

***Gentiana oreodoxa* Harry Smith (Gentianaceae): note on its rarity and occurrence in India**

Sentu Kumar Dey and D. Maity¹

Taxonomy and Biosystematics Laboratory, Department of Botany, University of Calcutta,
35 Ballygunge Circular Road, Kolkata – 700 019, West Bengal, India

¹Corresponding author: E-mail: debmaity@yahoo.com

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Abstract

Gentiana oreodoxa Harry Smith (Gentianaceae) was described from China. Presently the species is distributed from Bhutan to Myanmar through China (Tibet). This species was doubtfully recorded from eastern part of Sikkim (Jelep La) of India and now it is discovered from the extreme northern part of Sikkim (upper Thangu). Detail description, field photograph, critical notes on its distribution, habitat, etc. are provided.

Key words: *Gentiana oreodoxa*, Distribution, Discovery, Upper Thangu, Sikkim Himalaya

INTRODUCTION

The genus *Gentiana* Linnaeus (*s.l.*) of Gentianaceae consists of over 361 species and is distributed in the high altitude, temperate and alpine forests with few exceptions to the lower tropical region both in the old and new worlds (Ho & Pringle 1995; Mabberley 2008; Maity 2014). All the species of the genus have erect to ascending habit, glands at the base of the ovary and with folds (plicae) in between the corolla lobes (with the exception of *Gentiana sceptrum* Grisebach and *G. lutea* Linnaeus). However, in recent past few tribes were described as new genera to eliminate the polyphyly of the genus *Gentiana* Linnaeus (*s.l.*) (Ho *et al.* 2002; Favre *et al.* 2014).

To date, in India more than 65 species of *Gentiana* (*s.l.*) are recorded and most of those are the inhabitants of the Himalayas and NE India with the presence of a few in the subtropical regions. Few species were also described from Western Ghats (Clarke 1883; Garg 1987). During the plant collection trip to north Sikkim a few specimens of a late flowering *Gentiana* were collected from the upper valleys of Thangu during October, 2014. These specimens were with linear leaves and larger bluish flowers. Detailed literature studies (Clarke 1883; Garg 1987; Ubolcholaket 1987; Ho & Pringle 1995; Aitken 1999; Ho & Liu 1993, 2001), critical analysis of the specimens and comparison of all Himalayan *Gentiana* species confirmed its identity as *G. oreodoxa* Harry Smith belonging to *Gentiana* sect. *Kudoa* (Masamune) Satake & Toyokuni *ex* Toyokuni. Moreover, the specimens were also compared with the images of type specimens at E and general specimens at PE towards the confirmation of the identity.

The species is known to grow in Bhutan, China (Tibet) and Myanmar. In India it was doubtfully mentioned from eastern part of Sikkim (Jelep La) by Aitken (1999). However,

Indian specimens could not locate in any international herbarium (viz. CAL, BSHC, K, E, BM, NY, P, PE, WU, W, etc.). The species is now reported here confirming its occurrence in India and a detail description along with the image of this species is provided to facilitate its easy recognition.

Taxonomic treatment:

Gentiana oreodoxa Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 99. 1926. Ho & Pringle in Wu *et al.*, Fl. China 16:47.1995; Aitken in Grierson & Long, Fl. Bhutan 2(2): 642. 1999. [Fig.1]

Perennial to 7 cm tall including flower; roots fleshy; stems ascending, few, directly arising from rootstock, glabrous, 1 – 2 flowering; others vegetative, often ‘with cluster of bud-like shoots with very small leaves’; basal rosette leaves absent or poorly developed; lamina lanceolate, linear-lanceolate to elliptic, 0.7 – 1 cm × 1.5 – 2.5 mm, base connate for 1 – 2 mm, margin smooth to very slightly cartilaginous, rarely sparsely papillate towards base, apex acute to short acuminate, midvein distinct; cauline leaves usually larger and more crowded toward apex, uppermost ones surrounding calyx; lamina base connate for 1 – 2 mm; flowers solitary, terminal; calyx tube narrowly obconic, 0.6 – 1 cm; lobes distantly placed, green, linear-oblongate, 6 – 6.5 × 1 mm, margin smooth or slightly scabrous, apex acuminate; corolla pale blue, with pale white base and dark blue streaks (ridges/mid veins) and spots, obconic, 3.5 – 4 cm; lobes ovate-triangular, 2.5 – 3 mm, entire, apex obtuse; plicae, 1.5 – 2 mm broad, margin entire or denticulate, often shallowly 2-lobed, apex obtuse; stamens inserted below middle of corolla tube; filaments 7–10 mm; stigma lobes linear; capsules ellipsoid; gynophore to 2.5 cm.

Flowers: August – October; **Fruits:** September – November

Distribution: Himalayas: INDIA (Sikkim), BHUTAN, CHINA (TIBET); MYANMAR.

Ecology: The species grows on moist grassy alpine slopes; 3000 – 4900 m

IUCN red list category in India: The species is known only from a single population in upper Thangu valley of North Sikkim. The specimens were collected from a population of some 7 – 8 individuals. No other population were so far observed even after a detailed search in the area and its neighbouring regions in successive two years (2013 & 2014). In view of its very limited number of individual, the species should be considered Critically Endangered (CR D) in India (IUCN 2001).

Specimens examined: North Sikkim, upper Thangu, 4300 m, 14.10.2014, Dey 21498 & 21500 (CUH).

DISCUSSION

Gentiana oreodoxa Harry Smith was described in 1926 based on the specimens collected from Tibet, China. Later, this species was recorded from Bhutan and Myanmar.

The species can be diagnosed by its decumbent habit, fleshy roots, very poorly developed basal leaf rosette or even absent, linear stem leaves; vegetative shoots often with cluster of bud-like shoots with very small leaves, corolla pale blue, with pale white base and dark blue streaks and spots and broad symmetrical plicae with entire or denticulate margin.

The account of the species is never included in any Indian literatures (Clarke 1883; Smith & Cave 1911; Garg 1987; Maity 2005; Maity & Maity 2007). However, in the floristic



Fig. 1. *Gentiana oreodoxa* Harry Smith: **A.** Habitat; **B.** Habit with flower

account of Bhutan, Aitken (1999) mentioned its occurrence in the eastern part of Sikkim at Jelep La, a high mountain pass between India and Tibet of c. 4270 m altitude without mentioning the details of specimens. Inspired by this fact, a thorough search was conducted to locate the Indian specimen in different world herbaria and no such material was found in these repositories though several specimens including types were traced particularly at K, E and PE. However, there is not a single Indian representative of this species in referred world herbaria (BM, P, NY, W, WU). A critical search was also made at CAL and BSHC.

In this context, collection of the species in Indian territory is considered to be a new record to the country. All the collected specimens are deposited at Calcutta University Herbarium (CUH).

Most of the species of *Gentiana* are monsoon flowering (June – August), particularly the high altitude species. Notably, *G. oreodoxa* is a late flowering species of the genus and flowers in August to October and fruiting period is extended to late November. Present collections in mid–October are with fully open flowers and few buds. Therefore, fruiting stage may extends to late November to early December.

The habitat of the species is in the open alpine pasture of upper Thangu. Due to army camp and a small village with human settlement at Thangu some sorts of threats are noticed with the changing of land use pattern, expansion of settlement, etc. Some sorts of anthropogenic activities are also noticed around this area. Yaks and other domestic animals are also frequently grazing in this grassland. Therefore, some conservation measures should be taken to save this rare species.

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