

## FISSIDENS CURVATO-INVOLUTUS DIX. (FISSIDENTACEAE) NEW DISTRIBUTIONAL RECORDS FOR SATPUDA RANGE OF MAHARASHTRA

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### ABSTRACT

Khandesh region of Maharashtra part of Satpuda ranges exhibits unique topographical and climatic conditions that support rich bryoflora. Bryophytes are the second largest group of land plants and are also known as the amphibians of the plant kingdom. The family fissidentaceae which is a large moss family globally the family consists of 10 genera but only one genus, *Fissidens* Hedw. has been collected from Satpuda range. *Fissidens* is characterized by a unique leaf structure and shows the presence of three distinct lamina, the dorsal, the ventral and the vaginant lamina. The identification of different species was difficult due to substantial overlap in vegetative characters. Hence a detailed study on the diversity of members of Fissidentaceae in Satpuda range was carried out. The paper report for the first time population of *Fissidens curvato-involutus* Dix. of the Fissidentaceae from a new locality, Satpuda range in the Khandesh region of Maharashtra. This paper describes the *Fissidens curvato-involutus* Dix. along with images and the distributional pattern in the Satpuda range of Khandesh region.

**Keywords:** Bryophytes, Mosses, Fissidentaceae, Satpuda range

### INTRODUCTION

Satpuda range of Khandesh region is an ignored geographical area by Indian bryologist. Khandesh region comprises of three districts Nandurbar, Dhule and Jalgaon. It lies between 20° 8' and 22° 7' North latitude and 73° 42' and 76° 28' East longitude. Khandesh covers an entire area of 26,703.36 sq. km extending nearly 257.44 Km along. Satpuda range of Khandesh region lies at the Northwestern corner of the Deccan plateau, in the valley of the Tapi river, and is restricted in the north by the Satpuda ranges, in the east by the Berar (Vidarbha) region, in the south by the hills of Ajanta, belonging to the Marathwada region of Maharashtra, and in the West by the Northern most ranges of the Western Ghats, and outside that the coastal plain of Gujarat. Along the entire Northern frontier, the district is restricted by the Satpuda ranges, a mountainous tract from 48.27- 64.36 km wide.

Bryophytes are the second largest group of land plants after the angiosperms and are generally found in moist and damp habitats. They are divided into three groups, liverworts, hornworts and mosses. Mosses are the largest group among bryophytes and constitute comprise about 13,000 species (Goffinet *et al.*, 2009). They are differentiated from other two groups by the presence of a distinct juvenile gametophytic phase called the protonema stage. The genus *Fissidens* was established by Hedwig in 1801 (Prussel, 2007). The family Fissidentaceae comprises of acrocarpic haplolepidous mosses. Fissidentaceae is a distinct and homogenous family related to the Dicranales in peristome structure is but unique in leaf characters. The family consists of 10 genera in the world of which the most common genus is *Fissidens* and is characterized by equitant and distichous leaves and a unique leaf structure consisting of dorsal, ventral and vaginant lamina (Prussel, 2007). The name *Fissidens* is derived from two Latin roots (fissus= cleft + dens= tooth), in reference to the peristome teeth that are divided for much of their length. The plants of *Fissidens* are either corticolous or terricolous. The leaves of *Fissidens* are distichously arranged on the stem. The adaxial

end near the leaf base is differentiated into two vaginant laminae clasping the stem i.e., *Fissidens* leaf has three lamina: 1) Vaginant lamina, 2) Dorsal lamina and 3) Ventral lamina.

The bryophyte diversity in India is represented by 2489 species (Dandotiya *et al.*, 2011) of which includes 1786 species of mosses under 355 genera. They have reported 88 species of *Fissidens* which makes it one of the largest moss genera in terms of numbers. The climate of Satpuda range is supportive to the luxuriant growth of bryophytes. These species occurs in the rainy season and in winter season during the month of July-February, endures moderate winters and dies out on the onset of the summers. Mostly the *Fissidens curvato-involutus* Dix. shows terricolous habitat. Very little information is available regarding bryoflora of Khandesh range of Maharashtra (Tanveer & Javed, 2018, 2021, Tanveer & Shakila 2021 and Tanveer *et al.*, 2022).

## MATERIALS AND METHODS

Satpuda ranges, which is one of the major hotspot of plants in Khandesh region. While working on bryoflora of Khandesh region of Maharashtra State, we undertook frequent collection tours in every season during the month of October- December to collect Specimens. The outcome of the collection tour was the new taxa of *Fissidens curvato-involutus* Dix. is the first records for Satpuda range of Khandesh region of Maharashtra. The morphotaxonomical and anatomical analysis of the population was pursued after selecting fresh and previously preserved plants in 4% formalin (Bowers, 1964). External features of thalli were studied under stereo microscope. Hand sections of thalli were mounted in glycerine and observed under light microscope. All taxa have been identified with the help of available literature (Kashyap, 1929 and 1932, Daniels AED, 2003 and Gungulee HC, 1971, Mehta *et al.*, 2016) identification and confirmation of specimens by expert opinion. The voucher specimens are deposited at the Department of Botany, H.J. Thim College of Arts and Science Mehrun Jalgaon, Maharashtra.

