

Two new species of *Gentianella* (Gentianaceae) from Peru

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Abstract. Two new species of *Gentianella* (Gentianaceae, Gentianeae, Swertiinae), ***G. grantii*** and ***G. wayqecha***, are described from Departamento Cusco, Peru. These two species differ from other Peruvian species of *Gentianella* in a combination of stems 10–100 cm long; no rosette of basal leaves; cauline leaves 10–75 mm long; flowers in thyrses; and corollas 14–26 mm long, campanulate, and adaxially glabrous. The leaves of *G. grantii* consist of an appressed pseudopetiole and a spreading, narrowly elliptic-oblong to linear blade; the corollas are lavender; and the corolla lobes are 0.6–0.7× as long as the tube. *Gentianella grantii* is similar to *G. lythroides*, of Bolivia, but differs in having more closely spaced leaves and less deeply lobed corollas. The leaves of *G. wayqecha* are sessile, lanceolate to ovate; the corollas are rose-violet; and the corolla lobes are 0.75–1.35× as long as the tube. *Gentianella wayqecha* is similar to *G. rapunculoides*, of Colombia and Ecuador, and *G. ruizii*, of Peru, but differs from both in its adaxially glabrous corollas and from *G. rapunculoides* in its less deeply lobed corollas. Both *G. grantii* and *G. wayqecha* grow in moist habitats near tree line, and are known only from a area northeast of the city of Cusco.

Key Words: Gentianaceae, Gentianeae, *Gentianella*, Peru, new species.

Resumen. Se describen dos nuevas especies de *Gentianella* (Gentianaceae, Gentianeae, Swertiinae), ***G. grantii*** y ***G. wayqecha***, del Departamento Cusco, Perú. Los dos se diferencian de las otras especies peruanas de *Gentianella* por la combinación de los tallos de 10–100 cm de largo; la roseta de las hojas basales ausente; las hojas del tallo de 10–75 mm de largo; las flores agrupadas en tirso; y las corolas de 14–26 mm de largo, acampanadas, y dentro glabras. Las hojas de *G. grantii* consisten en el pseudopecíolo adpreso y la lámina desplegada, angostamente elíptico-oblonga; las corolas son lavandas; y los lóbulos de la corola son de largo 0.6–0.7× que del tubo. *Gentianella grantii* se parece a *G. lythroides*, de Bolivia, pero se diferencia por las hojas espaciadas más densamente y las corolas lobuladas menos profundamente. Las hojas de *G. wayqecha* son sesiles, lanceoladas a ovadas; las corolas son roseovioladas, y los lóbulos de la corola son de largo 0.6–0.7× que del tubo. *Gentianella wayqecha* se parece a *G. rapunculoides*, de Colombia y Ecuador, y *G. ruizii*, del Perú, pero se diferencia de las dos por la corola dentro glabra y de *G. rapunculoides* por las corolas lobuladas menos profundamente. Las dos *G. grantii* y *G. wayqecha* crecen en hábitats húmedos cerca del nivel de árboles, y se conocen solamente de la región al noroeste de la ciudad Cusco.

Gentianella Moench, formerly usually included in *Gentiana* L., comprises about 300 species, of which about 200 are endemic to the high mountains of South

America, generally growing near or above tree line. This genus attains its greatest diversity in Peru, where about 90 species are native.

A monograph of the South American species of *Gentianella* (as *Gentiana*), with a key and descriptions, was published by Gilg in 1916. Taxonomic revisions of the Ecuadorian species of this genus were published by Fabris in 1960 and by the first author of the present paper in 1995 (Pringle 1995). A treatment of the Argentinian species was published by Filippa and Barboza in 2006, incorporating earlier work on the genus by those authors. Lists of the accepted species in Bolivia and Colombia, with synonymy, have been compiled and submitted by the first author of the present paper, but have not yet been published.

Macbride's treatment of the Peruvian species of *Gentianella* (as *Gentiana*) in 1959 closely followed Gilg's monograph, although he questioned the distinctness of some of the species that Gilg had recognized and added descriptions of species that had been named between 1916 and 1959. Zarucchi (in Brako & Zarucchi, 1993), with extensive input from the first author of this paper, listed the Peruvian species of *Gentianella* accepted in 1993, with revised synonymy but without descriptions. Since 1993 several new Peruvian and Bolivian species have been described by the first author in a series of papers in *Novon*, along with further revisions in synonymy, and new species continue to be discovered in those countries. Except notes in which species being newly described were contrasted with similar, previously known species, the only published descriptions of Peruvian *Gentianella* species are the original descriptions of the respective species and those by Gilg and Macbride.

