



RESEARCH ARTICLE

A new distributional report of *Cremanthodium nepalense* (Asteraceae) in India: A vulnerable and endemic species of the Himalayas

Rahul Kumar & Vikas Kumar*

Environmental Technology Division, CSIR-Institute of Himalayan Bioresource Technology, Palampur-176 061, Himachal Pradesh, India

*Email: vikas@ihbt.res.in



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Abstract

Cremanthodium nepalense Kitam. (Asteraceae) is reported for the first time from India. It is endemic to the Himalayas and has only been reported from Nepal and China. It was found growing in alpine meadows near river bank in North Sikkim at an elevation of ca 4370 m. In the present report, the diagnostic features, morphological variations and coloured photo-plate are provided. Besides conservation, status 'Vulnerable' has also been evaluated using IUCN Red listing guidelines.

Keywords

Cremanthodium nepalense; Himalaya; new record; Sikkim; vulnerable

Introduction

The genus *Cremanthodium* Benth. (family Asteraceae), with about 79 accepted species, is found in the Himalayan region (1). The genus is commonly known as 'Himalayan Sunflower' and grows in alpine meadows, shrubs and screes at elevations ranging from 2400 to 5600 meters (2). In India, 17 *Cremanthodium* species are reported, mostly distributed in the Eastern Himalayas (3 - 5). The genus is very peculiar and members of this group can be easily distinguished by their usually solitary and drooping capitula, which are mostly adorned with yellow ray floret (6).

During a botanical expedition to the alpine region of Sikkim Himalaya in July 2022 for taxonomic studies of the genus *Cremanthodium*, an interesting population of the taxon with impressed leaves and pale yellow capitula, growing in alpine meadows near a water stream at an altitude of ca 4370 meters was discovered. After careful examination of collected specimens and consultation with the literature (6-9), the taxon was identified as *C. nepalense* Kitam., the species endemic to Nepal and China, hitherto not reported from India (4, 10-15).

It is worth mentioning that in the checklist published by BSI (4) and others (16, 17), the distribution of *Cremanthodium nepalense* Kitam. was reported from Uttarakhand, Darjeeling and Sikkim. The occurrence of this species from the above regions are erroneous as we could not trace any representative specimen as evidence from India. Hence, we report this species as a new distributional record to the flora of India. A detailed description along with coloured illustration, field photographs, morphological notes and conservation status have been provided (Fig. 1-3).

