especially *G. tayacajensis*, *G. tristicha* and *G. graminea*); the leaf blades are linear-lanceolate or narrowly oblanceolate, up to 3 mm wide.

Gentianella tayacajensis is distinguished from *G. tristicha* by having opposite leaves of 23–44 mm, with a connate base of 1.7–3 x 3–4.5 mm, herbaceous consistency, conduplicate, while *G. tristicha* has whorled leaves (3), of 40–85 mm, with a connate base of 6–15 x 3–6 mm, herbaceous to slightly thick consistency, not conduplicate; the inflorescences contain 2 to 6 flowers, while in *G. tristicha* there are 10 to 19

flowers per inflorescence. *G. tayacajensis* has narrowly obovate, flat coroline lobes, 18–22 x 5–6.2 mm, while *G. tristicha* has wide obovate, slightly concave coroline lobes, 13–19 x 6–10 mm (Table 1).

Gentianella tayacajensis and *G. graminea* have leaves of similar size and shape, however, *G. tayacajensis* has a pale lilac, rotaceous corolla of 26–31 mm, while *G. graminea* has an infundibuliform–campanulate corolla, whitish

Fig. 2. *Gentianella tayacajensis*: **A,** habitat; **B,** plant habit; **C,** basal branching; **D,** flowers; **E,** fruits; **F,** corolla trichomes. Photographs by Susy J. Castillo.

with purple lines or shades externally, of 16–22 mm; also, the corolla lobe is longer and narrowly obovate, of 18–22 × 5–6.2 mm, while *G. graminea* is obovate, of 10–14 × 6–9.5 mm (Table 1).

Gentianella tayacajensis and *G. oreosilene* have similar leaves and have lilac-coloured corollas; however, *G. tayacajensis* has 23–44 mm leaf-blades and *G. oreosilene* has 15–25 mm leaf-blades. *Gentianella tayacajensis* has 13–50 mm pedicels and a 26–31 mm rotaceous corolla, while G. *oreosilene* has 10–20 mm pedicels and a 15–17 mm infundibuliform–campanulate corolla; also, the corolla lobe is longer and narrowly obovate, 18–22 × 5–6.2 mm, while *G. oreosilene* is obovate, 11–12 × 5 mm (Table 1).

Another distinctive feature of *G. tayacajensis* is the presence of numerous filiform trichomes with rounded protuberances, located above the stamen insertion area and below the sinus (Fig. 2F). This character has not been previously documented in *Gentianella* species from Peru. *Gentianella tristicha* and *G. graminea* have filiform trichomes in the same area, but these lack protuberances, while *G. oreosilene* does not have trichomes.

The new species and related species are endemic to Peru and exhibit restricted distributions within specific regions of the country (Fig. 3). *Gentianella tayacajensis* has been collected in the province of Tayacaja, in the northern part of the department of Huancavelica, on an inter-Andean valley slope at 3560-3580 m a.s.l. *Gentianella tristicha* has multiple records in the department of Ancash, in the provinces of Carhuaz, Carlos F. Fitzcarrald, Huaraz, Huari, Recuay, Yungay, on mountain slopes and summits above 4000 m a.s.l. *Gentianella graminea* has been collected in the department of Cajamarca, in the provinces of Cajamarca, Celendín and Hualgayoc, on

Table 1. Characters to differentiate the new species from related species, at a morphological level.

Character	***G. tayacajensis***	***G. tristicha***	***G. graminea***	***G. oreosilene***
Height	19–48 cm	20–42 cm	18–35 cm	20–30 cm
Phyllotaxis	Opposite leaves	Whorled leaves (3)	Opposite leaves	Opposite leaves
Leaf blade shape	Narrowly oblanceolate to linear	Linear to lanceolate	Narrowly oblanceolate to linear	Narrowly oblanceolate to linear
Leaf blade dimensions	23–44 × 2.3–2.8 mm	40–85 × 2–3 mm	12–28 × 1–1.2 mm	15–25 × 2 mm
Number of nodes on the flowering branch	5–11	9–20	7–22	15–20
Number of flowers per inflorescence	(1-)2 to 6	10 to 19	3 to 6	2 to 6
Corolla lobes color	Light lilac	Lilac	Whitish, occasionally with light purple spots on the abaxial side	Lilac, violet veins
Calyx length	9.6–12 mm	8–16 mm	8.5–13 mm	9–10 mm
Dimensions of the calyx lobe	6–7.5 × 2–2.5 mm	4–9 × 2–2.7 mm	5–9.5 × 1.5–2 mm	5–7 × 1 mm
Corolla length	26–31 mm	19–28 mm	16–22 mm	14–17 mm
Corolla lobe dimensions	18–22 × 5–6.2 mm	13–19 × 6–10 mm	10–14 × 6–9.5 mm	11–12 × 5 mm
Corolla lobe shape	Narrow obovate, flattened	Obovate, slightly concave	Obovate, flattened	Obovate, flattened
Shape of corolla trichomes	Filiform with protuberances	Filiform	Filiform	Absent
Distribution	Huancavelica	Ancash	Cajamarca	Amazonas