## RESULTS AND DISCUSSION

Due to human interference, anthropogenic activities and grazing animals the bryoflora from Satpuda range of Khandesh get disturbed. Considering the ecological importance, sensitivity and vulnerability of bryophytes to changing environment, it is most essential to enlist bryophyte through periodical survey and revision. Therefore proper documentation is needed for conservation of these ecologically important plants before their extinction. While exploring the study area *Fissidens curvato-involutus* Dix. have been collected from Satpuda range of Khandesh region detailed descriptions are given below:

***Fissidens curvato-involutus* Dix.** In Not. R. Bot. Gard. Edinb., 19:279.1938; Gangulee, Mosses of E. India and adjacent regions 1(2): 548-549.1971; Daniels, Bryophytes of Southern W.Ghats 46.2003. Fig.1.

Plants terricolous, stem 0.7-9 mm long and 0.2 mm wide with leaves with 8-12 pairs of leaves, green to light-green. Leaves ovate-lanceolate, which are more crowded in some plants, in some plants leaves are arranged freely and both plants more crowded towards apex, 1.2-1.8 x 0.3-0.45 mm with sheathing lamina; sheathing lamina to 0.7-1.2 x 0.15 - 0.22 mm wide, tip acuminate. Dorsal lamina base rounded and then decurrent with a fold. Perichaetial leaves 2-2.4 x 0.48-0.52 mm wide. Costa ending at few cells below apex. Leaf margin dentate by development of cells. Leaf cells hexagonal, gradually larger towards vein. Apical cells 3 x 4.77µm. long, 2-3 x 4.77 µm wide. Middle cells 3 x 4.77 µm long, 4 x 4.77 µm wide and basal cells 2-3 x 4.77 µm long, 3 x 4.77 µm wide. Plants sterile. Leaf Midrib 6-7 cells thick, cells of centre part with larger lumen, 2 Stereidal bands on upper and lower side of midrib, each with 5-10 highly thick-walled cells, lamina unistratose. Sporophytes present on apical portion of the plant.

**Locality:** Rare. In Khandesh region Found on dry and moist soils along streams, roads in interior forests, mostly as monodominant patches. Sometimes found associated with other members of Ricciaceae.

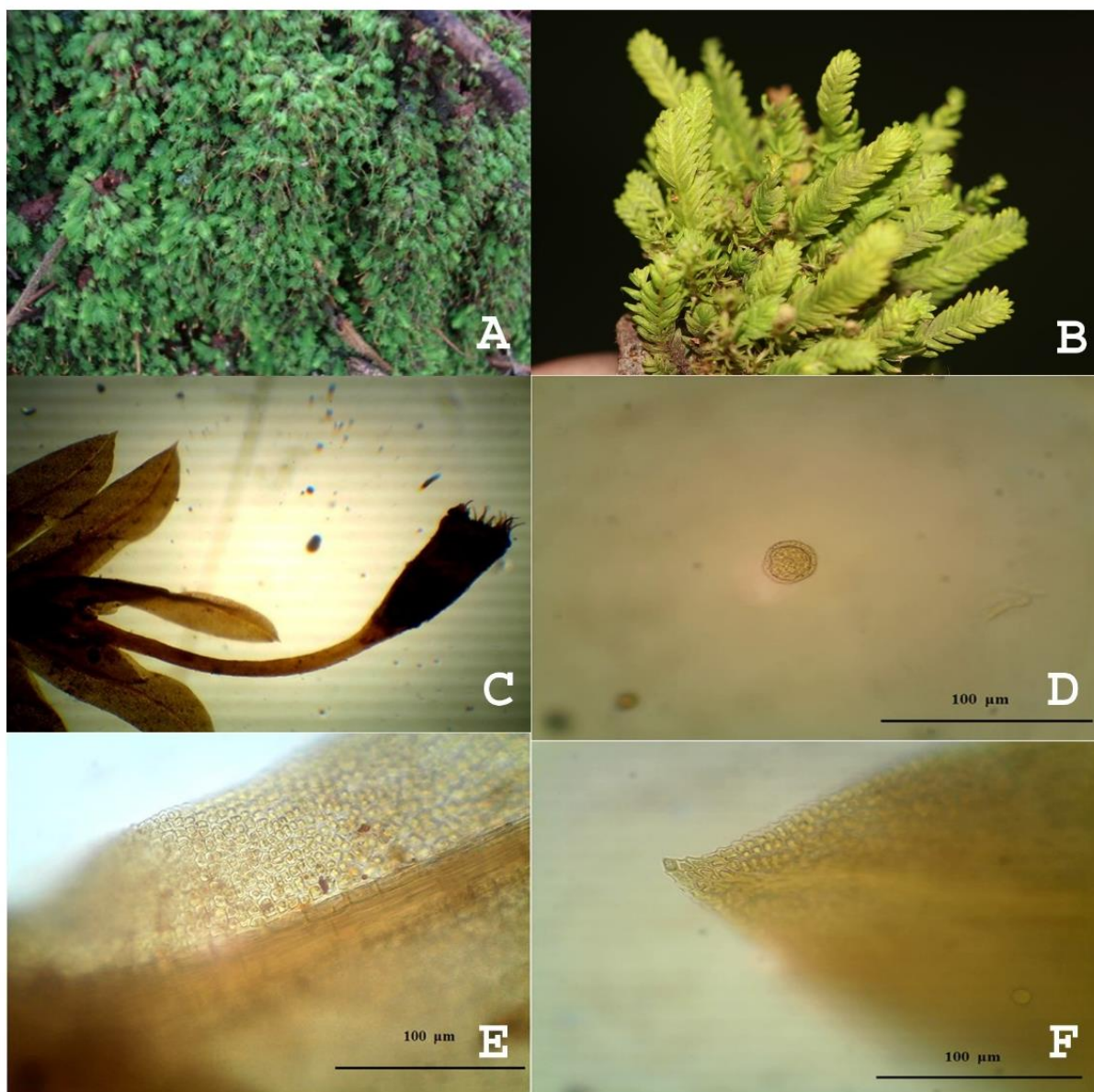
**Habitat:** Terricolous.