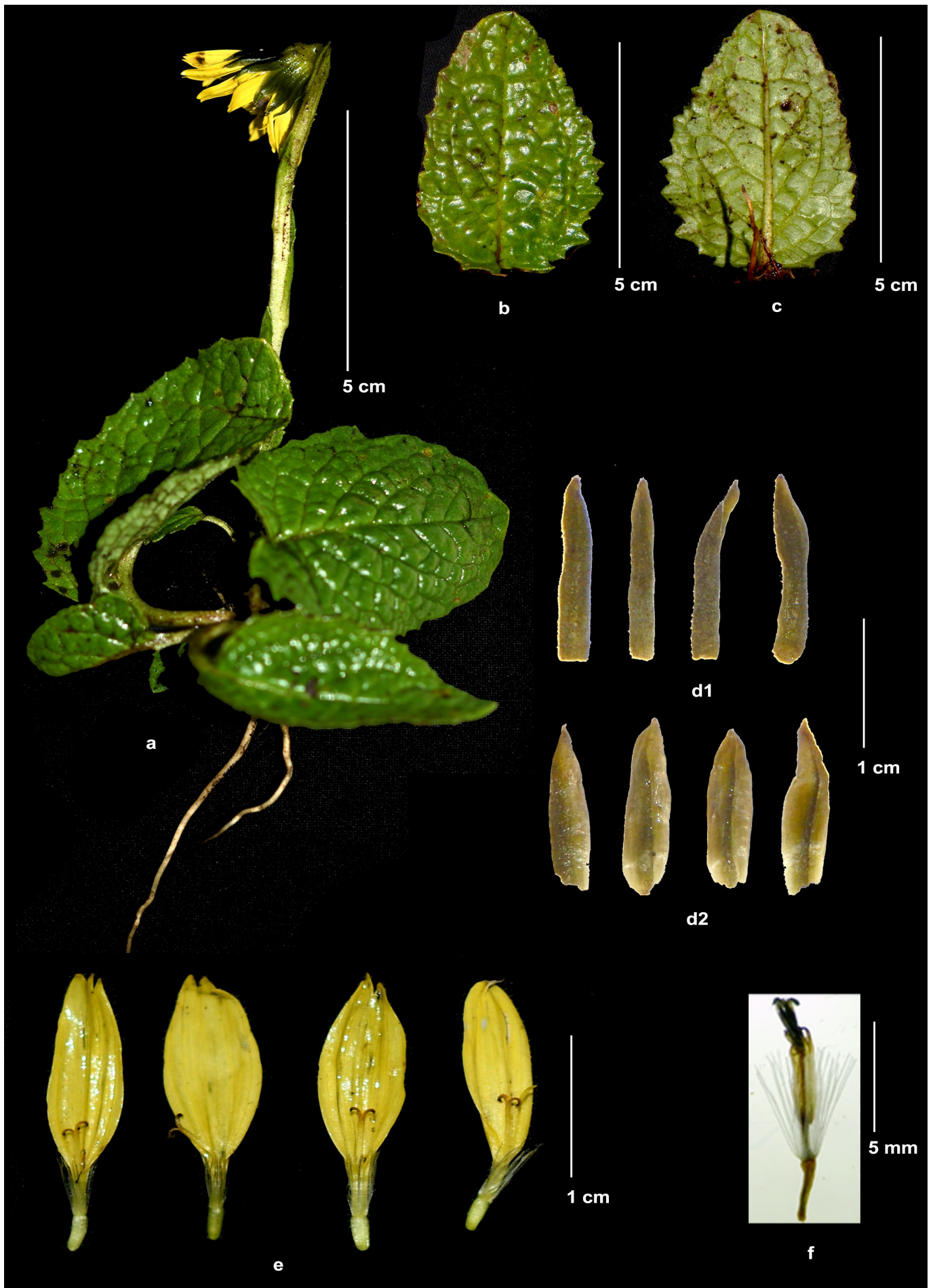


Fig. 1. *Cremanthodium nepalense* Kitam. **a.** habit; **b & c.** leaf adaxial and abaxial surface respectively; **d1.** outer phyllaries; **d2.** inner phyllaries; **e.** ray florets; **f.** tubular florets.

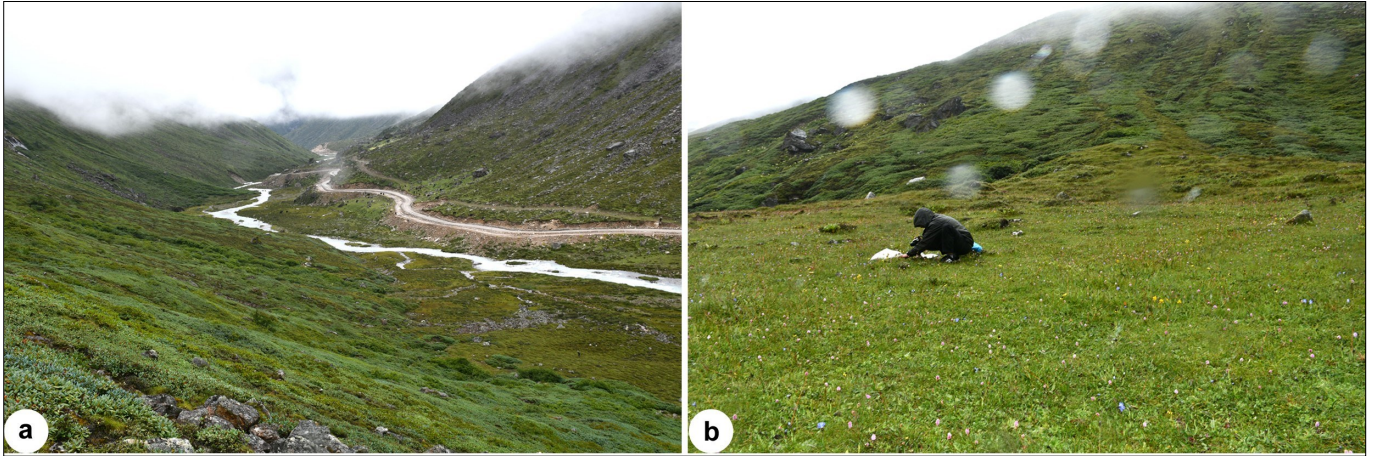


Fig. 2. a & b. Habitat of *Cremanthodium nepalense* Kitam.