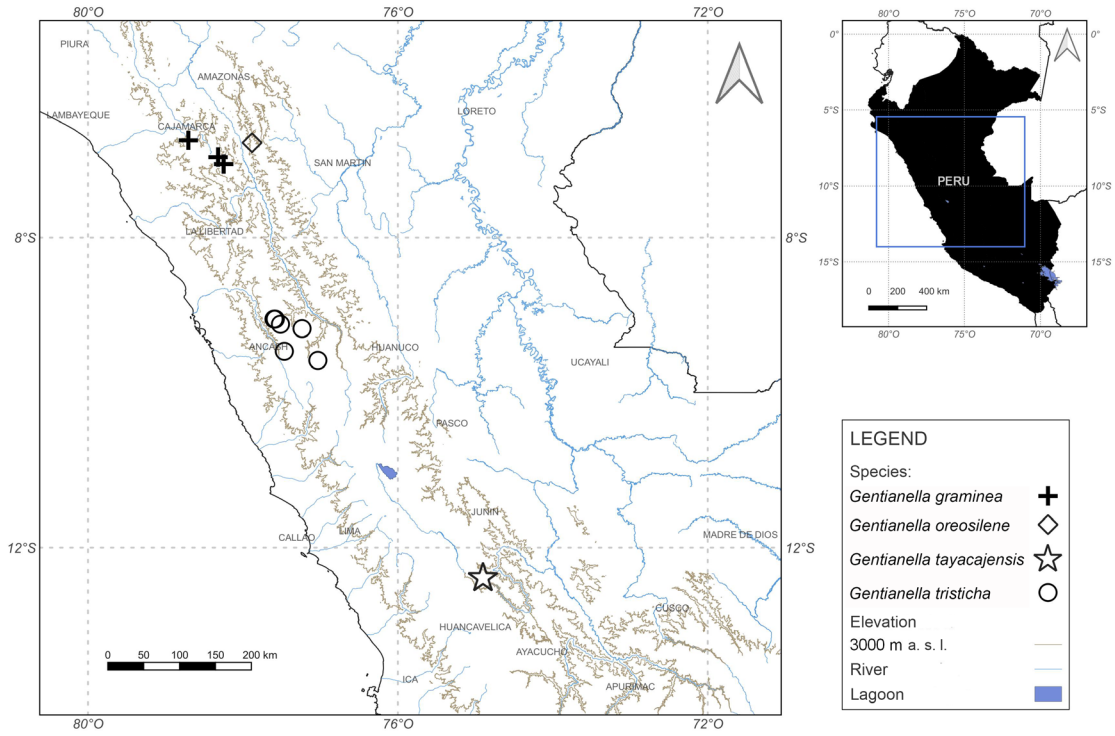

Fig. 3. Distribution map of *Gentianella tayacajensis* and related species.

mountain slopes and summits at elevations above 3500 m a.s.l. *Gentianella oreosilene* is known only from its type locality, in the province of Chachapoyas, district of Balsas, where it occurs on the summit and adjacent slopes of the Calla Calla mountain range at elevations between 3400 and 3750 m a.s.l.

ACKNOWLEDGEMENTS

We thank the Universidad Nacional Mayor de San Marcos (UNMSM), Innovate Perú (contract 184-PNICP-PIAP-2015), and the Museo de Historia Natural, UNMSM, for financial support and facilities. We also acknowledge the curators and staff of the Herbario San Marcos (USM), Herbarium Truxillense (HUT), Herbarium Augusto Weberbauer (MOL), and the United States National Herbarium (US). Special thanks to the Smithsonian Institution (USA) for awarding the 2018 Ruth and Lyman Smith Scholarship for Botanists. We are grateful to Asunción Cano, Mónica Arakaki, Martha Valdivia, Marisol Mendoza, Raquel Gonzáles, and Paúl Gonzáles for their support in the completion of this work. Finally, we thank SERFOR for providing the research permit (AUT-IFL-2022-003).

