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Note

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Gentiana urnula Harry Sm. (Gentianaceae), a new record for the flora of Arunachal Pradesh, India

Khilendra Singh Kanwal [1], Umeshkumar Lalchand Tiwari [2], Lod Yama [3] & Mahendra Singh Lodhi [4]

[1,3,4] G.B. Pant National Institute of Himalayan Environment and Sustainable Development, North East Regional Centre, Itanagar, Arunachal Pradesh 791111, India.
[2] Botanical Survey of India, Arunachal Pradesh Regional Centre, Itanagar, Arunachal Pradesh 791111, India.
[1] kskanwal03@gmail.com (corresponding author), [2] tigerumesh11@gmail.com, [3] lod1437@gmail.com, [4] mahen29.mail@gmail.com

The genus *Gentiana* L. (Gentianaceae) consists of around 400 species that are mainly distributed in the alpine regions of the world, but also occur in temperate regions of Asia, Europe and the Americas (Ho & Liu 2001; Struwe & Albert 2002; Mabberley 2008; Favre et al. 2016). The Qinghai–Tibet Plateau (QTP) of the Himalaya is considered to be the main centre of diversity for *Gentiana*, hosting around 250 species (Ho & Pringle 1995). The name *Gentiana* is given by Linnaeus after Gentius, the King of Illyria. Gentianas are important medicinal plants in traditional Chinese medicine, and have been used for over 2,000 years for curing various ailments like hypotension, rheumatic pains, fevers and allergic inflammations (Gupta et al. 2012). In India, the genus is mainly distributed in temperate, sub-alpine, and alpine regions of the Himalaya. A total of 73 taxa (66 species, 4 subspecies and 3 varieties) of *Gentiana* are recognised from India, out of which 31 taxa are recorded from the eastern Himalayan region whereas 27 taxa are confined to the western Himalaya and only five taxa are described from southern India (Sasidharan 2004; Gupta et al. 2012; Maity 2014; Shabir et al. 2017; Maity & Dey 2017; Maity et al. 2018).

A floristic survey was carried out in Tawang District of Arunachal during 2016–17 for the assessment of floral diversity of high altitude areas. During the collection, *Gentiana urnula* Harry Sm. was recorded from Nagula wetland complex area (27.647^{0}N and 91.861^{0}E at an altitude of 4,000m) of Tawang. The Nagula wetland area is very rich in high altitude floral diversity and little explored at present. This species is very rare and endemic to the eastern Himalaya. *Gentiana urnula* is an important medicinal plant and mostly used in Tibetan medicinal system for the treatment of diarrhoea, dysentery, food poisoning and common cold. The identification of the species was confirmed through the consultation of type specimens, the protologue description of the species and consultation of literature (Hooker 1882; Hara 1965, 1975; Polunin & Stainton 1984; Garg 1987; Stainton 1988; Hajara et al. 1996; Ho & Liu 2001; Giri et al. 2008; Chowdhery et al. 2009; Gupta et al. 2012; Maity 2014; Favre et al. 2016; Maity & Dey 2017; Shabir et al. 2017; Shabir et al. 2018; Maity et al. 2018). Furthermore the Herbarium specimens of the Botanical Survey of India (BSI), Itanagar (ARUN) and State Forest Research Institute (SFRI), Itanagar were consulted. International online herbaria and the Global Biodiversity Information Facility

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(GBIF) were also explored for species identification and distribution records. *G. urnula* has not been reported earlier from Arunachal Pradesh. The voucher specimen was deposited in the herbarium of the G.B. Pant National Institute of Himalayan Environment and Sustainable Development, (GBP) and Botanical Survey of India (BSI), Itanagar (ARUN) for future references.

***Gentiana urnula* Harry Smith**

Bull. Misc. Inform. Kew. 15: 51. 1961. Ho & Liu, Worldwide Monogr. *Gentiana*: 2001 (Image 1 A, B).

Holotype: Bhutan, Nelli la near Lingshi Dzong, 4,500m, 13 October 1949, Ludlow, Sherriff & Hicks 17458 (BM holotype; EUPS isotypes).