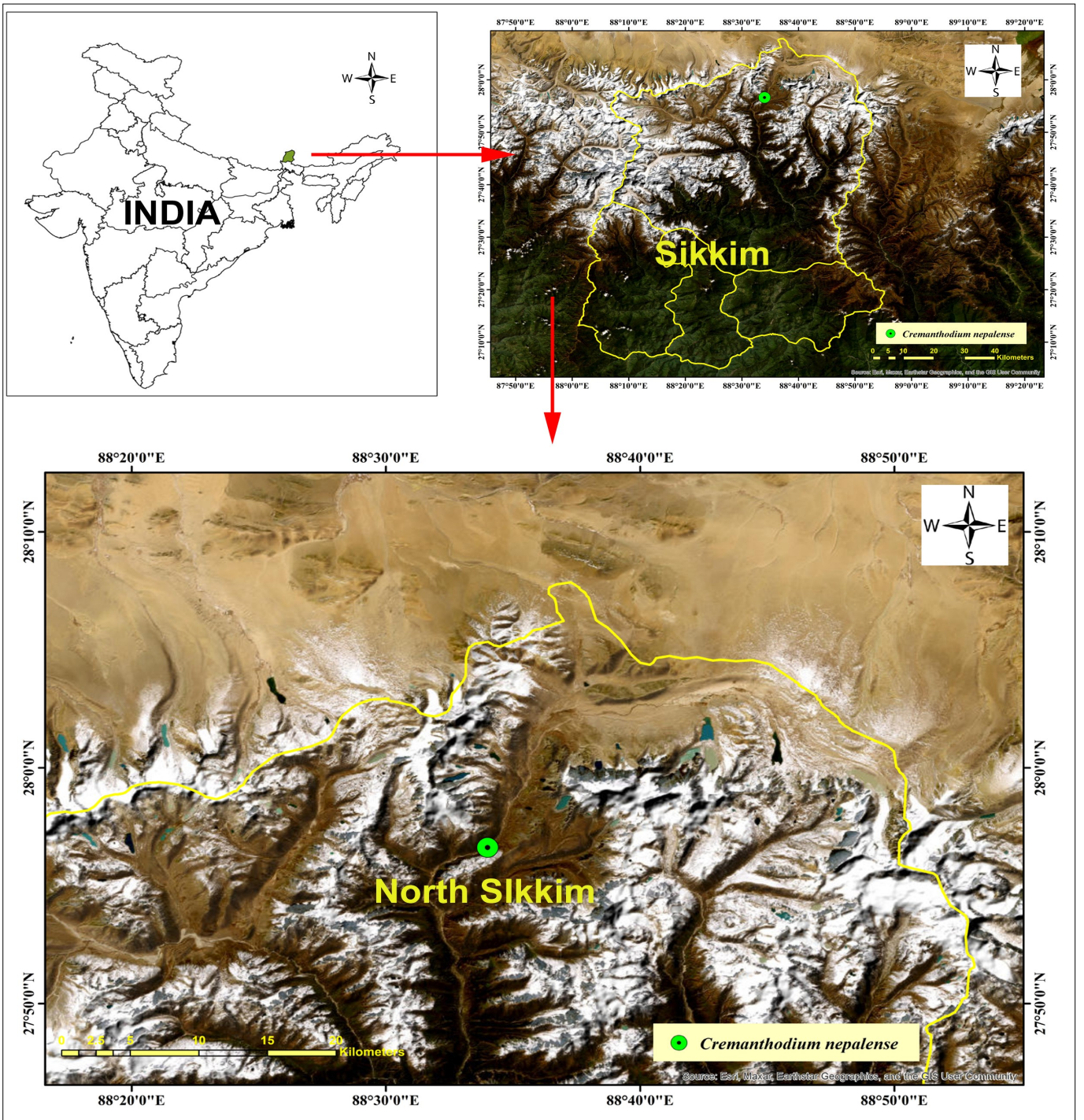


Fig. 3. Locality map of *Cremanthodium nepalense* Kitam in Sikkim.

