

RESEARCH ARTICLE

## Pleurocarpus moss, *Symphyodon echinatus* (Mitt.) A. Jaeger (*Symphyodontaceae*) new to Western Himalayas, India

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**Abstract:** *Symphyodon echinatus* (Mitt.) A. Jaeger a pleurocarpus moss of the family Symphyodontaceae is reported as new to Western Himalayas. The species is characterized by abundant multicellular brood bodies developing from leaf axils. Earlier the moss, *S. echinatus* was listed as endemic to Eastern Himalayas. The present occurrence, therefore, puts a record of the new distributional range of this epiphytic species in the Garhwal region of Western Himalayas.

**Keywords-** Bryophyte, Epiphyte, Gemmae, Pleurocarpus moss, Western Himalayas

### Introduction

The sematophyllaceous genus *Symphyodon* was first instituted for a single species by Montagne (1841). On worldwide basis, Brotherus (1925) made the first assessment on the genus *Symphyodon* recognizing 14 out of the 17 species. Occasionally some of the *Symphyodon* taxa have been treated in regional floras (Bartram 1939, Gangulee 1976, Horikawa and Ando 1964). He and Snider (2000) in their taxonomic revision of *Symphyodon* included and described 15 species. From India, Gangulee (1976) reported nine species and one variety. Since then, *S. echinatus* species has shown extended distribution and expanded significantly in China, Nepal, India, Sri Lanka, and Thailand (He and Snider 2000). Scrutiny of previous literature indicates that this species has not been reported so far from the Western Himalayas (Lal 2005, Manju *et al.* 2009, Dandotiya *et al.* 2011, Bahuguna *et al.* 2015, Sahu and Asthana 2016, plant list WFO). However, Sahu and Asthana (2014) reported another species of *Symphyodon* as *S. erraticus* (Mitt.) A. Jaeger from the area of Govind Wildlife Sanctuary, Uttarakhand in Western Himalayas. *S. echinatus* is reported here for the first time from the Tungnath area of Rudraprayag

district in the Garhwal region of Western Himalayas.

### Material and methods

While studying the collection of bryophytes made on way to the Tungnath area (30.4887°N, 79.2170°E; 2100-3200 m) of district Rudraprayag, Garhwal Himalayas (Fig.1), we came across an interesting gemmiferous, pleurocarpus moss belonging to the family Symphyodontaceae. Temporary slides of leaves and gemmae were prepared in 30% glycerine and permanent slides in gum chloral mounting medium (Watson 1955). Photographs of different plant parts were taken. Identification was made with the help of available literature and further confirmed by experts of the related group.

### Observations

### Taxonomic Description

*Symphyodon echinatus* (Mitt.) A. Jaeger., Ber. Thatigk. St. Gallischen Naturwiss. Ges. 1876-77: 296.1878.

*Stereodon echinatus* Mitt., J. Proc. Linn. Soc. Bot. Suppl. 1: 110. 1859. TYPE: INDIA. SIKKIM. Hooker 734 (NY. Holotype; BM, S, W, isotypes).