LITERATURE CITED

Bachman, S.; J. Moat, A. Hill, J. De La Torre & B. Scott. 2011. Supporting Red List threat assessments with GeoCAT: Geospatial conservation assessment tool. ZooKeys 150: 117–126. DOI: https://doi.org/10.3897/zooke ys.150.2109

Bridson, D. & L. Forman. 1992. The Herbarium Handbook. Royal Botanic Gardens. Kew. 303 pp.

Brako, L. & J. L. Zarucchi. 1993. Catalogue of the flowering plants and gymnosperms of Peru. *Monographs in Systematic Botany from the Missouri Botanical Garden* 45: 1255-1256.

Cerrate, E. 1969. Manera de preparar plantas para un herbario. *Serie de Divulgación del Museo de Historia Natural "Javier Prado", Universidad Nacional Mayor de San Marcos* 1:1-10.

Castillo S.; N. Salinas, B. León & I. Sánchez. 2006. Gentianaceae Endémicas del Perú. En: León B., Pitman N., Roque J. (Eds.). El Libro Rojo de las Plantas Endémicas del Perú. *Revista Peruana de Biología, número especial* 13(2): 339s-354s. DOI: http://dx.doi.org/10.15381/rpb.v13i2.1860

Castillo, S. J. & J. S. Pringle. 2018. *Gentianella canoi* S.J. Castillo & J.S. Pringle sp. nov. (Gentianaceae), una nueva especie del Perú. *Anales del Jardín Botánico de Madrid* 75(1):1-4. DOI: https://doi.org/10.3989/ajbm.2463

Decreto Supremo N° 043-2006-AG. 2006. Aprueban Categorización de Especies Amenazadas de Flora Silvestre. 04

de abril de 2013. El Peruano Normas Legales: 323527–323539.

Gillett, J. M. 1957. A revision of the North American species of *Gentianella* Moench. *Annals of the Missouri Botanical Garden* 44: 195-269.

IPNI, The International Plant Names Index. 2024. Published on the Internet: http://www.ipni.org [consulta agosto–diciembre 2022].

IUCN. 2012. IUCN Red List Categories and Criteria: Version 3.1. Second edition. Gland, Switzerland and Cambridge, UK: IUCN. 32pp.

IUCN. 2024. The IUCN Red List of Threatened Species. Version 2022-1, https://www.iucnredlist.org [permanentemente actualizado, consulta 2024]

Fabris, H. 1955. Nuevas especies de *Gentianella* del Perú. *Boletín de la Sociedad Argentina de Botánica* 6(1): 45-50.

Fabris, H. 1958. Notas sobre *Gentianella* del Perú. *Boletín de la Sociedad Argentina de Botánica* 7(2): 86-93.

Fabris, H. 1960. El género *Gentianella* en Ecuador. *Boletín de la Sociedad Argentina de Botánica* 8(3-4): 160-192.

Gilg, E. 1906. Beiträge zur Kenntnis der Gentianaceae III. Gentianaceae andinae. *Repertorium Specierum Novarum Regni Vegetabilis* 2(16/17): 3-56.

León, B.; N. Pitman, & J. Roque. 2006. Introducción a las plantas endémicas del Perú. En: León B.; N. Pitman & J. Roque (eds.). El Libro Rojo de las Plantas Endémicas del Perú. *Revista peruana de biología* 13(2): 9-22. DOI: http://dx.doi.org/10.15381/rpb.v13i2.1782

Macbride, J. F. 1959. Flora of Peru. Gentianaceae. *Field Museum of Natural History Botany* 13 (5): 270-363.

Pfanzelt; S.; S. P. Sylvester, L. Ammann, & M. D. P. V. Sylvester. 2015. *Gentianella viridiflora* (Gentianaceae), a new species from the Peruvian Andes. *Phytotaxa* 222(4): 283-289. DOI: https://doi.org/10.11646/phytotaxa.222.4.6

Pringle J. S. 1981. Nomenclatural transfers and taxonomic notes on some South American Gentianaceae. *Phytologia* 48: 281-285.

Pringle J. S. 1986. A new species and taxonomic notes on Gentianella (Gentianaceae) in South America. *Sida* 11: 357-369.

Pringle, J. S. 1993. New nomenclatural combinations in *Gentianella*. En: Brako, L. & Zarucchi, J.L., Catalogue of the flowering plants and gymnosperms of Peru. *Monographs in Systematic Botany from the Missouri Botanical Garden* 45: 1255-1256.