Materials and Methods

Samples were collected from North Sikkim 4370 m altitude for research purpose. Photographs of the habitat and plants were taken in the field. Fresh flowers were dissected and morphological characters were noted using Olympus SZ61 Stereo Microscope. Herbarium of the species were prepared following standard protocol and deposited at the herbarium of CSIR-IHBT, Palampur (PLP). To access the conservation status of *Cremanthodium nepalense*, the Extent of Occurrence and Area of Occupancy were calculated using GeoCAT based on 2 km × 2 km grid cells. The locality map of the species was made using ArcGIS software 10.4.

Taxonomic Treatment

Cremanthodium nepalense Kitam., *Acta Phytotax. Geobot.* 15(4): 105. 1954.

Type

Nepal, Prope Tsumje, Bangu Kholo, 3300 m, 19 June, 1953, S. Nakao s.n. (KYO [KYO-00104930-image!])

Herbs erect stem, solitary, 10–20 (–30) cm tall, light green, darker upwards, arachnoid puberulent, sparsely black hairy. Basal leaves petiolate; petiole 2–4 (–10) cm long, purple or green, glabrescent or with few black hairs; lamina ovate 2.5–5.8 (–8.0) × 2.0–4.6 (–5.8) cm, dark green, reticulate veins deeply impressed on the lower surface, apex obtuse or rounded, leaf base cordate to rounded (–truncate), margins dentate with minute erect hairs or trichome. Stem leaves (2–) 5–11, 1.4–2.5 cm long, linear with sheathed base, margin dentate, weakly entire upwards. Capitula solitary, drooping; phyllaries 14–20, in 2 rows, 11–15 × 2.0–3.5 mm, apex acute-acuminate, arachnoid hairy, glabrescent, sometimes with a few black hairs, dark green and light green towards the edges. Ray florets yellow, lanceolate-elliptic, 14–20, 12–17 × 3–6 mm, 5-veined; pappus white, ca 5 mm long. Disc florets, yellow, turning blackish grey on drying; tube ca 1 mm long; throat ca 6 mm long; lobe ca 1 mm long; style branch dark yellow. Pappus ca 6 mm long, white.

Flowering

July to August.

Habitat & Ecology

The species is found growing on alpine meadows, marshy areas and river banks at elevations ranging from 4000–4500 m.

Distribution

India (Sikkim- present report), Nepal, China.

Specimen examined

India, Sikkim, North Sikkim, on way to Gurudongmar Lake, 4370 m., 24 July 2022, R. Kumar & V. Kumar 20968 (PLP).

Notes

Cremanthodium nepalense is known to occur in Nepal and China. Our specimens from Sikkim show some morphological variations from Nepal and China, such as the shorter size of the stems (10–19 cm) cm; petioles (2–4 cm) and cordate to rounded leaf bases. The number of stem leaves from the Chinese population was reported to be 2–5

whereas, the Sikkim population have 5–11.

Conservation Status

Cremanthodium nepalense has a narrow distributional range and is distributed in Nepal and China. During the present study, a small subpopulation has been discovered from India (Sikkim). The Extent of Occurrence (EOO) and Area of Occupancy (AOO) were calculated as 33425 km² and 68 km² respectively. The EOO exceeds the threshold value for the threatened category but, AOO qualifies for Endangered under Criterion B2. It is known from 17 localities in 09 subpopulations, meeting the threshold of Vulnerable under sub-criterion B2a. The China subpopulation is reported from grazed grassland slopes (18) and the population in Nepal is not known. Based on herbarium records and relevant literature the species is quite rare in China and Nepal. The Indian subpopulation is also threatened by landslides, tourism, grazing and other anthropogenic threats. So far, we could locate 20–25 mature individuals from North Sikkim. In the Himalayan range the population of the species is inferred to be severely fragmented. Based on the present observations its conservation status can be evaluated as 'Vulnerable' [VU B2ab(iii)] as per the IUCN Red listing guidelines (19, 20).

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Authors contributions

RK and VK have collected and identified the species. VK prepared photo-illustrative plate and manuscript.

Compliance with ethical standards

Conflict of interest: Authors do not have any conflict of interests to declare.

Ethical issues: None.

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