

Rare species of fungi parasiting on algae I. Parasites of *Spirogyra* and *Mougeotia*

JOANNA ZOFIA KADŁUBOWSKA

Department of Algology and Mycology, University of Łódź
Banacha 12/16, PL-90-237 Łódź, Poland

Kadłubowska J. Z.: Rare species of fungi parasiting on algae. I. Parasites of *Spirogyra* and *Mougeotia*. Acta Mycol. 33 (2): 247–254, 1998.

Investigations carried out on the genus *Spirogyra* Link and *Mougeotia* Agardh revealed the following species of fungi parasiting in the *Spirogyra* and *Mougeotia* cells: *Olpidium endogenum*, *Blyttomyces helicus*, *B. spinulosus*, *Micromyces zygogonii* and *Rhizophydium ampullaceum*. First information on *B. helicus* as parasitic on algae is presented.

Key words: fungi parasites, *Spirogyra*, *Mougeotia*, aquatic fungi.

INTRODUCTION

In the course of investigations concerning the studies of the family *Zygnemaceae* (Kadłubowska 1984) parasitic fungi of the cells of *Spirogyra* and *Mougeotia* were identified. First publication of the occurrence of eight fungus species on the *Spirogyra* cells was available thirty years ago (Kadłubowska 1968). Initial information concerning this topic was presented by Kadłubowska (1981).

Samples of algae from Denmark were sent to the present authoress by Prof. Dr Tyge Christensen and from Norway by Dr Anders Langangen during taxonomical elaborating of *Zygnemataceae*.

While identifying, comparing dimensions and determining morphological features, the use was made of the Skirgiełło (1954), Sparrow (1960) and Batko (1975).

DESCRIPTION OF THE SPECIMENS

Olpidium endogenum (Braun) Schroeter

Sporangium broadly ellipsoid, $41 \times 14 \mu\text{m}$, endobiotic. Its longer axis parallel with that of the *Spirogyra* cell. Wall smooth, colourless.

Discharge tube $5 \mu\text{m}$ long, arising from the end of the sporangium, cylindrical with a pronounced swelling up to $7 \mu\text{m}$, where it meets the inner face of the *Spirogyra* wall, and terminating in a funnel like apex $4 \mu\text{m}$ broad (Fig. 1). Zoospores not observed.

Resting spore ellipsoid $80 \times 30 \mu\text{m}$, contents with two oil globules (Fig. 2), in vegetative cells of *Spirogyra paludosa* Czurda.

Habitat of *S. paludosa*: Pond Lipowy (Experimental Pond Farm of the Laboratory of Water Biology of the Polish Academy of Sciences at Golysz, (near Cieszyn), 2.06.1965. Resting spore dimensions of this species differ significantly from those given by Sparrow (1960). This species is new for the Polish flora. *O. endogenum*, parasitic primarily in desmids, is also reported from Spain in the cells of *Spirogyra majuscula*. Figure of resting spore presented in this report is the first graphic documentation of this species.

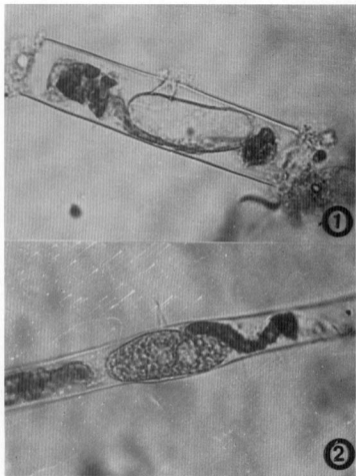
Blyttomyces helicus Sparrow et Barr

Sporangium epibiotic, globose, $24 \mu\text{m}$ high (including the apiculus), $27 \mu\text{m}$ in diameter. Sporangium wall brown, bearing narrow low $1 \mu\text{m}$ thick helical bands, apiculus $3 \mu\text{m}$ high by $4 \mu\text{m}$ in diameter (Fig. 3). Discharge pore not observed. Apophysis is endobiotic. Resting spore endobiotic, globose, smooth, thick-walled, $20 \mu\text{m}$ in diameter, in the zygote of *Spirogyra porticalis* (Fig. 3). Habitat of *Spirogyra porticalis*: a pond at Lutomiersk (near Łódź), 30.05.1975.

