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# *Gentiana pringlei* (Gentianaceae) – A new species from cold deserts of Ladakh Himalaya, India

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ABSTRACT: A new species, *Gentiana pringlei* (Gentianaceae) has been collected from Suru valley in Kargil district of Ladakh, Jammu and Kashmir. The new species shows morphological resemblance to *G. loureiroi* and *G. napulifera,* but differs from both in annual habit, absence of stolons, stem branched from base as well as from middle, three distinct veins on all the leaves, slightly keeled abaxially, purple flowers, ovate calyx lobes, sinus between calyx lobes truncate, corolla lobes oblong-elliptic, plicae bifid, shape and size of anthers and seeds small. The new species is described and illustrated here as *Gentiana pringlei.* In addition, the comparative morphological features with the sympatric species are tabulated.

KEY WORDS: *Chondrophyllae*, *Gentiana pringlei*, Ladakh Himalaya, *Napuliferae* Gentianaceae, New species.

## INTRODUCTION

The genus *Gentiana* L. (Gentianaceae) comprises ca 362 species in the world distributed from Asia to Europe, North America and a few species in Andes of South America, Central America, East Australia and Northwest Africa (Ho and Liu, 2001, Struwe and Albert, 2002, Mabberley, 2008). In India, the genus is represented by 68 species (Garg 1987, Gupta *et al*., 2012, Maity 2014, Shabir *et al*., 2017, 2018) chiefly distributed in the Himalayan region.

The first author (MS) in his recent botanical trips to Kargil in June 2017 and 2018 located several populations of *Gentiana* in Suru valley of Kargil district, consisting of thousands of individuals. Some plants were collected from these populations for study in the laboratory. After critical examination of the specimens under the microscope, it was observed that the populations consisted of one common species, *G. coronata* Royle, growing in the area and another species, which had not yet been described. Therefore, detailed studies were made of this species, which turned out to be a new species, resembling *G. loureiroi* (G. Don) Grisebach and *G. napulifera* Franch (Table 1). This species is described and illustrated here as *Gentiana pringlei.*

## TAXONOMIC TREATMENTS

***Gentiana pringlei*** M. Shabir, P. Agnihotri, J.K. Tiwari & T. Husain, ***sp. nov.*** **Figs. 1&2**

***Type***: **INDIA**. Jammu and Kashmir: Ladakh, Kargil, Suru valley, Panikhar, 34.11613005 N, 75.95018676 E, 3300 m, 11-06-2017, *Mohd Shabir, 305779* (Holotype: LWG, Isotype: BSD)

Annual, 2.5–3.0 mm high. Root slender, cylindric. Stem erect, densely papillate, branched from base as well from stem. Basal leaves, 1 to 2 pairs, forming sheath at the base, leaf blade elliptic, 6.0–6.5 × 1.8–2.3 mm, 0.6–1.0 mm, apex acuminate, margin papillate to scabrous, vein distinct, 3-nerved, keeled abaxially; cauline leaves, few-paired (2–4), forming sheath at base, widely spaced, leaf blade elliptic to lanceolate, 3.4–5.7 × 1.2–2.0 mm, apex acuminate to acute, margin papillate, veins distinct, 3-nerved, slightly keeled abaxially. Flower solitary, terminal, on 3–6 short to long branches, pedicellate; pedicels 1.0–4.0 mm. Calyx 5.6–6.0 mm, tube 4.2–4.5 mm, lobes 1.4–1.7 × 0.6–0.7 mm, ovate, broadly-lanceolate, apex acute to acuminate, margin ciliolate and membranous, mid-vein crested; sinus between lobes truncate. Corolla purple, 8.0–8.6 mm; tube 6.3–6.6 mm; lobes 1.7–2.2 × 0.8–1.0 mm, oblong to elliptic, apex obtuse to sub-rounded, margin entire, plicae bifid, 1.0-1.7 mm, apex acute, margin entire; each of the two primary divisions may sometimes have at least one secondary tooth along the margin. Stamens inserted from middle of the tube, filaments 2.5–3.0 mm, flattened toward base; anther yellow, oblong to narrowly ellipsoid, 0.6–0.8 × 0.18–0.25. Style 0.8–1.0 mm; stigma bifid, lobes coiled; ovary ellipsoid, 2.4–2.5 × 0.9–1.0 mm. Seeds brown, ellipsoid, 0.27–0.42 × 0.14–0.18 mm, seed coat reticulate.

***Etymology*:** The specific epithet "*pringlei*" is in honor of Dr. J.S. Pringle for his remarkable contribution in the family Gentianaceae.

