

# REPORT ON *PHAEOPHILA DENDROIDES* (CROUAN) BATTERS ENDOPHYTIC IN *ROSENVEINGEA INTRICATA* (J. AG.) BOERGS.

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## ABSTRACT

*Phaeophila dendroides* (Crouan) Batters is reported here for the first time from North India from Chilka Lake. While the species is known as an endophyte in several marine algae belonging to Chlorophyta and Rhodophyta and a few marine Spermatophyta, it is reported here for the first time in a Phaeophyta in *Rosenvingea intricata* (J. Ag.) Boergs. The endophyte from Chilka Lake is described in some detail.

While examining a collection of *Rosenvingea intricata* (J. Ag.) Boergs. (Scytosiphonaceae) from Chilka Lake in India, some specimens were found infested with a Chaetophoraceous endophyte referable to *Phaeophila dendroides* (Crouan) Batters. *Phaeophila dendroides* has been reported earlier from a number of localities along the Pacific and the Atlantic coasts of North America, South British coasts and the Adriatic Sea (De Toni, 1889; Huber, 1892; Batters, 1902; Engler & Prantl, 1911; Newton, 1931; Taylor, 1928, 1945, 1957, 1960; Dawson, 1946, 1952, 1961). But in the Indian Ocean it is reported from Mauritius (Boergesen, 1940) and Pamban Island in the Gulf of Manaar in South India only (Boergesen, 1937). The present record of *P. dendroides* from the Chilka Lake in North India is thus of interest in providing an extended distribution of this species in the Indian region.

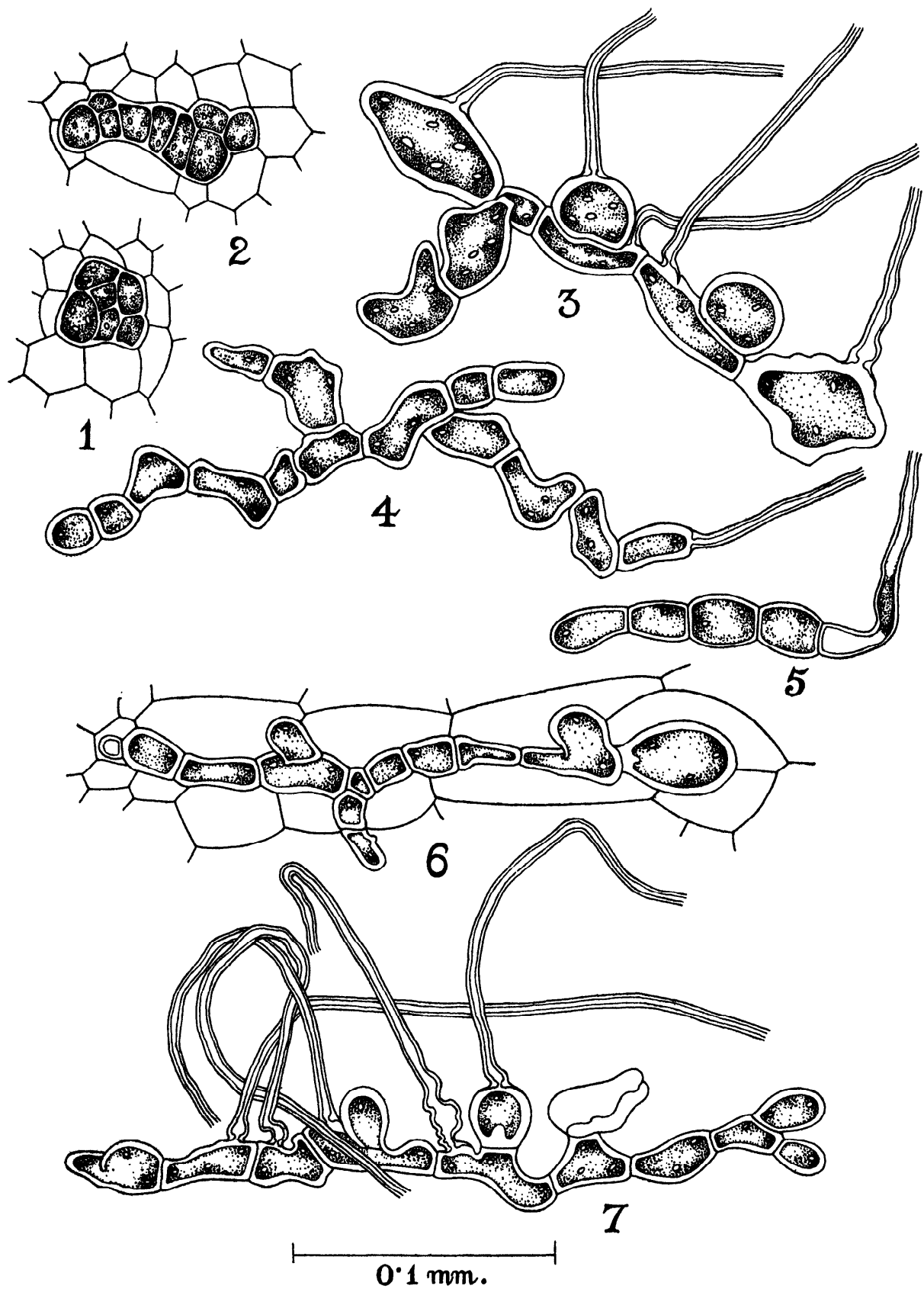
All the earlier reports of *P. dendroides* point to the alga occurring either as an epiphyte or more generally as an endophyte. The host plants recorded for the species are *Zostera* and *Enhalus acoroides* Rich. among the Spermatophyta, *Cladophora*, *Chaetomorpha linum* (Muller) Kütz., and *Codiaceae* among the Chlorophyta, and a large number of marine algae belonging to the Rhodophyta, some among them being *Acanthophora spicifera* (Vahl) Boergs., *Champia parvula* (C. Ag.) Harv., *Chondria tenuissima* (Good. & Woodw.) Ag., *Chondrus crispus* (L) Stackh., *Callithamnion*, *Gracilaria*, *Griffithsia*, *Hypnea*, *Laurencia obtusa* (Huds.) Lamx., *Polysiphonia flexicaulis* (Harv.) Collins, *Rhodomenia palmata* (L) Grev. and *Lithothamnicae* on stones, an unusual habitat for this species. Its occurrence, as reported here, in *Rosenvingea intricata*, a member of the Phaeophyta, is of added interest.