During a recent expedition to the Cusco region of Peru, the second author et al. made a series of *Gentianella* collections in an effort toward a systematic account of the genus in that area. The nine collections included two found to represent new species, which are described here. These two species are similar in habit, inflorescence form, and corolla size and shape, but differ distinctly in vegetative characters, notably in leaf texture and in the presence of sheathing leaf bases in *G. grantii* but not in *G. wayqecha*. These species also differ in the depth of calyx and corolla lobing and in the shape of both the calyx and corolla lobes, as indicated in the respective descriptions

below. The difference in corolla color, although not pronounced in the herbarium specimens examined, is conspicuous in the field.

***Gentianella grantii* J. S. Pringle, sp. nov.**

Type: Peru. Cusco: Prov. Paucartambo, Parque Nacional del Manú, near the Mirador de Tres Cruces, 13°07'18.5" S, 071°36'43.3" W, 3663 m, 29 Mar 2010, J. R. Grant et al. 10-4622 (holotype: NY; isotype: G). (Fig. 1)

Herba caule decumbente 10–80 cm, foliis oblanceolatis vel linearibus basi vaginantibus, floribus 6–30 in thyrsium dispositis, calycis lobis fere linearibus inaequalibus et corolla lavandula campanulata 16–26 mm intus glabra lobis obovato-ellipticis, aspectu *G. lythroidi* similis sed foliis remotius dispositis apice non acuminatis et corolla minus profunde lobata differens.

Plants synoecious, herbaceous, perennial; stem solitary, decumbent, 10–80 cm long (including inflorescence), proximally 1.7–2.5 mm in diameter, unbranched below inflorescence or few-branched from mid-cauline and distal nodes. Proximal leaves not in rosettes, proximal internodes 1–2.5 cm long, distal internodes longer, those at mid-stem and near inflorescence 2.5–6(–8) cm long; leaves present and green at 10 to 20 nodes at flowering time, in various stages of deterioration below those still green, only leaf scars and persistent bases at proximal nodes. Leaves subcoriaceous, narrowly elliptic-oblong to linear, spreading above a narrowed, strongly ascending pseudopetiolar base, 35–55 long × 4–5 mm wide, only midvein prominent, margins minutely papillose-scabridulous and very narrowly involute, apex subacute to acute, leaf pairs with a connate-sheathing base 1–4 mm long. Inflorescence a thyrses; flowers 6 to 30 per primary stem; pedicels mostly 8–30 mm on main axis, sometimes shorter on branches. Calyx 13–22 mm long, commissural and midveins low-ridged, tube (2–)4–7 mm long, lobes nearly linear, 6–14 mm long, 1.2–2 mm wide at base, 1.5–3(–6) × as long as tube, longest lobes 1.2–1.4 × as long as shortest lobes, apices acuminate; adaxial colleters at base of calyx many, ca. 0.3 mm long. Corolla pale lavender (bluer when dried), campanulate, 16–26 mm long (as measured closed), tube

