Institute of Environmental Sciences

**The influence of temperature on the biology, morphology and ecology of fungi preying on rotifers.**

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**Background information:** Predatory fungi, particularly those preying on rotifers in aquatic biota, are so far poorly studied. Recent investigations, carried among others in wastewater treatment plants, indicate that the diversity of this group is much bigger than previously assumed. Preliminary studies shown that the temperature significantly influence growth rate of fungi, their hunting efficiency and in consequence resource exploitation.Up to date suchresearch was conducted on only one species isolated from activated sludge. Other research showed that hunting efficiency of different fungi species depends on rotifer taxa. Moreover, recently intraguild predation (IGP) phenomenon was discovered in an assemblage comprising a fungus (top predator) and two species of rotifers one of which was preyed uponby the fungus, and at the same time hunting for the other rotifer. So far nothing is known about influence of temperature on fungi food preferences and prey-predator relations within IGP.

**The main questions to be addressed in the project:** The project will focus on three main problems. First will involve relating the extent of morphological changesin a particular species to variations in ambient temperature. Second will concentrate on relating trapping/hunting efficiency of a given species to changes in temperature, and third will investigate the influence of the above on reproduction and growth of predatory fungi.

**Information on the methods/description of work:**

The work will be done primarily on rotiferofagous fungi cultured in the laboratory of Aquatic Ecosystems Group. As the cultures originate from wastewater treatment plants,some field collecting in other aquatic ecosystemsmay prove worthwhile. Series of experiments aimed at investigating changes in fungi morphology, and – separate ones – at their reproduction and hunting strategies will be carried out at different temperatures reflecting conditions prevailing in natural habitats in different seasons. Direct observations and digital images will be obtained using inverted microscope Olympus IX 71 and Nicon Eclipse 80i equipped with digital camera and image analysis system. Experiments will be done in environmental test chambers. To visualise fungi growing inside the prey and to distinguish live and dead sections of hyphae fluorescence microscopy will be employed.

**Special requirements from the student:** Skills inwork with modern optical microscopes.

**Name of potential foreign collaborator:** Christopher Wilson, Imperial College London

**Reference(s):**

BarronG. L., Morikawa C., Saikawa M.(1990) New Cephaliophora species capturing rotifers and tardigrades. Canadian Journal of Botany, 1990, 68:685-690

Fiałkowska, E., & Pajdak-Stós, A. (2018). Temperature-dependence of predator-prey dynamics in interactions between the predatory fungus Lecophagus sp. and its prey L. inermis rotifers. Microbial ecology, 75(2):400-406.

Pajdak-Stós A, Ważny R, Fiałkowska E (2016) Can a predatory fungus (Zoophagus sp.) endanger the rotifer populations in activated sludge? Fungal Ecol 23:75–78