Acta Bot. Neerl. 35(1), February 1986, p. 1–4.

PTEROCLADIOPHILA HEMISPHAERICA (RHODOPHYTA, CRYPTONEMIALES) IN THE CARIBBEAN

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SUMMARY

Pterocladiophila hemisphaerica Fan et Papenfuss is reported from the island of Bonaire (Netherlands Antilles). It was found growing in *Pterocladia bartlettii* Taylor. A short description of its reproductive structures is given.

1. INTRODUCTION

Pterocladiophila hemisphaerica Fan et Papenfuss was described as a parasite of *Pterocladia lucida* (Turner) J. Ag. from New Zealand (FAN & PAPENFUSS 1959). The genus was assigned to a separate family Pterocladiophilaceae in the order Cryptonemiales (see also KRAFT 1981 – as *Pterocladiophylla* and Pterocladiophyllaceae respectively).

In material of *Pterocladia bartlettii* Taylor, collected on the island of Bonaire (Netherlands Antilles, Caribbean) we found a parasitic growth that could be assigned to the genus *Pterocladiophila* without much doubt. A short description of the available material will be given in order to make a comparison with the original description of *P. hemisphaerica.*

2. MATERIAL AND METHODS

Pterocladia bartlettii bearing *Pterocladiophila* was collected 26-III-1958 in the lower littoral zone of Lagoen, an inlet on the east coast of Bonaire (approx. 12° 12′ N, 68° 13′ W). Material was preserved in 4% formalin in seawater. Warty outgrowths containing the parasite were sectioned and stained partly with Heidenhain's haematoxylin, partly with FCF – fast green. Drawings were made with the aid of a camera lucida.

3. DESCRIPTION

Externally the presence of the parasite is seen on the axes of *Pterocladia bartlettii* as an outgrowth of semiglobose or irregularly lobed shape, up to 1 mm wide and 0.8 mm high (*fig. 1*). In section it appears that the bulk of the outgrowth

consists of host tissue; like in normal axes this is differentiated into relatively large medullary cells and somewhat smaller cortical cells, in some of the larger tubercles characteristic rhizines (*fig. 4*) can be found.

The parasite consists of irregularly branched filaments interspersed between the cells of the host. These filaments do occur in normal vegetative sections of the host (*fig. 2*), but they are more abundant in the tubercles. Cells of the filaments are of cylindrical or somewhat irregular shape, 2.5–5 μm in diameter, up to 25 μm long.

Fructifications develop in subperipheral chambers of the tubercles, to be termed conceptacles (*fig. 3*). The approximately globular cavities measure up to 60 μm in diameter. There is virtually no parasite tissue taking part in the formation of the conceptacle wall, but there is a somewhat denser reticulum of parasitic cells at the bottom of the conceptacle.

Tetrasporangia (*fig. 4* and *5*) develop terminally on short (one or two-celled) filaments arising from the basal reticulum. Mature sporangia measure 20–23 × 6–8 μm, and divide zonately; loose tetraspores are *c.* 6–8 μm in diameter.

Spermatangia (*fig. 6* and *7*) are formed in spore-beds of the same construction as the tetrasporangial ones. Spermatangia are cut off in a single chain at the distal end of a spermatangium mother cell. Spermatangium mother cells are elongate, *c.* 12 × 2.5 μm, spermatangia are 2.0–3.5 μm in diameter.

Carpogonial filaments and early postfertilization stages were not observed. Mature carposporophytes (*fig. 8*) are found singly in a conceptacle. They consist of a few gonimolobes on a large fusion cell. Gonimolobes are up to 50 μm in diameter, virtually all cells develop into carposporangia. Carposporangia are angular, *c.* 6–8 μm in diameter.

Some tubercles appear to contain reproductive structures of two different kinds. Since the hosts are infested by numerous parasites this does not necessarily mean that these structures are borne by one and the same thallus.