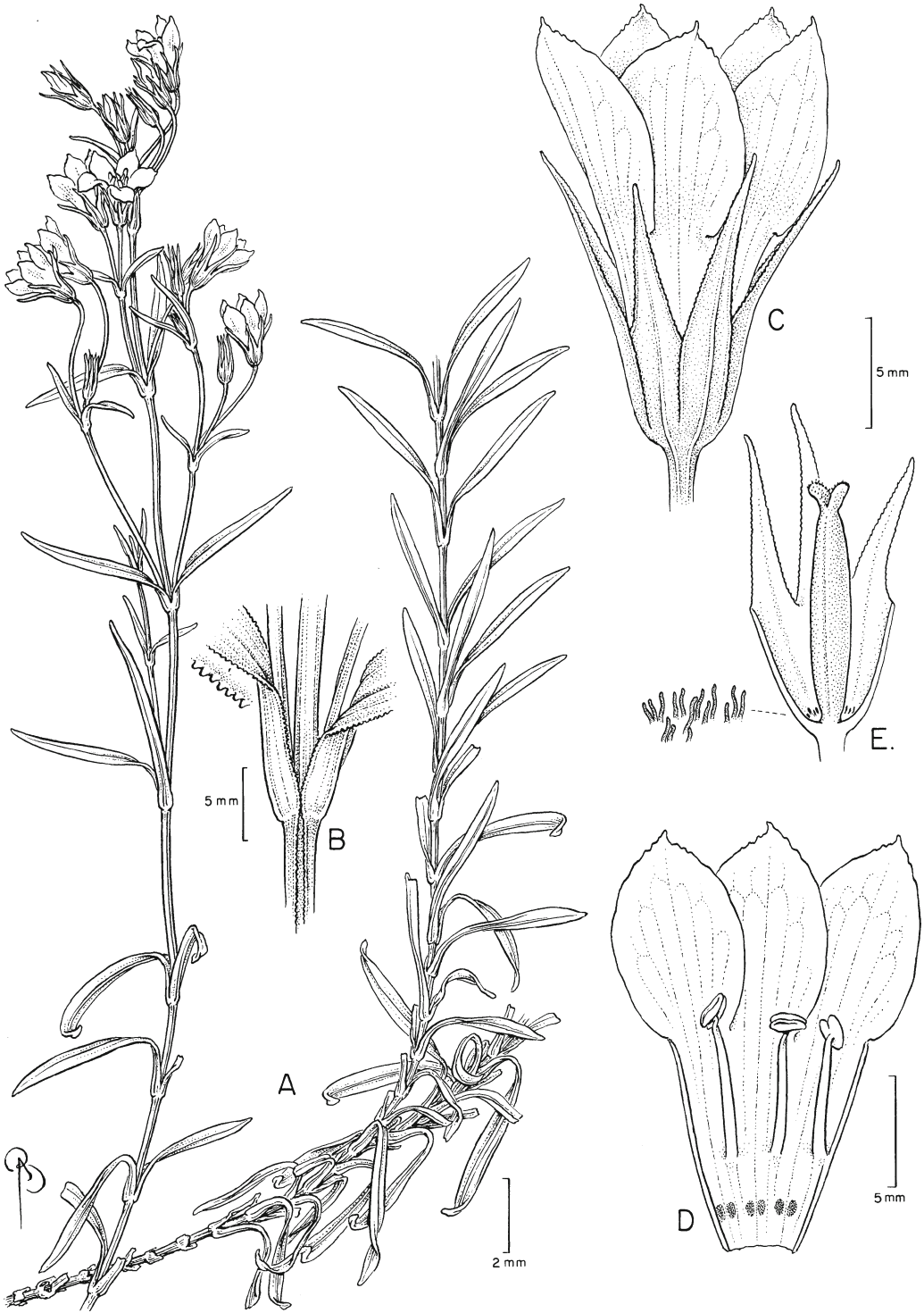


FIG. 1. *Gentianella grantii*. A. Habit, showing proximal and distal parts of plant. B. Node in inflorescence, showing leaf bases. C. Intact flower. D. Longitudinal section of corolla, showing stamens and nectaries. E. Pistil and longitudinal section of calyx, with enlargement of calycine collectors. (Drawn from the holotype.)

11–14 mm long, lobes elliptic-ovate, 7–10 long \times 4–6 mm wide, 0.6–0.7 \times as long as tube, 1.4–2 \times as long as wide, widest at 0.45–0.5 \times their length, apex obtuse or abruptly acute, minutely erose; adaxial trichomes absent; nectaries ca. 0.3 mm, \pm divided into 2 by petal midvein. Filaments inserted at ca. 0.4 \times height of corolla tube, 7–10 mm; undehiscent anthers blue, ca. 2 mm. Ovary sessile. Fruit not seen. Chromosome number $2n=4x=36$ (Grant 4622, G).

Distribution and habitat.—*Gentianella grantii* is known only from a small area in Departamento Cusco, Peru, northeast of the city of Cusco. The type was collected at tree line, between dense primary cloud forest and páramo. The other specimens were found in moist, sloping pastures without woody vegetation, where at both sites this species was abundant (Cano, in sched.), or in a weedy roadside site (“pajonal,” Núñez, in sched.).

IUCN Red List category.—*Gentianella grantii* occurs in a formally protected area, the Parque Nacional del Manú in southwestern Peru. Nevertheless, the recent identification of this new species and the existence of only four collections suggests a preliminary IUCN status assignment of Vulnerable (VU) as set forth in the IUCN Red List Categories and Criteria (IUCN, 2001).

Phenology.—The specimens cited here were collected in flower from March through July. Data are deficient for a statement as to the phenology of this species.