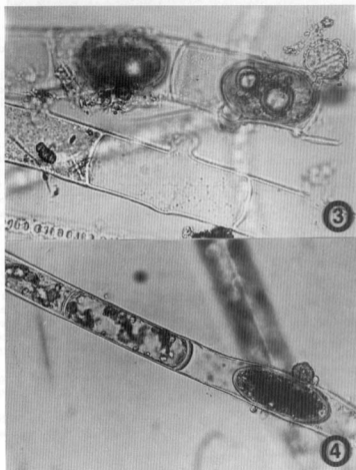
Blyttomyces helicus is cited from the United States and Germany, saprophytic on pine-pollen (citation after Sparrow 1960). This species is new for the Polish flora. It is the first information on this species as parasitic on algae, namely on the zygotes of *Spirogyra*. Morphological features and dimensions of *B. helicus* from Lutomiersk are congruent with the description of Sparrow (1960).

Blyttomyces spinulosus (Blytt) Bartsch

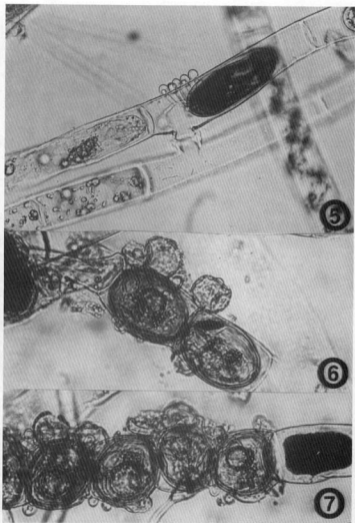
Sporangium with apiculus epibiotic, globose, $15-20 \mu\text{m}$ in diameter. Sporangium wall covered with short spines (Fig. 4). Apiculus hyaline, smooth walled, $3 \mu\text{m}$ high. Discharge pore lateral. Apophysis endobiotic. Numerous immature sporangia on the surface of host (Fig. 5). Resting spore not observed, in zygote of *Spirogyra* sp.



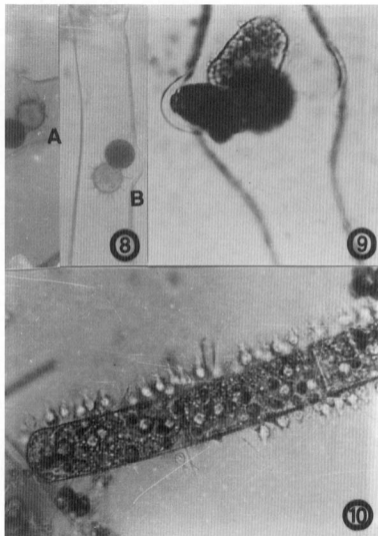
Figs 1, 2. *Olpidium endogenum*: Fig. 1. Sporangium with discharge tube in the vegetative cell of *Spirogyra paludosa*, $\times 1000$; Fig. 2. Resting spore with two oil globules in the vegetative cell of *Spirogyra paludosa*. Remnant of discharge tube, $\times 500$



Figs 3, 4. Sporangia of *Blyttomyces*: Fig. 3. Sporangium epibiotic with helically banded wall in zygote of *Spirogyra* sp. Resting spores endobiotic, $\times 500$; Fig. 4. Sporangium with short spines on zygote of *Spirogyra* sp. (Phot. T. Christensen), $\times 250$



Figs 5-7. *Blyttiomycetes spinulosus*: Fig. 5. Immature sporangia on zygote of *Spirogyra* sp. (Phot. T. Christensen), $\times 250$; Fig. 6. Two sporangia epibiotic with apiculus, on zygotes of *Spirogyra fluviatilis*, $\times 500$; Fig. 7. Numerous sporangia on surface of zygotes of *Spirogyra fluviatilis*, $\times 500$



Figs 8–10. Fig. 8. *Micromyces zygogonii*. Prosorus with curved (A) and straight (B) spines, and sorus in slightly inflated cell of *Mougeotia* sp., $\times 500$; Fig. 9. *Micromyces zygogonii*. Prosorus and sporangia in inflated cell of *Mougeotia* sp., $\times 1000$; Fig. 10. *Rhizophyidium ampullaceum*. Numerous sporangia on vegetative cells of *Mougeotia* sp., $\times 500$.