*Symphyodon asper* var. *mamosum* Gangulee,

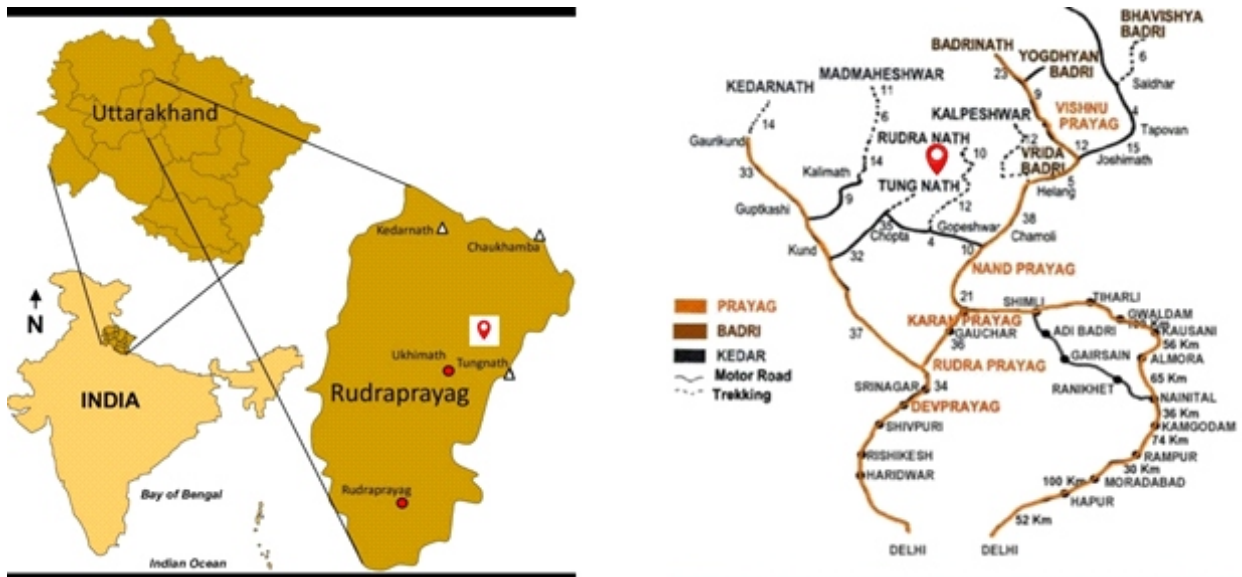
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**Figure 1.** Location map of *Symphodon echinatus* in the study area

Mosses E. India 6:1527, f. 766: 2. 1977. TYPE: INDIA (East Himalayas). Builfa, *ign.* (NY. Holotype).

Plants yellowish-green, medium to large-sized 5-8 cm long. Stem with bi or tripinnate branching. Leaves dimorphic; stem leaves dense, concave, ovate, 0.8-0.9 mm long and 0.3-0.5 mm wide; branch leaves ovate, smaller 0.53-0.60 × 0.20-0.24 mm narrowly acuminate apex; leaf margin irregularly serrate at apex; costae unequal short extending to 2/5-1/2 total leaf length; alar cells well-differentiated yellowish-brown, quadrate to rectangular, thick-walled 20.5 × 11.7 μm; basal leaf cells 29.4 × 8.8 μm; mid-leaf cells linear, elongate 38 × 5 μm; leaf cells papillose at an upper angle; juxtacoastal cells porose. Multicellular, filamentous gemmae 12-24 cells long, brownish 0.32-0.42 × 0.04-0.05 mm abundant in leaf axils. Sporophyte not seen.

### Distribution

Thailand, Bhutan, Sri Lanka, China, India (Sikkim, Darjeeling, Manipur and Peninsular India). The present collection is a new record for Western Himalaya, India.

### Specimen Examined

INDIA. Western Himalayas (Garhwal), district Rudraprayag, Tungnath, Bhujgali (2900 m)