Etymology.—*Gentianella grantii* is named for the collector of the type specimen, Jason Randall Grant (1969–), of the Institut de Biologie, Université de Neuchâtel, Neuchâtel, Switzerland.

Additional specimens examined: PERÚ. Cusco: Prov. Paucartambo, Pillahuata, alrededores de Tres Cruces, \pm 130 km de Cusco en el camino hacia Pilcopata, 13°05'S, 71°30' W, 2000 m, 4 Apr 1987, Núñez 7786 (HAM, MO n.v.). Prov. Paucartambo, Jesús María, 3600–3700 m, 14 July 1990, Cano E. 3709 (F, HAM, USM n.v.). Prov. Paucartambo, Tres Cruces, Parque Nacional Manú, 3500–3600 m, Cano E. 4628 (F n.v., HAM, USM n.v.).

In aspect, especially in its inflorescence form and corolla shape, *Gentianella grantii* is similar to *G. lythroides* (Gilg) Fabris ex T. N.

Ho & S. W. Liu, of Bolivia, but in *G. lythroides* the leaves are more widely spaced, with the apex acuminate; the calyx lobes are 2.5 \times to 4 \times as long as the tube; and the corolla is 14–17 mm long, with the lobes 2.5 \times to 4 \times as long as the tube. In its inflorescence form and corolla size and shape, *G. grantii* is also similar to *G. bicolor* (Wedd.) Fabris ex J. S. Pringle and *G. liniflora* (Kunth) Fabris, both of which are native to northern Peru, with their ranges separated from that of *G. grantii* by over 900 km. Both *G. bicolor* and *G. liniflora* differ from *G. grantii* in having closely spaced basal and proximal cauline leaves larger than the mid-cauline and distal leaves and persistent at flowering time, and mid-cauline and distal internodes leaves mostly longer than the subtending leaves. *Gentianella bicolor* further differs from *G. grantii* in its non-sheathing leaf bases. The corolla lobes of *G. liniflora* are ca. 2 \times as long as the tube, and at least a few trichomes to 0.5 mm long are usually present adaxially on the corolla tube near the insertion of the stamens. *Gentianella alborubra* Fabris, which is likewise native to Prov. Paucartambo, Departamento Cusco, differs from *G. grantii* in its arcuate leaves mostly 6–7 mm wide, which are more closely spaced, especially distally, all leaves generally being distinctly longer than the internodes they subtend; denser inflorescences, with shorter branches and with pedicels mostly 4–8 mm long; and predominantly white corollas abaxially suffused with red.

Gentianella wayqecha J. S. Pringle & J. R. Grant, **sp. nov.** Type: Peru. Cusco: Prov. Paucartambo, on road from Paucartambo to Wayqecha Biological Field Station, 13°11'19.1" S, 071°38'34.7" W, 3429 m, 27 Mar 2010, J. R. Grant et al. 10–4616 (holotype: NY; isotypes: G, MO). (Fig. 2)

Herba caule valde decumbente 10–100 cm, foliis lanceolatis vel ovatis basi non vaginantibus, floribus 15–50 in thyrsum dispositis, calycis lobis anguste lanceolato-triangularibus inaequalibus et corolla roseopurpurea campanulata 14–25 mm intus glabra lobis obovato-ellipticis, a *G. grantii* foliis basin versus non angustatis appressisque differens, aspectu *G. rapunculoidei* similis sed corolla intus glabra.