Habitat of *Spirogyra* sp.: Denmark (no other data).

Sporangium 25–28 μm in diameter, numerous on the surface of host (Fig. 6 and 7), in zygotes of *Spirogyra fluviatilis*.

Habitat of *S. fluviatilis*: Norway, river in Kongsberg, 17.08.1991.

Morphological features and dimensions of *B. spinulosus* from Denmark and Norway are congruent with the description of Sparrow (1960).

Micromyces zygogonii Dangeard

Prosor spherical, 15–18 μm (mostly 15) in diameter, with a colourless wall, the outer surface of which is covered with numerous sharp tapering straight or somewhat curved 5–7 μm long spines; sorus 13–19 μm mostly, 17 μm in diameter. Resting spore spherical, 10–14 μm in diameter, covered with 3–4 μm long spines, occurred in 27 vegetative slightly inflated cells of *Mougeotia* sp. (Fig. 8A and B). Dimensions and morphological features, except somewhat curved spines of prosorus, of *M. zygogonii* from Pond Okręt are congruent with the description of Sparrow (1960).

Habitat of *Mougeotia* sp.: Pond Okręt (near Łowicz), 21.06.1967.

Prosor spherical, 18–19 μm in diameter covered with sharp, straight up to 12 μm long spines, sorus ovoid with rounded base of 13 \times 26 μm . Host cell pronounced, inflated up to 100% (Fig. 9), in vegetative cell of *Mougeotia* sp.

Habitat of *Mougeotia* sp.: Pond Leśna Niwa (near Lubiec), 23.06.1965.

Rhizophydium ampullaceum (Braun) Fischer

Sporangium epibiotic, sessile spherical, 6–7 μm in diameter, with an apical discharge tube 4–5 μm long by 2–3 μm in diameter. Wall thin, smooth, colourless (Fig. 10). Zoospores and resting spore not observed, in vegetative cells of *Mougeotia* sp.

Clustered on *Mougeotia* sp.: a pond in Arturówek (Łódź), 12.10.1960 r. and Pond Chyliński (Experimental Pond Farm of the Laboratory of Water Biology of the Polish Academy of Sciences) at Golysz (near Cieszyn), 2.06.1965. Morphological features and dimensions of *Rh. ampullaceum* from Arturówek and Pond Chyliński are congruent with the description of Sparrow (1960).

REFERENCES

- Batko A. 1975. Zarys hydromikologii. PWN. Warszawa. 478 pp.
Kadlubowska J. Z. 1968. Fungi parasites on the genus *Spirogyra* Link rare or new for the Polish flora. Acta Mycol. 4 (2): 363–367.

- K a d ł u b o w s k a J. Z. 1981. Fungi parasiting on Algae new or rare for the Polish and Danish flora. VIIIth Congress of European Mycologists, Bologna 23–29 Sept. 1981. Summaries: 80.
- K a d ł u b o w s k a J. Z. 1984. Conjugatophyceae I. Chlorophyta VIII. Zygnemales. In: H. Ettl, J. Gerloff, H. Heynig, D. Mollenhauer (eds.); Süßwasserflora von Mitteleuropa. G. Fischer. Jena. Stuttgart. 532 pp.
- S k i r g i e l l o A. 1954. Grzyby niższe. PWN. Warszawa. 247 pp.
- S p a r r o w Fr. K. 1960. Aquatic Phycomycetes. Michigan. 2nd ed. University of Michigan Press. Ann Arbor. Mich. 1187 pp.

Rzadkie gatunki grzybów pasożytujących na glonach I. Pasożyty *Spirogyra* i *Mougeotia*

Streszczenie

Opisano następujące gatunki grzybów pasożytujących na *Spirogyra* i *Mougeotia*: *Olpidium endogenum*, *Blyttomyces helicus*, *B. spinulosus*, *Micromyces zygogonii* i *Rhizophydium ampullaceum*. Dane o *B. helicus* pasożytującym na zygotach *Spirogyra* sp. są pierwszą informacją w piśmiennictwie o występowaniu tego gatunku na glonach.