



## ***Gentianella devendrae* (Gentianaceae) - A new species from Trans-Himalayan region of India**

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**ABSTRACT:** A new species of the genus *Gentianella*, *G. devendrae* sp. nov., from the cold desert of Ladakh in northwest Himalaya, India is described and illustrated. The species shows morphological resemblance with *Gentianella azurea*, but differs from the latter in having always dwarf habit (plants never more than 2 cm high), veins on all the leaf blades reticulate, yellow and scabrous margins of leaves and calyx lobes, apex of corolla lobes sub-acute to acuminate and sinus between lobes acute, bluish white to blue colour of corolla, seeds variously shaped, membranous with glandular surface. The new species is described and illustrated here as *G. devendrae*.

**KEY WORDS:** Gentianaceae, *Gentianella azurea*, *Gentianella arenaria*, *Gentianella pygmaea*, cold desert, Ladakh, endemic.

### **INTRODUCTION**

The genus *Gentianella* Moench consists of ca. 300 species, widely distributed in the temperate, arctic and alpine regions across the world, with the exception of Central and South Africa (Struwe *et al.*, 2002; Hagen and Kadereit, 2001; Pringle, 2017). In India, Garg (1987) included 7 species and one doubtful species (*G. borealis* Bunge) of *Gentianella* from Western Himalaya. Later, Gupta (2009) in her treatment of “Taxonomic studies in Gentianaceae Juss. in India” recognized 18 species under the genus. Garg (1987) has treated the genus *Comastoma* (Wall.) Toyokuni, as a section under *Gentianella*, though the former is presently treated as a valid genus. While Gupta (2009) treated some species, e.g., *G. tenella* Rottb., *G. pedunculata* Royle ex G. Don and *G. urnigera* E. Aitken & D.G. Long under *Gentianella*, these are currently treated under the genus *Comastoma*. Further, some species such as *G. amoena* (Wedd.) Fabris, *G. glanduligera* Airy Shaw and *G. thomsonii* (C.B. Clarke) U.C. Bhattach. & S. Agrawal treated by the same author have been reduced as synonyms, similarly *G. borealis* and *G. falcata* (Turcz.) Harry Sm. ex S. Nilsson are reduced as basionyms, whereas the status of *G. duthiei* (Burkill) Harry Sm. ex S. Nilsson, *G. pseudopulmonaria* Harry Sm. and *G. stellarifolia* (Franch. ex Hemsl.) Harry Sm. is still unresolved. Thus, in the present state of our knowledge, the genus is represented in India by 10 species, largely distributed in the Indian Himalayan region. These are *G. angustiflora* Harry Sm., *G. arenaria* (Maxim.) T.N. Ho, *G. aurea* (L.) Harry Sm., *G. azurea* (Bunge) Holub, *G. gentianoides* (Franch.) Harry Sm., *G. maddeni* (C.B. Clarke) Airy Shaw, *G. moorcroftiana* (Wall. ex Griseb.) Airy Shaw, *G. pygmaea* (Regel & Schmalh.) Harry Sm. ex S. Nilsson, *G. stoliczka* (Kurz ex C.B. Clarke) Holub and *G. tumailica* M. Shabir,

P. Agnihotri, J.K. Tiwari & T. Husain (Garg, 1987; Gupta, 2009; Shabir *et al.*, 2018).

During a botanical visit to Nubra valley in Ladakh of northwest Himalaya, in August 2016, the first author came across an interesting population of *Gentianella* on the west facing alpine pasture of North Polu. A critical morpho-taxonomic examination of the specimens and review of literature (Garg, 1987; Brako and Zarucchi, 1993; Ho and Pringle, 1995; Gupta, 2009; Pringle and Grant, 2012; Pringle, 2014; Pfanzelt *et al.*, 2015; Zárate, 2016; Shabir *et al.*, 2018) revealed it to be a new species. Thus, the same is described and illustrated here as *G. devendrae*.

### **TAXONOMIC TREATMENT**

***Gentianella devendrae* M. Shabir & J.K. Tiwari, sp. nov.**

**Figs. 1–2 & Table 1**

**Type:** INDIA. LADAKH. Leh district, Nubra Valley, North Polu. 4757–4817 m a.s.l., 16 August 2016, Mohd Shabir 309919 (holotype: LWG, isotypes: LWG, GUH).