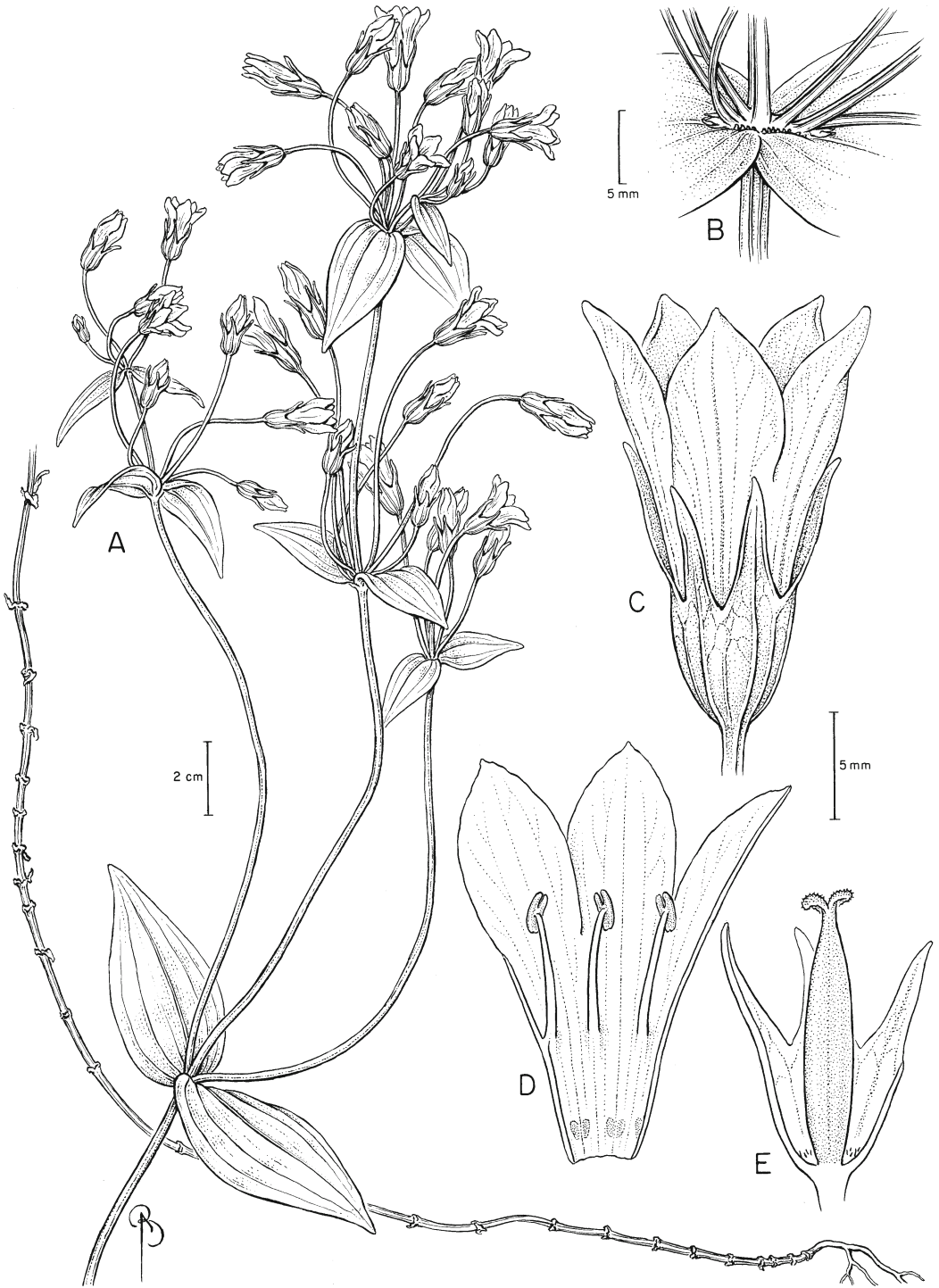


FIG. 2. *Gentianella waygecha*. A. Habit. B. Node, showing leaf bases, with enlargement of leaf margin. C. Intact flower. D. Longitudinal section of corolla, showing stamens and nectaries. E. Pistil and longitudinal section of calyx. (Drawn from the holotype.)

Plants synoecious, herbaceous, probably monocarpic; stem solitary, decumbent and sometimes ± vinelike, proximally 2–5 mm in diameter, unbranched below inflorescence or few-branched from mid-cauline and distal nodes, 10–100 cm long. Proximal internodes 8–15 mm long, distal internodes longer, those at mid-stem mostly 4–20 cm long; leaves present at 3 to 6 nodes at flowering time, only leaf scars and persistent leaf bases at proximal nodes. Stem generally reddish-purple, leaves, calyces, and ovaries variably suffused with reddish-purple; corolla color and purple suffusion of calyx darker along major veins. Leaves membranous, spreading from base, lanceolate to ovate, 10–70 mm long × 5–35 mm wide, 5- to 9-nerved or those in inflorescence narrower and fewer-nerved, margins flat, smooth, bases neither pseudopetiolate nor connate-sheathing, apices acute to acuminate. Inflorescence a thyrse, terminal portion umbelloid; flowers 15 to 50 per stem; pedicels mostly 5–50 mm long on main axis, sometimes shorter on branches. Calyx 11–15 mm long, commissural and midveins low-ridged, tube 4–6 mm long, lobes narrowly triangular, 4–10 mm long, 1–3 mm wide at base, 1–1.5 × as long as tube, longest lobes 1.25–1.7(–2) × as long as shortest lobes, apices acute to short-acuminate; adaxial colleters at base of calyx relatively few, ca. 0.1 mm long. Corolla magenta-purple (bluer when dried), campanulate, 14–25 mm long, tube 7.5–11 mm long, lobes oblong-obovate, 7–11 mm long × 3.5–6 mm wide, 0.7–1.3 × as long as tube, 1.4–2.3 × as long as wide, widest at 0.5–0.7 × their length, apices acute or short-acuminate, entire or minutely erose; adaxial trichomes absent; nectaries ca. 0.5 mm long, ± divided into 2 by petal midvein. Filaments inserted at ca. 0.5 × height of corolla tube, 5–6 mm long; undehisced anthers blue, ca. 2 mm long. Ovary sessile. Chromosome number $2n=4x=36$ (Grant 4616, G).