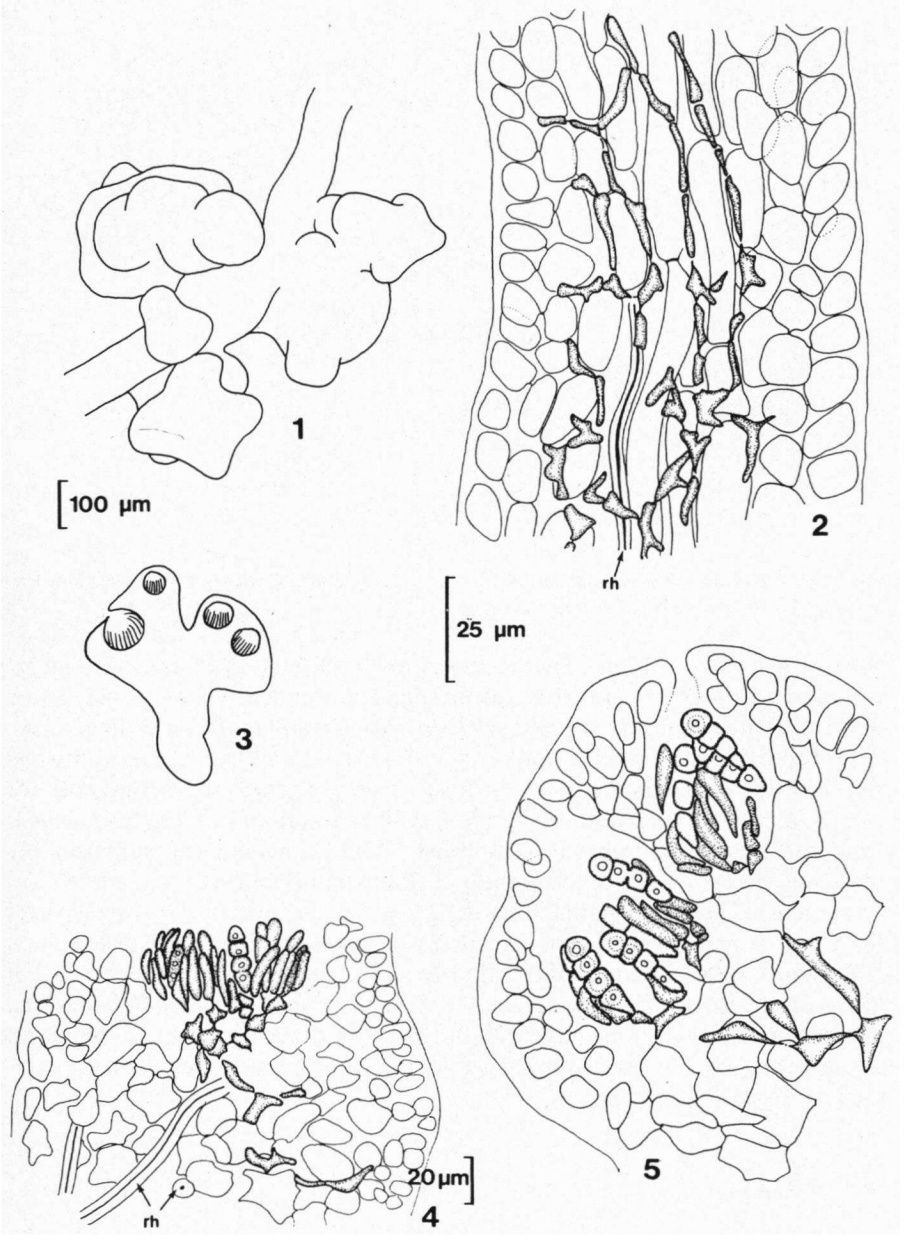
4. DISCUSSION

Our material of *Pterocladiophila* appears to match the description of *Pterocladiophila hemisphaerica* to a large extent. The authors (FAN & PAPENFUSS 1959) do not give actual sizes of reproductive cells, but from their figures (*fig. 1, 4* and *5*) and our own measurements the following comparison can be made:

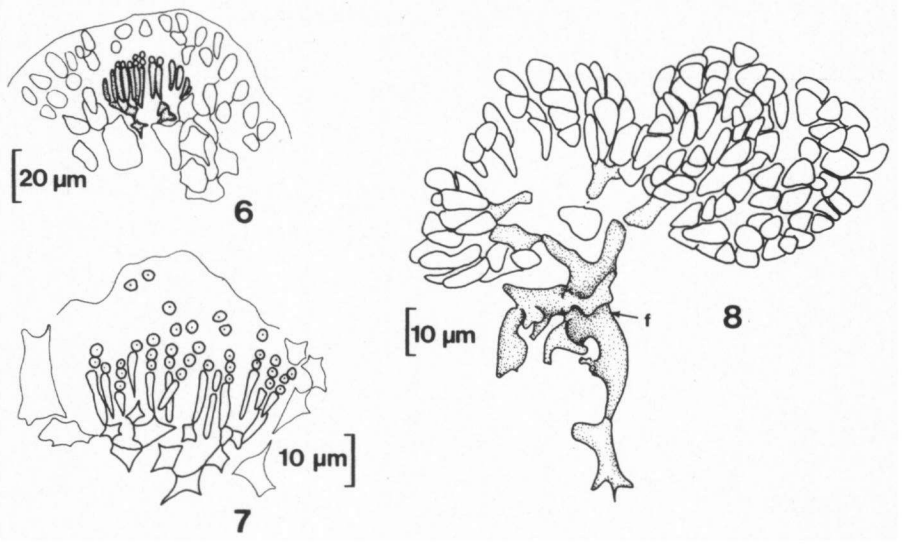
	P. hemisphaerica	Caribbean material
tetrasporangia	18–22 × 4–6 μm	20–23 × 6–8 μm
spermatangia (diam.)	3–4 μm	2–3.5 μm
carposporangia (diam.)	*c.* 7 μm	6–8 μm

Conceptacle size not stated by FAN & PAPENFUSS, the tetrasporangial conceptacle pictured in full measures *c.* 80 μm in inner diameter. In view of the large overlap in dimensions of reproductive structures we assume the Caribbean material to belong to the same species.

It is not clear to what extent the external tubercles of *P. hemisphaerica* as described by FAN & PAPENFUSS (1959) consist of parasite tissue. Although the



Figs. 1–5. *Pterocladiophila hemisphaerica*. Fig. 1. Habit of tubercles on *Pterocladia bartlettii*. Fig. 2. Longitudinal section of *Pterocladia* showing endophytic filaments of *Pterocladiophila* (dotted). Fig. 3. Cross section of tubercle with tetrasporangial conceptacles (schematic). Figs. 4, 5. Tetrasporangial conceptacles in section. (rh = rhizines of the host).



Figs. 6–8. *Pterocladiophila hemisphaerica*. Figs 6, 7. Spermatangial conceptacles in section. Fig. 8. Isolated carposporophyte (f = fusion cell).

authors state that the outgrowths consist of both host and parasite tissue, it would appear that at least the tetrasporangial conceptacle wall is largely made up of parasite tissue. In contrast, *Gelidiocolax mammillata* Fan et Papenfuss, described in the same publication (FAN & PAPENFUSS 1959) has the reproductive structures produced in chambers of host tissue, for which the authors do not use the term conceptacles; clearly the Caribbean material of *Pterocladiophila* shows the latter condition. In *Gelidiocolax* (Fam. Choreocolacaceae), probably the genus closest related to the monotypic Pterocladiophilaceae, the relative development of host and parasite tissue is said to vary widely, in some species the whole tubercle consisting of parasite tissue, in others only in part (FELDMANN & FELDMANN 1963). *Gelidiocolax* differs from *Pterocladiophila* by the possession of cruciately divided tetrasporangia; the aforementioned *G. mammillata* has the tetrasporangia formed in chambers, but in some other members of the genus tetrasporangia are formed over the whole surface of the tubercles (see e.g. FELDMANN & FELDMANN 1963).

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