Perennial herbs, sometimes mat forming, 1.5–2.0 cm high. Stems simple or rarely branched, 1 or 2, glabrous. Basal leaves reddish-green, not rosette; cauline leaves crowded upward; petioles 1–1.5 mm long, membranous; lamina truncate-flabelliform, 5–8 mm, truncate or emarginate at apex, abruptly contracted at base, slightly cartilaginous a long margin, papillate near base only; mid-vein cartilaginous and crested, vein 1, upper most pair of leaves often sessile. Flowers terminal, solitary or 2, subsessile. Calyx tubular, obconic; lobes 5, leafy, leathery, orbicular; tube 4–6 mm long, membranous; lobes 3–4 mm long, similar to leaves. Corolla pale bluish-purple to pale yellow with blue streaks, campanulate, 2–3 cm long; lobes broadly ovate, 3–4.5 × 2.5–3.5 mm, apex rounded and cuspidate, entire at margins; plicae broadly ovate to subtruncate, 1–2 mm, entire at margins or denticulate. Stamens inserted in corolla tube; filaments 5.5–8.5 mm long; anthers 2–3.5 mm long, ellipsoid. Style short; stigma with triangular lobes. Capsules 1.5–1.8 cm; ovoid-ellipsoid; gynophores up to 4cm, slender. Seeds ellipsoid, 2–2.5 mm long, dark brown; seed coats with simple pits.

Flowering and Fruiting: July–October.

Distribution: India (Sikkim, Arunachal Pradesh), Bhutan, Nepal, China (SW Qinghai, E Xizang) (Ho & Liu 2001).

Specimen examined: 1013(GBP), 10.viii.2017, Nagula Lake, Tawang District, Arunachal Pradesh, India, 27.647^{0}N, 91.861^{0}E, 4,000m, coll. Lod Yama & KS. Kanwal (Images 2 & 3).

Habitat and Ecology: The plants were found growing in some isolated pockets in Nagula Lake area of western Arunachal Pradesh in alpine meadows and gravel slope at 4,000m altitude. It is facing threats from livestock mainly from trampling by yaks and horses, unregulated tourism and developmental activities which result in habitat destruction and fragmentation in the area. In future, the species may face further threat from climate change due to very limited population size and restricted distribution in the Himalayan region. Therefore, conservation action should be taken for this rare and endemic species before it becomes extinct in this region. Extensive grazing by yaks along with the consequent human intrusion for plant exhibited more pronounced habitat destruction and made the plant status crucial for immediate management intervention. Proper updated information regarding the species is

Image 1. *Gentiana urnula* Harry Sm.: A—plants in natural habitat | B—flowers. © K.S. Kanwal.