Distribution and habitat.—Like *Gentianella grantii*, *G. wayqecha* is known only from a small area in Departamento Cusco, Peru, northeast of the city of Cusco. It grows in moist, open or partially wooded habitats. The type was collected along a roadside in very moist tropical (somewhat secondary) vegetation. The other collections cited here were all

from moist places, one without further habitat information, the others, respectively, on grassy knolls on an open slope (Pennell, in sched.), in a subtropical woodland (Chávez, in sched.), in an ericaceous heath (Madison, in sched.), and in a woodland dominated by *Polylepis* (Cano, in sched.).

IUCN Red List category.—*Gentianella wayqecha* occurs near the Parque Nacional del Manú and Wayqecha Biological Field Station in southwestern Peru. Nevertheless, the recent identification of this new species and the existence of only five collections suggests a preliminary IUCN status assignment of Vulnerable (VU) as set forth in the IUCN Red List Categories and Criteria (IUCN, 2001).

Phenology.—The specimens seen were collected in flower from January through July. Data are deficient for a more complete statement as to the phenology of this species.

Etymology.—The specific epithet of the name *Gentianella wayqecha*, meaning “friend” in Quechua, is taken from the name of the Wayqecha Biological Field Station, managed by two non-governmental organizations, the Peruvian Asociación para la Conservación and the U.S.-based Amazon Conservation Association, near which the type specimen was collected.

Additional specimens examined: PERU. Cusco: Paucartambo to Tres Cruces, 3400–3900 m, 2–6 May 1925, Pennell 13912 (GH); Prov. Paucartambo, Disto. Marcacocha, near the small town of Marcacocha (2 km away), 3400–3700 m, 3 July 1939, Vargas 11172 (GH); Río Marcapato, 95 km above Quincemil, 3480 m, 19 Jan 1973, Madison 1026 (GH); Prov. Calca, Amparaes, 3350 m, 9 May 1975, Chávez 3263 (MO).

In fresh material the nectaries of *Gentianella wayqecha* are yellow, conspicuous in the intact corolla, rather than concolorous with the corolla tube or merely darker as in most Andean species of *Gentianella*. Although in herbarium specimens, under magnification, they appear divided by the midvein of the petal, they appear isomerous with the corolla lobes in the field.

Like *Gentianella grantii*, *G. wayqecha* is similar to *G. bicolor* and *G. liniflora* in its inflorescence form and corolla size and shape, but differs in the absence of larger,

persistent basal and proximal cauline leaves at flowering time. *Gentianella bicolor* further differs from *G. wayqecha* in its linear leaves mostly 2 mm to 4 mm wide. *Gentianella liniflora* differs from *G. wayqecha* in its corolla with the lobes ca. 2× as long as the tube and in the usual presence of trichomes on the adaxial surface of the corolla tube. In aspect, *G. wayqecha* resembles *G. ruizii* (Griseb.) Holub, a relatively widespread species in Peru, and *G. rapunculoides* (Willd. ex Schult.) J. S. Pringle, of Colombia and Ecuador, but those species differ in having a dense zone of trichomes 1 mm to 5 mm long in the throat of the corolla, and *G. rapunculoides* further differs in its corollas with the lobes 4× to 5× as long as the tube. *Gentianella wayqecha* is also similar in aspect to *G. stenosepala* (Gilg) T.N. Ho & S.W. Liu, of Bolivia, but does not have the extremely narrow, recurved calyx lobes for which that species is named. *Gentianella stenosepala* also differs from *G. wayqecha* in its attenuate leaf apices, more compact inflorescences, and corolla lobes about 0.5× as long as the tube.

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