Pringle, J. S. 2008a. Four new species of peruvian *Gentianella* (Gentianaceae). *Novon* 18: 511-516. DOI: https://doi.org/10.3417/1997030

Pringle, J. S. 2008b. Noteworthy collections: Peru. *Madroño* 55(1): 91-92.

Pringle, J. S. 2011. Five new species of South American *Gentianella* (Gentianaceae). *Novon*–21(1): 78-89. DOI: https://doi.org/10.3417/2008086

Pringle, J. S. 2012a. Two taxonomic innovations in South American *Gentianella* (Gentianaceae). *Novon* 22(2): 217-219. DOI: https://doi.org/10.3417/2011034

Pringle, J. S. 2012b. *Gentianella weigendii* (Gentianaceae), an unusual new gentian from Peru. *Novon* 22(1): 70-74. DOI: https://doi.org/10.3417/2011008

Pringle, J. S. 2014a. Morphological Characteristics of the Family Gentianaceae. En: Rybczyński J. J, et al. (Eds.). The Gentianaceae Vol. 1: Characterization and Ecology. Springer, Berlin, Heidelberg.

Pringle, J. S. 2014b. New species and nomenclatural transfers in South American *Gentianella* (Gentianaceae). *Annales Botanici Fennici* 51(1-2): 117-124. DOI: https://doi.org/10.5735/085.051.0116

Pringle, J. S. 2016. New South American species of *Gentiana* and *Gentianella* (Gentianaceae). *Novon:* 24: 389-398. DOI: https://doi.org/10.3417/2015009

Pringle, J. S. 2017a. Especies ginodioicas de *Gentianella* (Gentianaceae) en Colombia, Ecuador y Perú, con la descripción de *G. quipuscoana*, nueva especie del Perú. *Arnaldoa* 24(1): 9-18. DOI: http://dx.doi.org/10.22497/arnaldoa.241.24101.

Pringle, J. S. 2017b. Four new species of *Gentianella* (Gentianaceae, Gentianeae, Swertiinae) from Peru, with a review of the taxonomy of the Genus. *Novon* 25: 451-466. DOI: https://doi.org/10.3417/2016001

Pringle, J. S. 2019. *Gentianella montesinosii* (Gentianaceae, Gentianeae, Swertiinae), a New Species from Peru. *Novon* 27(4): 248-252. DOI: https://doi.org/10.3417/2019357

Pringle, J. S. 2020. A Taxonomic Reassessment and a New Synonymy in Peruvian *Gentianella* (Gentianaceae, Gentianeae, Swertiinae). *Novon* 28: 40-45. DOI: https://doi.org/10.3417/2019417

Pringle, J.S. & J. R. Grant. 2012. Two new species of *Gentianella* (Gentianaceae) from Peru. *Brittonia* 64(3): 282–288. DOI: https://doi.org/10.1007/s12228-012-9239-z

QGIS.org. 2024. QGIS Geographic Information System. QGIS Association. http://www.qgis.org

Struwe, L.; J.W. Kadereit, J. Klackenberg, S. Nilsson, M. Thiv, K. B. von Hagen & V.A. Albert. 2002. Systematics, character evolution, and biogeography of Gentianaceae, including a new tribal and subtribal classification. En: Struwe, L. & Albert VA, (Eds.). Gentianaceae – Systematics and Natural History (21-309), Cambridge, Reino Unido: Cambridge University Press.

Struwe, L. 2014. Classification and evolution of the Family Gentianaceae. In: J.J. Rybczyński, M.R. Davey & A. Mikuła (eds.), The Gentianaceae volume 1: characterization & ecology (13-35). New York, USA: Springer Verlag, Heidelberg. DOI: https://doi.org/10.1007/978-3-642-54010-3

Thiers, B. [permanentemente actualizado, consulta 2024]. Index Herbariorum: a global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium https://sweetgum.nybg.org/science/ih/

Yang, L.-L.; H.-L. Li, L. Wu, T. Yang, D.-Y. Kuang, M.-H. Li, Y.-Y. Liao, Z.-D. Chen, H. Wu & S.-Z. Zhang. 2016. A supermatrix approach provides a comprehensive genus-level phylogeny for Gentianales. *Journal of Systematics and Evolution* 54: 400-415. DOI: https://doi.org/10.1111/jse.12192

Yuan, Y.-M. & P. Küpfer. 1995. Molecular phylogenetics of the subtribe Gentianinae (Gentianaceae) inferred from the sequences of internal transcribed spacers (ITS) of nuclear ribosomal DNA. *Plant Systematics and Evolution* 196: 207-226. DOI: https://doi.org/10.1007/BF00982961