Discovery of a new taxonomic character in genus Cyathodium (Cyathodiaceae: Marchantiales) from India

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ABSTRACT

Presence of stalked tubers on the ventral thallus surface of Cyathodium was recently recorded from Maharashtra. This is a new taxonomic character hitherto undescribed under the genus, the same has been described here.

Key-words: Cyathodium, character, stalked tubers, Maharashtra.

INTRODUCTION

Genus Cyathodium Kunze is a small terrestrial bryophyte with luminescent-green thalli, represented by fourteen species in the world (Singh & Singh 2007, Söderström et al. 2016). The majority of its species are confined to Asia and Neotropical regions, while two species namely C. cavernarum Kunze and C. foetidissimum Schiffner are pantropical (Schiffner 1938, 1939, Srivastava & Dixit 1996, Salazar Allen 2001, Duckett & Ligrone 2006). Interestingly, in India the genus is represented by a maximum of nine species (Singh et al. 2016).

The genus Cyathodium grows terrestrially in hilly areas on the calcareous rocks, ditches, near caves and other deeply shaded walls or buildings, and in the plains the species occurs on soil or old brick walls. The presently studied specimens (tuberiferous Cyathodium) were collected on 17th October 2014 from Khandala (Maharashtra), which were growing as epiphytes on the bark of an angiospermic tree at an elevation of 510 m asl. The average annual precipitation of the area is ~1050 mm and the annual mean temperature is ~26.4°C (min. 14.3°C in January and max. 33.3°C in April and May). The specimens had a very striking habit due to the presence of stalked tubers on the ventral surface of the thalli. The tubers are very easily detached, which suggests that they function as vegetative dispersal units. Like other members of the order Marchantiales, none of the species of Cythodium are epiphytic. However, Cyathodium cavernarum has a tendency to grow at tree bases (pers. comm.: D.K. Singh and in our observation), but is certainly not a true epiphyte. It, therefore, came as a considerable surprise to discover a new phorophyte for this delicate group of plants.

TAXONOMIC OBSERVATIONS


(Text-Figure 1 A-H)

Thallus is yellowish-green to whitish-green in colour, fluorescent, thin, delicate, 5–10 mm long, 2.0–3.5 mm wide, dichotomously branched, lobes are oblong–obcordate, margin entire. Dorsal pores usually
confined to anterior part of the thallus, oval, 80–140 × 70–120 μm, consisting of 2–3 concentric rings of 4–5 cells each, epidermal cells chlorophyllose, 37.5–87.5 × 35.0–70.0 μm, thin-walled. Ventral pores bounded by epidermal cells of thallus and rarely present. Air chambers in a single layer, without filaments, partition 3–4 cells high, uniseriate. Midrib absent. Rhizoids numerous on ventral surface of thallus and at young involucres, hyaline, both smooth and tuberculate. Ventral scales simple, filamentous, usually confined to the growing region of the thallus, 1–2 seriate, 5–6 cells high, usually with terminal, rounded mucilage papillae. Long stalked tubers usually present at the apical, marginal as well as on the ventral surface of the thallus, densely covered with hairs and rhizoids. Dioicous male plants not seen. Young involucres are present, large, ovoid with more or less circular mouth, growing at the base of the sinus between the apical lobes of the thallus, outer surface covered with numerous long hairs, rhizoids and ventral scales. Mature sporophytes not seen.
Specimens examined: India, Maharashtra, Khandala, 18°45′48″N 73°22′05″E, 510 m, 17.10.2014, epiphytic, S.K. Singh 135152, 135153 (ASSAM).

DISCUSSION

Tubers are a less known character in the genus Cyathodium and reported only in four species, namely Cyathodium tuberosum Kashyap, Cyathodium steerei Hässel, C. areonitans (Griff.) Mitt. and C. mehranum Singh. The tubers are marginally placed, usually sessile or sub-sessile in all the species. However, in C. areonitans (syn. C. flabellatum Mehra) and C. mehranum they are shortly stalked (Mehra & Sokhi 1972, Singh 1983). But, interestingly, the presence of tubers on the ventral surface of the thalli was not recorded in any of the species in various publications on Cyathodium or in its world monograph. We could also not come across any species of Cyathodium bearing tubers on the ventral surface of the thalli while conducting field explorations and subsequent studies of the different parts of the Indian Himalayan region.

All the tuberiferous species are dioicous and found either as terricolous or saxicolous plants. It is well known that dioicous species develop sporophytes less frequently than the monoicous species (Longton & Heddderson 2000). Formation of spores in dioicous species may result in the spatial separation of male and female gametophores. Thus the asexual propagules may be of particular importance in building up and maintaining local populations in dioicous species and especially in the case of epiphytic forms.

C. tuberosum has a wide range of distribution within India from the hills to the plains. Kashyap (1929) simply remarked that the plants growing in the hills form tubers, while those in the plains are devoid of them. Our plants closely resemble C. tuberosum in their almost all similar vegetative features but differ in frequently having stalked tubers on the ventral surface of thalli and apical as well as marginal tubers are also stalked as compared to sessile apical and marginal tubers in typical C. tuberosum. It is also interesting to note that the presence of vegetative tubers on the ventral surface of the thalli is recorded not only for the first time in C. cf. tuberosum but also for the entire genus.

The question remains as to whether typical plants of C. tuberosum with apical and marginal tubers are genetically distinct from plants with long stalked tubers on the ventral surface of the thalli or they are simply induced by particular environmental conditions.

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