***Flowering and Fruiting*:** June to July

***Distribution:*** INDIA (Northwest Himalaya, Jammu & Kashmir, Ladakh, Kargil, Suru valley, Panikhar) probably endemic.


**Fig. 1 : *Gentiana pringlei*** M. Shabir, P. Agnihotri, J.K. Tiwari & T. Husain, *sp. nov*. **A.** Habit**; B.** Calyx**; C.** Corolla**; D.** Carpel**; E.** Seeds

***Conservation status*:** *G. pringlei* had been collected from one locality and consisted of a small population of 4 individuals in the year 2017. Later on, in June 2018 several larger populations of the same species were found in different localities of Suru valley. In view of the present consideration of small populations size, 'area of occupancy' (AOO): 200–500 $m^2$ and 'extent of occurrence' (EOO): 40 $km^2$, the species is assessed as 'Critically Endangered' [CR: B1+2+C+D (IUCN, 2012)].

## DISCUSSION

*G. pringlei* is described and placed under *Gentiana* sect. *Chondrophyllae* ser. *Napuliferae* along with *Gentiana loureiroi* and *Gentiana napulifera.* The series *Napuliferae* was described by T.N. Ho in 1985 and is characterized by perennial herbs, with stolons and fleshy roots, basal leaves distinctly larger and fleshy than cauline leaves. *G. loureiroi* differs from *G. pringlei* in perennial habit, presence of stolons, stem few-branched, one to few flowered, calyx lobes linear-lanceolate, mid-vein indistinct, corolla lobes ovate, plicae ovate-orbicular, apex rounded, margin entire or denticulate, small size of anther and narrowly oblong stigma lobes. *G. napulifera* is distinguished from the latter in having the stems as long as or slightly longer than basal leaves, leaves linear, linear-lanceolate, pedicel sub-sessile, apex of calyx lobes acuminate-cuspidate, mid-vein hirsute, plicae ovate-oblong, apex truncate, margin denticulate and stigma lobes narrowly oblong.

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**Table 1:** Comparative account of morphological features between ***G. pringlei***; ***G. loureiroi*** *and* ***G. napulifera***

| Characters | *G. pringlei* | *G. loureiroi* | *G. napulifera* |
|---|---|---|---|
| Habit | Annuals, 2.5–3.0 cm high. | Perennials, 3.0–8.0 cm high. | Perennials, 1.0–4.0 cm high. |
| Stem | Branched from base as well from stem. | Simple or few branched. | Simple or apically few branched. |
| Leaves | | | |
| Basal | 6.0–6.5 × 1.8–2.3 mm, elliptic, veins distinct, 3-nerved, mid-vein slightly keeled abaxially. | 15–30 × 3.0–5.0 mm, elliptic, mid-vein indistinct or abaxially slender. | 12–16 × 3.0–4.0 mm, linear, linear-lanceolate, mid-vein prominent and densely hirsute. |
| Cauline | 3.4–5.7 × 1.2–2.0 mm, elliptic to lanceolate, apex acuminate to acute. | 4.0–8.0 × 1.0–2.5 mm, elliptical to lanceolate, apex acute and cuspidate. | 4.0–10 × 1. 5–2. 5 mm, leaf blades linear to linear-lanceolate, apex acuminate and cuspidate. |
| Inflorescence | Flower 3–6, terminal, clustered, pedicel 1.0–4.0 mm long. | Flowers 1 to few; pedicel 4.0-12 mm long. | Flowers 1–3, sub-sessile. |
| Calyx | 5.6–6.0 mm long, tubular, lobes 1.4–1.7 mm long, ovate-broadly lanceolate, apex acuminate. | 5.0–6.5 mm long, campanulate; lobes 2.5–4.0 mm long, lanceolate to linear-lanceolate, apex acute and cuspidate. | 5.0–7.0 mm long, narrowly obconic; lobes 2.0–3.0 mm long, linear-lanceolate, apex acuminate and cuspidate. |
| Corolla | Purple, 8.0–8.6 mm long; lobes 1.7–2.2 mm long, oblong to elliptic, apex obtuse to sub-rounded. | Blue to blue-purple; 12–14 mm long, funnel form, lobes 2–2.5 mm long, ovate, apex obtuse. | Pale to blue-purple; 10–12 mm long, funnel form, lobes 2-3 mm long, ovate, apex obtuse. |
| Plicae | 1.0–1.7 mm long, linear-lanceolate, apex acute, margin entire or sometimes toothed at one of each division. | 1.0–1.5 mm long, ovate-orbicular, apex rounded, margin entire or denticulate. | 1.5–2.0 mm long, ovate-oblong, apex truncate, margin denticulate. |
| Stamens | | | |
| Filament | 2.5–3.0 mm long. | 3.0–6.0 mm long. | 2.5–3.0 mm long |
| Anther | 0.6–0.8 mm long, oblong to narrowly ellipsoid. | 1.8–2.5 mm long, linear. | 2.0–2.2 mm long, linear. |
| Carpel | Stigma lobes coiled. | Stigma lobes narrowly oblong. | Stigma lobes semi-orbicular |
| Seeds | 0.27–0.42 mm long. | 0. 7–0. 9 mm long. | 0.6– 1.0 mm long. |