Annual herbs, 0.5–2.0 cm high; stem quadrangular, much branched. Leaves both radical and cauline; radical leaves 3.5–5.3 × 1.3–1.9 mm, sessile, oblong–elliptic, obovate, apex obtuse to acute, margin scabrous, yellow, veins reticulate, on both the surfaces, predominant abaxially, mid-vein distinct; cauline leaves 2.3–3.0 × 1.1–1.3 mm, sessile, elliptic, apex obtuse to acute, narrow at base, margin yellow, scabrous, veins reticulate, mid-vein distinct. Flowers 5-merous, terminal and axillary, solitary, pedicellate; pedicel, 2.40–3.55 mm. Calyx 3.3–4.0 mm long, distally dark shaded, proximally yellowish white, enclosing up to 1/2–2/3 of the corolla; tube 1.2–1.5 mm long, yellowish white, shorter than lobes; lobes 5, unequal, (3-broad, 2-narrow), broad 1.9–2.0 × 0.8–1.0 mm, narrow 1.5–1.8 × 0.4–0.6 mm, elliptic–

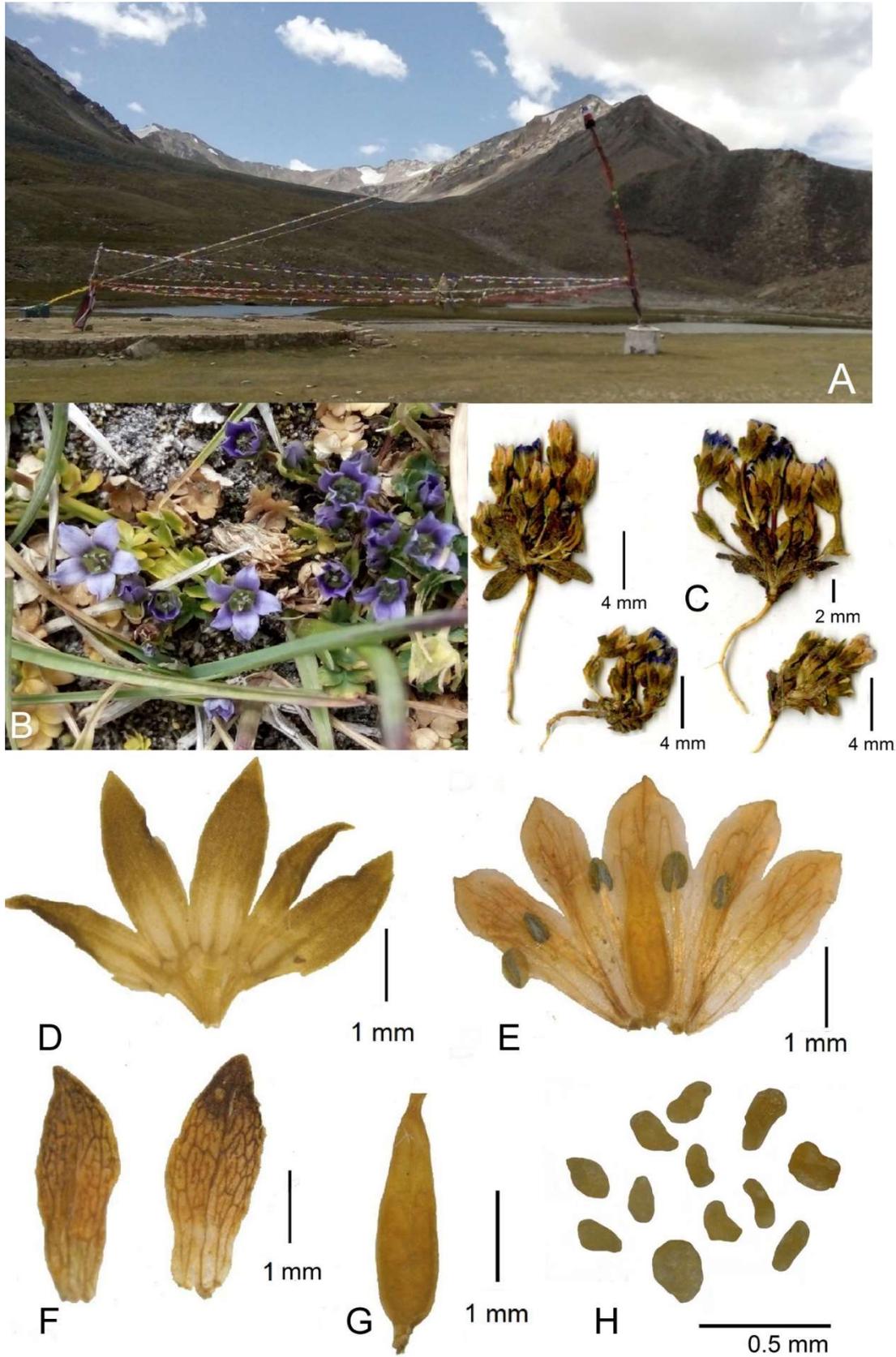
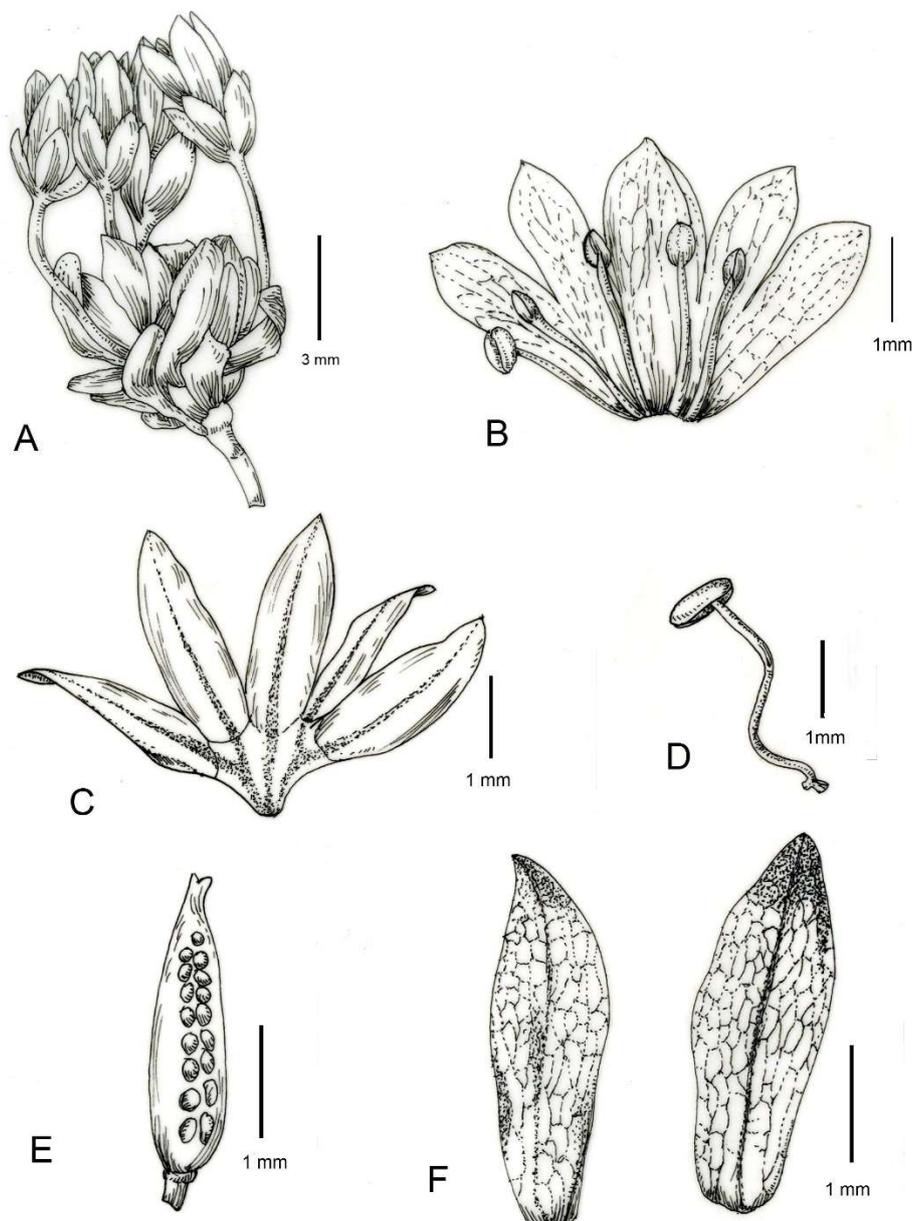


Fig. 1. *Gentianella devendrae* sp. nov., A. Habitat, B-C. Plants, Habits, D. Calyx, E. Opened corolla showing stamens, F. Leaves, G. Capsules, H. Seeds.

**Table 1.** Comparative morphological characters between *Gentianella devendrae* sp. nov. and *Gentianella azurea* Bunge.