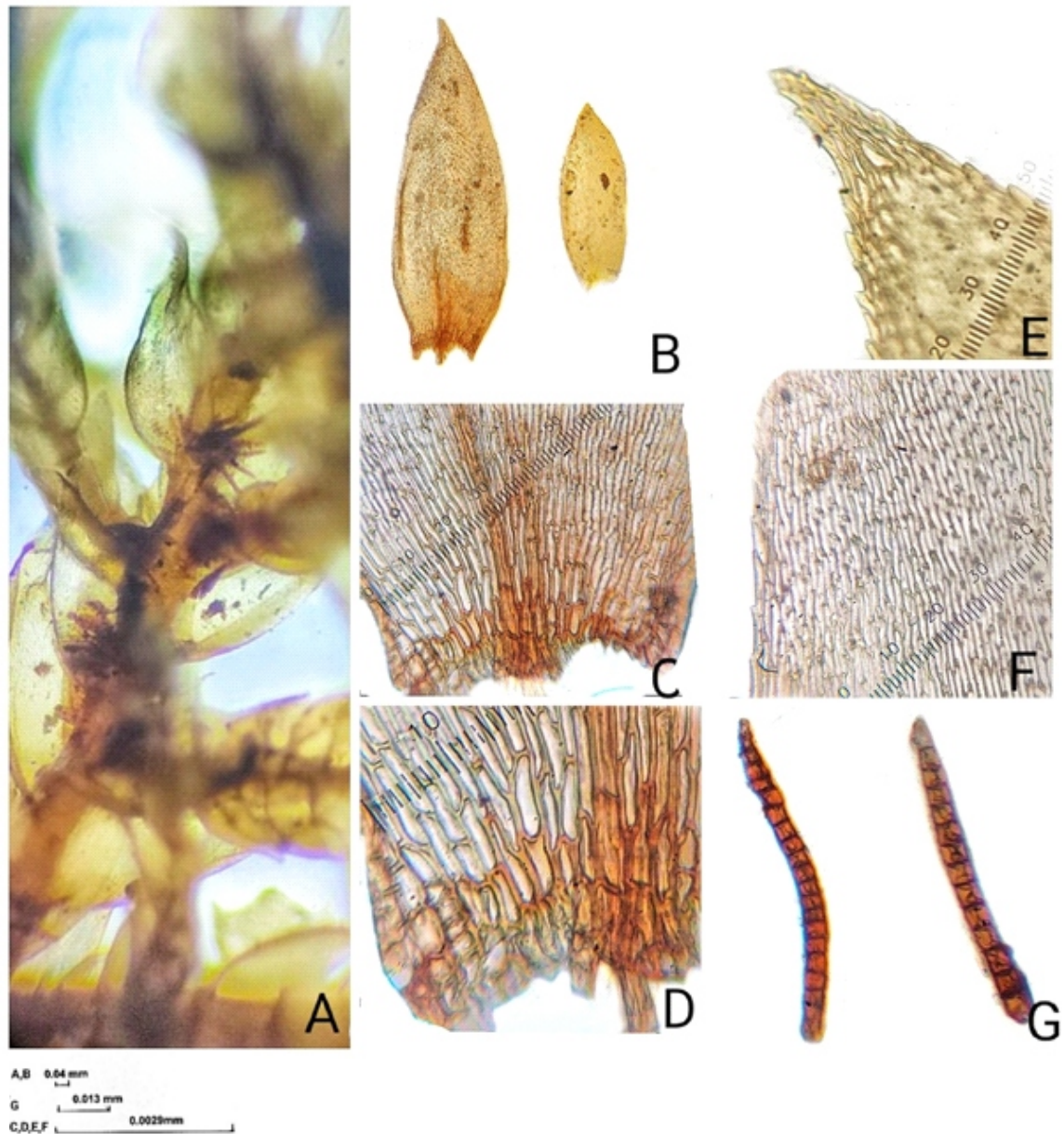
30.4887°N, 79.2170°E, 31.08.2019, TN1(F). The voucher specimens TN1(F), TS41 (2300 m), and TK164 (2400 m) are deposited in the recognised Indian herbarium LWG accession number TN1F/SD-1 and Museum of Nature and Human Activities Japan HYO, accession number C6-055849.

### Ecology

*Symphodon echinatus* plants were collected from the basal portion of a tree trunk at an elevation of 2900 m. The intermixed population of the moss was in association with other bryophyte species viz., *Bazzania praerupta* (Reinw., Blume & Nees) Trevis., *Frullania pyriforma* Steph., *Plagiochila flexuosa* Mitt., *Scapania undulata* (L.) Dumort., and mosses namely of *Anomodon rugelii* (Mull. Hal.) Keissl., *Cryptoleptodon flexuosus* (Harv.) Renaud & Cardot, *Entodon luridus* (Griff.) A. Jaeger, and *Trachypodopsis serrulata* (P. Beauv.) M. Fleisch.

### Discussion and conclusion

The presently reported epiphytic, gemmiferous moss, *S. echinatus* was earlier listed as endemic to Eastern Himalaya Gangulee (1976). Thereafter, several studies proved it is not endemic and the species is being documented as a new record from Western Himalayan sector, indicating its significant expanded new distributional range.



**Figure 2 (A-F).** *Symphyodon echinatus* (Mitt.) A. Jaeger **A-** Gemmiferous shoot **B-** Stem and branch leaves **C-** double costa with porose juxtacostal cells **D-** Alar cells **E-** Leaf apex **F-** Papillose middle cells **G-** Gemmae TN1(F)

Enormous multicellular gemmae production and unavailability of sporophyte indicate congenial habitat for the growth of this symphyodontaceous moss.

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