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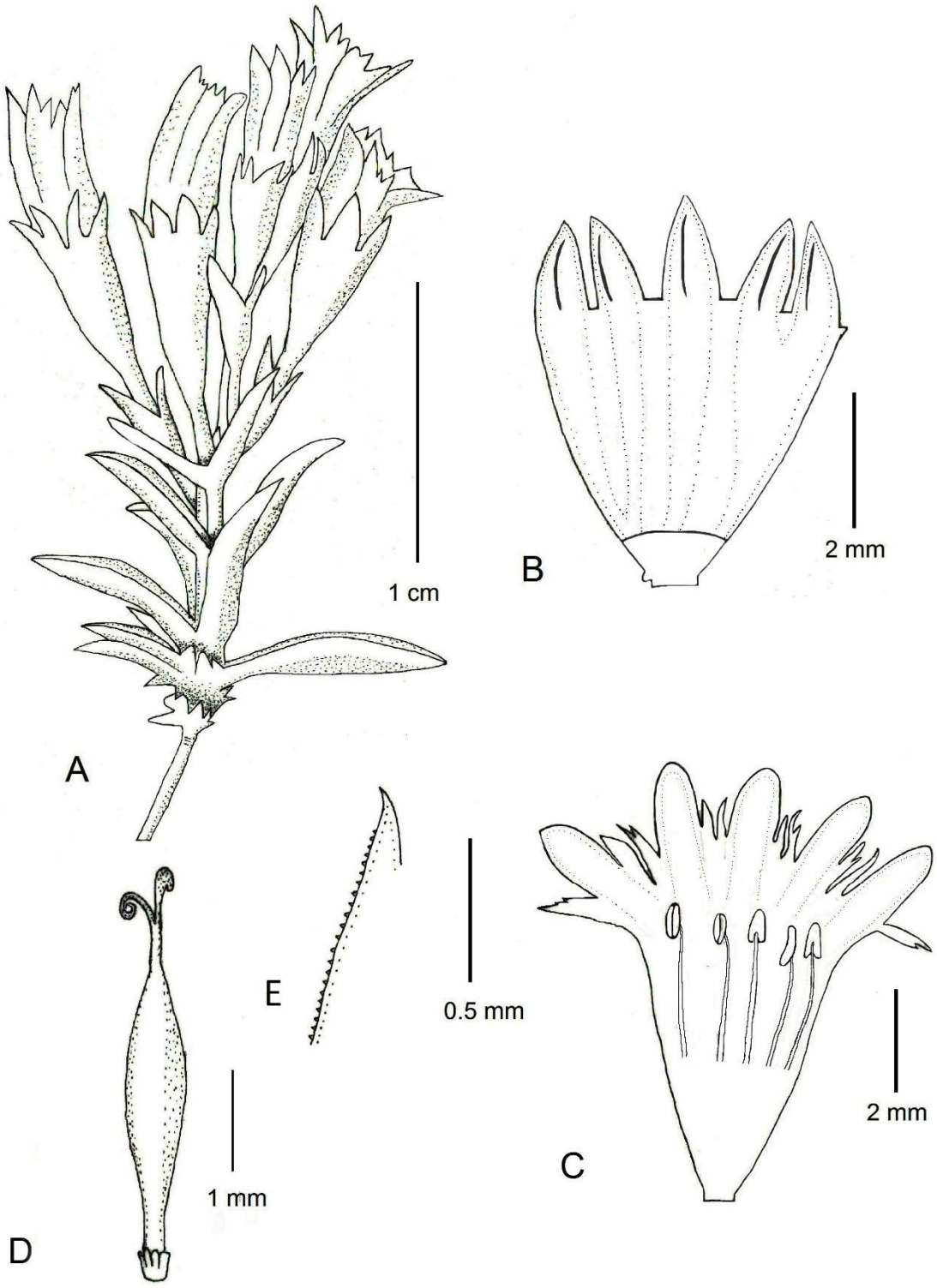


**Fig. 2**: **A**. Habit; **B**. Calyx; **C**. Corolla; **D**. Carpel, **E**. Papillate leaf margin.