The Chilka Lake alga is briefly described here. The endophyte was met with in the older portions of the thallus of *R. intricata* occasionally only. It could be detected under the microscope even in unstained preparations. It becomes, however, more distinct, standing out very prominently from the surrounding host tissue in preparations suitably stained with eosin or safranin.

In the very early stage of its growth and develop-

ment, the endophyte is a large, somewhat isodiametric cell of irregular shape, with very rich green contents, completely filling the cell of the endophyte. As growth advances, this cell divides in different planes to result in a compact mass of cells within the host tissue (Fig. 1). A similar structure has been described for *Ectochaete taylori* Thivy, where on germination, the gamete or zygote forms a disc of irregular expanse of cells (Thivy, 1942). Thivy (l.c.) observed that this type of germination is characteristic of the epiphytic series of prostrate Chaetophoraceae and it is interesting to find that this species of *Ectochaete*, though endophytic, still retain a relatively simple form of germination. The subsequent growth of the present alga was found to be more or less along the long axis of the alga (Fig. 2). Ultimately the thallus develops into a branching uniseriate filamentous structure with large cells of variable shapes and dimensions (Figs. 3-7). In the procumbent filament, the cells are generally found to be cylindrical and horizontally elongated, or large and somewhat isodiametric, or irregularly shaped with more or less sinuous walls. The lateral branches arising from the procumbent filament are also uniseriate and filamentous and few celled, occurring alternate on the main filament of the thallus (Figs. 4, 6), or the branch cells may be globular and rounded or obovate (Figs. 3, 7). The cells in the procumbent thallus as well as in the short branches measure about  $9.9\mu$  to  $39.6\mu$  across. In the procumbent filament, some of the cylindrical cells measure upto 4 times as long as broad.

Some of the cells of the procumbent filament and its short lateral branches bear on their dorsal side long setae usually one to a cell (Figs. 3, 7). Generally the setae are not very many, and in several instances they were found lacking from many cells (Figs. 4, 6). The setae are usually found to be firm with undulating walls (Figs. 3, 7). They measure about  $3.3\mu$  broad and from  $36\mu$  to  $204.6\mu$  or more long. Occasionally, however, the basal part of the seta is broader than the portions above it, thus appearing swollen and measuring about  $6.6\mu$  or a little more across (Figs. 5, 7). The basal part of some setae shows very sparse granular



Explanation of Figures 1—7. *Phaeophila dendroides* (Crouan) Batters. Fig. 1. Early stage of development of the endophyte forming a mass of cells. Fig. 2. Beginning of the filamentous growth. Figs. 3-7. Well developed plants showing structure. Note the variable size and shape of cells and the nodular thickenings at the base of the setae. In Fig. 5, the lumen of the seta is separated from the supporting cell by the formation of septum at the base of the seta.

contents (Fig. 5). The lumen of the seta, in most cases, is found to be continuous with that of the supporting cells (Figs. 3, 7). At the base of the setae, a sort of a nodular thickening is also clearly discernable, appearing as a thick collar (Figs. 3, 4, 7). In one case, however, the basal part of the seta, which was developed from the terminal cell of the procumbent filament, was found to be very broad, and a basal septum was also quite distinctly seen, separating the lumen of the seta from that of the cell supporting the same (Fig. 5). Thivy (1943) also reported that in *P. dendroides* the phenomenon of setae developing a basal wall found in *P. engleri* may also be seen, though rarely. Occasionally, however, the terminal cell of the branched procumbent filament may develop a seta (Figs. 4, 5). Thivy (1942) also recorded in *Ectochaete* that the apex of a horizontal filament may sometimes end in a seta, which is thus a continuation of the long axis of the filament concerned (cf. her Pl. I, Fig. 2). Similar origin of the solid setae of *Gonatoblaste rostrata* Huber has also been alluded to by her. She inferred that in the procumbent Chaetophoraceae, the reduction of branches and development of setae may occur in the horizontal system as well.

No sporangia were detected by me in the materials examined from Chilka Lake.

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