Characters	<i>Gentianella devendrae</i>	<i>Gentianella azurea</i>
Habit	0.5–2.0 cm high.	2.0–25 cm high.
Leaves	2.3–5.3 × 1.1–1.9 mm, oblong-elliptic, obovate, apex obtuse to acute, veins reticulate, mid-vein distinct, margin yellowish.	0.3–2.2 cm × 1.0–7.0 mm, oblong, elliptic-lanceolate, or elliptic, apex obtuse, veins not reticulate, mid-vein distinct, margin blackish.
Calyx	3.3–4.0 mm long; lobes 1.5–2.2 × 0.4–1.0 mm, elliptic-lanceolate, margin yellowish.	4.0–9.0 mm long; lobes 2.0–6.0 × c. 2.0 mm, linear-lanceolate, elliptic or ovate-oblong, margin blackish.
Corolla	3.0–4.5 mm long, bluish white to blue; lobes 1.0–1.8 mm long, ovate-elliptic, sub-acute to acuminate; sinus between lobes acute.	5.0–14 mm long, pale blue to blue; lobes 2.0–6.0 mm long, ovate, oblong, apex obtuse; sinus between lobes cuneate.
Stamens	Filaments 1.5–2.3 mm long; anthers 0.4–0.7 mm long, oblong to elliptic.	Filaments 2.0–4.5 mm long; anthers 0.4–1.0 mm long, ovoid to elliptic.
Capsules	2.6–3.0 mm long.	6.0–15 mm long.
Seeds	0.10–0.25 mm long, variously shaped, membranous, surface glandular.	1.0–1.2 mm long, elliptic, not membranous, surface reticulate, smooth.

**Fig. 2.** *Gentianella devendrae* sp. nov., A. Habits, B. Corolla, C. Calyx, D. Stamens, E. Capsules, F. Leaves.



lanceolate, apex acute, margin scabrous, yellow, mid-veins distinct, sometimes blackish on margins of one calyx lobes; sinus between the lobes acute. Corolla 3.0–4.5 mm long, bluish white to blue; tube 1.5–2.5 mm long, longer than lobes; lobes 1.0–1.8 × 0.7–1.2 mm, ovate-elliptic, apex sub-acute to acuminate, sinus between the lobes acute; nectaries twice as many as corolla lobes, slightly above the base of the corolla and merging with the background of the corolla. Stamens 5, inserted near or below the middle of corolla between the lobes; filaments 1.5–2.3 mm long, proximally flattened; anthers 0.4–0.7 × 0.2–0.3 mm, blue, oblong-elliptic. Style indistinct or very short; stigma bifid, lobes sub-globose. Capsules 2.6–3.0 mm long, ovate, lanceolate, stipitate; stipe 0.1–0.3 mm long. Seeds 0.10–0.25 × 0.10–0.15 mm, variously shaped, membranous, surface glandular.

**Etymology:** The specific epithet “*devendrae*” is named after Dr. Devendra Kumar Singh (a renowned Indian plant taxonomist), as a token of respect to the mentor of first author and former Scientist G of the Botanical Survey of India.

**Flowering & fruiting:** August.

**Habitat:** The species was found growing on an alpine meadow at the west facing slope in the type locality, North Polu in Nubra valley of Leh-Ladakh.

**Distribution:** India (Ladakh, Leh district, Nubra Valley), probably endemic.

**Conservation status:** *Gentianella devendrae* grows luxuriantly in the type locality, spreading over 6–7 sub-populations, each consisting of thousands of mature individuals in an area of 200–300 m<sup>2</sup>.

## DISCUSSION

*Gentianella devendrae* is characterized by dwarf habit, less than 2.0 cm high, veins on all the leaf blades reticulate, yellow and scabrous margins of leaves and calyx lobes, bluish white to blue flowers, apex of the corolla lobes sub-acute to acuminate and sinus between lobes acute, anthers blue, seeds variously shaped, membranous with glandular surface. *G. devendrae* shows morphological resemblance with the sympatric species *G. azurea*, but the latter differs from the former in having taller habit, up to 25 cm, veins on leaf blades not reticulate, margin of leaves and calyx lobes blackish, corolla deep blue to blue, apex of corolla lobes obtuse to acute and sinus between lobes cuneate, seeds ellipsoid, sub-globose with reticulate or smooth surface. The species shows morphological resemblance with *G. arenaria* and *G. pygmaea* in dwarf size of the plants, but differs from both in 5-merous flowers; shape of leaves, having reticulate veins on leaf blades, yellow and scabrous margin of leaves and calyx lobes, shape of calyx and corolla, and colour of corolla and anthers.

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