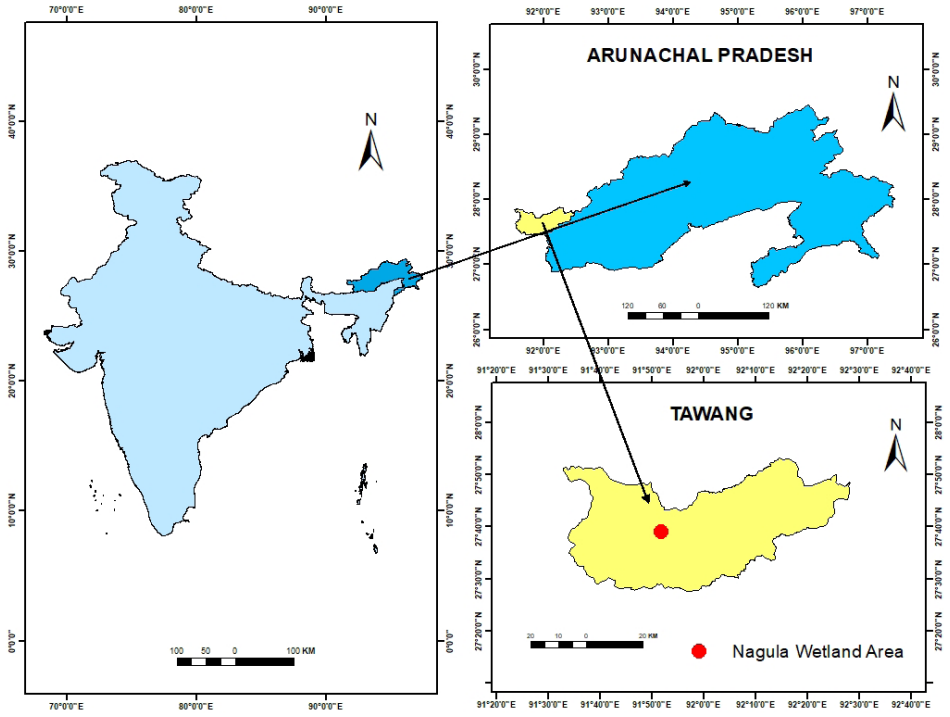

Image 2. Distribution of *Gentiana urnula* Harry Sm. near Nagula wetland, Tawang District.

lacking in India or neighbouring countries, especially with regard to ecological and habitat information, thereby creating huge lacuna in the knowledge base. Qualitative and quantitative inventory of the species is urgently needed for evolving a long term conservation plan of the species. In addition to this, in situ and ex situ conservation measures, awareness through educational programmes, and community participation should also be required for the conservation of *Gentiana urnula* in the region.

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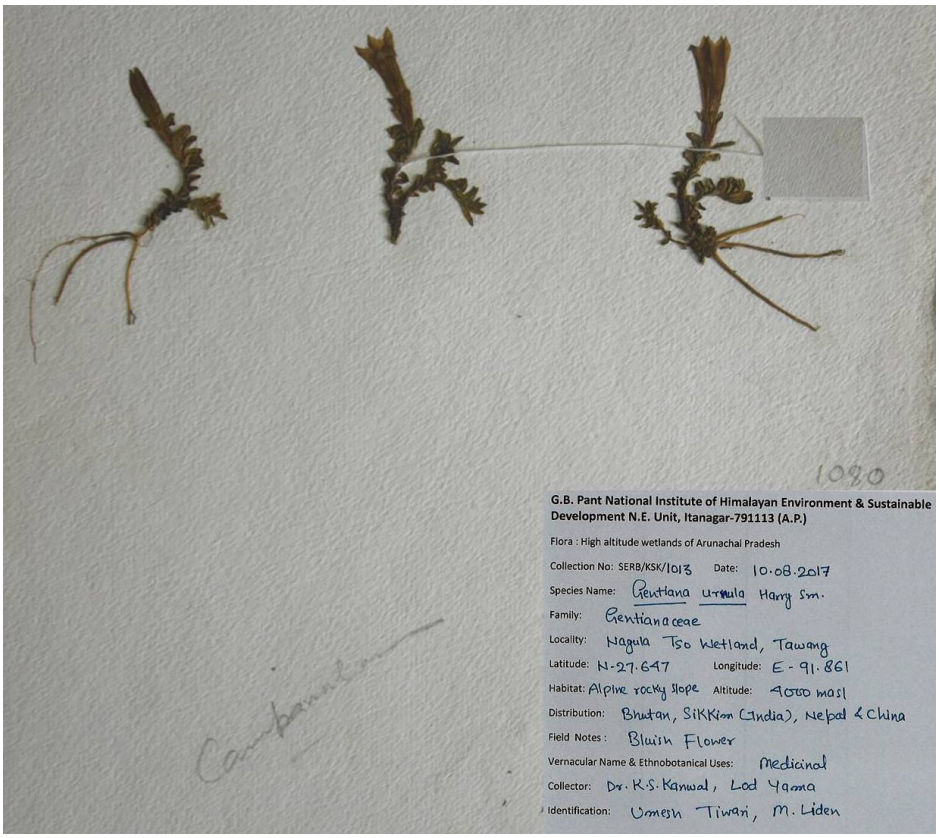

Image 3. Herbarium image of *Gentiana urnula* (GBP) [1013].

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