



***Cyathodium cavernarum* Kunze and *Cyathodium tuberosum* Kash are new distributional records for Khandesh region of Maharashtra**

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Abstract

The paper reports for the first time populations of *Cyathodium cavernarum* Kunze and *Cyathodium tuberosum* Kash of species of the Marchantialian taxon *Cyathodium* Kunze from a new locality, Satpuda range in the Khandesh region of Maharashtra. Morphological studies have revealed interesting strategies adopted by the populations for successful establishment in the new habitat.

INTRODUCTION

Satpuda range of Khandesh region is an ignored geographical area by Indian bryologist. Khandesh region consists of three districts Jalgaon, Dhule and Nandurbar. It lies between 20° 8' and 22° 7' North latitude and 73° 42' and 76° 28' East longitude. Khandesh covers a total area of 26,703.36 sq. km stretching nearly 257.44 Km along. Khandesh lies at the Northwestern corner of the Deccan plateau, in the valley of the Tapti river, and is bounded 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 beyond that the coastal plain of Gujarat. Along the whole Northern frontier, the district is bounded by the Satpuda ranges, a mountainous tract from 48.27-64.36 km wide.

In this study attempt was made to find out the status of genus *Cyathodium* Kunze in this region. The worldwide distributed Marchantialian member *Cyathodium* Kunze shows 13 valid species (Soderstrom *et al.*, 2016) out of which 9 species are known from the Indian sub-continent (Singh, 2016).

The taxon is abundantly represented both in the plains and hills though a majority of them are reportedly endemic. The present article embodies morphotaxonomical and anatomical variations observed in a species of the taxon *Cyathodium cavernarum* Kunze and *Cyathodium tuberosum* Kash recorded from a new locality, Satpuda range in the Khandesh region of Maharashtra.

These species occurs in the rainy season during the month of July-September, endures moderate winters and dies out on the onset of the summers. Mostly the genus *Cyathodium* shows Terricolous habitat.

Very little information is available regarding bryoflora of Khandesh range of Maharashtra (Tanveer and Javed, 2018).

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 July – September to collect Specimens. The outcome of the collection tour was the 02 new taxa of *Cyathodium*

Kunze that are *Cyathodium cavernarum* Kunze and *Cyathodium tuberosum* Kash are the first distributional records for Khandesh region. 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 (Bapna & Kachroo 2000 and Chaudhary *et al.*, 2008, Barve 1992) 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

While exploring the study area 2 species of *Cyathodium* Kunze have been collected from satpuda range of Khandesh region detailed descriptions are given below:

Cyathodium cavernarum Kunze in Lehm., Pugillus 6:17 1844; Schiffn., Ann. Bryol. 11: 132-134. 1938; Khanna, J. Burma Res. Soc. 16: 4. 227.1927. *Cyathodium mexicanum* Steph., Hep. 6: 4. 1917. *Cyathodium barodae* Chav., Bryologist 11: 57.f. 1-13. 1937; Amer. J. Bot. 24: 484-492. F. 1-83. 1937. *Cyathodium africanum* Mitt., J. Linn. Soc. 22: 298. 1887. Plate-I

Plant 2-10 mm long, 2-5 mm broad delicate, yellowish green or green, restricted to caves or in dank places or in open moist protected places; thalli often dichotomously branched and may appear fan-shaped, dorsal epidermal cells thin walled, chlorophyllose, lower epidermal cells larger and chlorophyllose. Air chambers usually in a single row, partition between air chambers 1-2 cells high with chloroplasts, chloroplasts few and large; pores on dorsal surface bounded by 2-3 concentric rings of 4-6 cells each; rhizoids smooth walled; ventral scales simple, filamentous or small plate, with mucilage papillae. Monoecious; male receptacles lateral to terminal, disc shaped or cushioned; involucre globose, bilipped; foot of 2-4 cells, seta of one row of cells, capsule ovoid, wall unistratose, cells in upper part with semiannular or annular thickening bands but in lower parts cells lack thickenings; operculum two tiered, outer tier of 4-6 cells and inner tier of 8-10 cells; spores 41-70 µm in diameter, brownish-black, isopolar, spiny,

spines 3-4 mm high; elaters 8-12 in a capsule, 225-450 µm long, 2-3 spirals, reddish brown.

Distribution: Rare. In Satpuda ranges. On gravelly, rocky substrate or hill slopes.

GPS reading: N 21°38'44.98" E 74°1'20.24" (Elevation 480.9m)

Specimens examined: Nandurbar Dist., Amlibarighat TAK 48; Molgi, TAK 51.

Cyathodium tuberosum Kash, New phytol. 13: 210. 1914; Liverw W. Himalayas Punjab Pl. 1-53. Pl. 10. f.1-11. 1929; Khanna. J. Burma Rec. Soc. 17: 270. 1927. *Cyathodium penicillatum* Steph., Spec. Hep. 6:4. 1917. *Cyathodium pectinatum* Goeb., Organogr. 2: 650. 1915; Schiffn., Ann. bryol. 12:128.f. 32-35. 1939. Plate-I

Dioecious, pale green or green, small, delicate 5-10 mm long, 2-5 mm wide, dichotomously branched, densely overlapping, lobes linear, male plants narrow more or less branched, linear lobes; female plants linear; dorsal surface flat, usually dorsal pores lacking, but may be present in well-developed female plants, ventral pores many, large simple bounded by 2-3 concentric rings of 4-5 cells each, elongated antero-posteriorly and rounded towards base; mid-rib not differentiated, thallus consist of a ventral layer of cells separated from upper single-layered epidermis by a row or series of air chambers, divided by vertical partitions (2-4 cells high); air chambers empty, epidermal cells bear chloroplasts; thalli bear tubers densely covered with rhizoids; rhizoids on ventral surface smooth, thin or thick walled, scales of simple cell rows of 3-6 cells in a row or plate like. Male plants small, male receptacle lateral, cushion shaped or in fork between two lobes and circular or terminal and disc shaped, they may be sessile or subsessile or shortly stalked. Female plants large; involucre many with 1-4 sporogonia in each; involucre ovoid, open by a circular or elliptic mouth, margins purplish, involucre with scales and rhizoids. Foot of two lobed cells; seta of one row of cells, capsule globose, wall one layered; operculum two tiered outer tier of 4 thick walled cells, the inner tier consists of upto 12 thin walled cells; spores 40-62 µm, spherical, dark brown, spiny; elaters 30-45 in a capsule, 3-spirals, sometimes 1-2 spirals, upto 500 µm long.

Distribution: Occasional. In wet patches, along hill slopes.

GPS reading: N 21°22'20.62" E 75°29'46.23" (Elevation 428m)

Specimens examined: Jalgaon Dist., Devjiri, TAK 68; Manudevi, TAK 73; Pal, TAK 89.

Cyathodium cavernarum Kunze and *Cyathodium tuberosum* Kash are to be first report for Satpuda range of Khandesh region of Maharashtra. Data available about these species are meager but field

surveys will play important role to enhance knowledge about the Indian Bryology, particularly in satpuda range of Khandesh region of Maharashtra.



Cyathodium cavernarum Kunze



Cyathodium tuberosum Kash

Plate - I

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