**Distribution:** First distributional records for Satpuda range of Maharashtra.

**Field notes:** Capsule curved is remarkable for identification.

**GPS reading:** N 21°21'27.77" E 75°31'32.55" (Elevation 489.7m).

**Specimen examined:** India: Maharastra: Jalgaon Dist., Devjiri forest, TAK 208; Manudevi, TAK 249; Nandurbar Dist., Molgi, TAK 279.



**Figure 1: Fissidens curvato-involutus Dix.**

A. Habitat B. Stem and Leaves C. Sporophyte D. Spore E. Cells from upper part of Leaf F. Cells from tips of leaf

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## REFERENCES

- Dandotiya DH, Govindaparyi S Suman & PL Uniyal (2011).** Check list of bryophytes of India, *Archive for Bryology*, **88** 1-122.
- Daniels AED, (2003).** Studies on Bryoflora of Southern Western Ghats, Tamil Nadu, India. PhD thesis. Department of Botany, Manomaniam Sundaradar University, Tirunelveli. 46.
- Gangulee HC, (1971).** Mosses of Eastern India and adjacent regions a monograph, **1**(2) 548-549.
- Goffinet B, Shaw AJ (2009).** Mophology, anatomy and classification of the bryophyte. *Bryophyte biology 2nd Ed., Cambridge University Press, Cambridge*.
- Kashyap SR, (1929).** *Liverworts of western Himalayas and Panjab plains*. **1**, University of Panjab, Lahore. 129-137.
- Kashyap SR and Chopra RN (1932).** *Liverworts of western Himalayas and Panjab plains*. **2**, University of Panjab, Lahore. 137.
- Khan TA and Khan JV (2018).** Diversity of Genus *Plagiochasma* in Satpuda Range of Khandesh Region, Maharashtra, India. *International Journal of Current Research in Bioscience and Plant Biology*, **5**(11) 50-55.
- Khan TA and Bagwan SA (2021).** *Cyathodium cavernarum* Kunze and *Cyathodium tuberosum* Kash are new distributional records for Khandesh region of Maharashtra. *Bioscience Discovery*, **12**(4) 201-203.
- Khan TA and Khan JV (2021).** *Riccia discolor* Lehm. & Lindenb. And *Riccia frostii* Austin are new distributional records for Khandesh region on Maharashtra, *International Journal of Current Research in Biosciences and Plant Biology*, **8**(10), 34-37.
- Khan TA, Chaudhari RY and Bagwan SA (2022).** Occurrence of *Riccia cavernosa* Hoffm. In Satpuda range of Maharashtra, India. *Plant Archives* **22**(1) 246-248.
- Pursell RA (2007).** Fissidentaceae. The New York Botanical Garden Press 200<sup>th</sup> Street and Kazimiroff Boulevard.
- Pursell RA (2007).** Fissidentaceae. *Flora of North America*. **27** 331-343.
- Mehta DN, Gujar RV and Shah DG (2016).** *Cryptogam Biodiversity and Assessment*, **1**(1) 84-91.