

Folliculinids – epibiotic ciliates from Puck Bay

Joanna Jaszczolt¹, Anna Szaniawska

*Department of Experimental Ecology of Marine Organisms
Institute of Oceanography, University of Gdańsk
al. Marszałka Piłsudskiego 46, 81-378 Gdynia, Poland*

Key words: Folliculinidae, *Orconectes limosus*, epibiotic ciliates, ciliates colonization, Puck Bay

Abstract

The present paper reports on the occurrence of the epibiotic ciliates of the family Folliculinidae Dons on the American crayfish *Orconectes limosus* (Raf., 1817). This is the first report of folliculinid ciliates from coastal waters of Puck Bay observed on animal substrata.

¹ Corresponding author: asia@ocean.univ.gda.pl, phone: 058 523 68 69, Fax: 058 523 66 78; 058 523 55 31

Studies based on the farming of freshwater crayfish *Orconectes limosus* were carried out in laboratory conditions at the Marine Station in Hel, from May to September 2005. Experimental animals were collected from the western part of the Vistula Lagoon (2 PSU). Specimens of *O. limosus* were held in aquaria containing water at two salinities, 3 PSU and 7 PSU. Natural water of salinity 7 PSU was directly pumped from Puck Bay, water salinity of 3 PSU was prepared by diluting 7 PSU water with fresh water. After the experiment had been running for 64 days, ciliates belonging to the family Folliculinidae (Ciliophora, Heterotricha) covered the exoskeletons of the juvenile crayfish held in the 7 PSU aquaria. However, the exoskeletons of crayfish in the 3 PSU aquaria were not covered, indicating that the low salinity prevents their development. Folliculinid colonization on the crayfish surfaces was probably due to their presence in the natural water intake from coastal waters of the bay (7 PSU), near Hel city. The lack of development of the epibiotic ciliates in the 3 PSU salinity water implies that their origin was from Puck Bay water, and not that of the Vistula Lagoon.

The Folliculinidae are a family of loricate, sessile ciliates (Hadži 1951, Corliss 1979). The lorica is shaped like a bottle, and each individual is fixed inside the chitinous lorica by a holdfast organelle. The trophic cells (trophonts) are large and elongate, especially in the neck region, and have a conspicuous pair of peristomal “wings” extending from the lorica. The body is highly contractile and often pigmented (Primc-Habdija&Matoničkin 2005). The life cycle of folliculinid ciliates includes two phases, sedentary and migratory (Das 1949). Folliculinids are distributed world-wide, primarily inhabiting marine environments, where they are usually attached to algae, molluscs, polychaetes and crustaceans. In freshwater ecosystems they are extremely rare (Primc-Habdija&Matoničkin 2005).

The specimens recorded on the crayfish in this experiment were bottle-green, their elongate and cylindrical cells residing in single and plain lorica (not divided by a constriction, and without sculpting) (Fig. 1). The length of the lorica was about 150 μm , with the fully protruding ciliates measuring about 260 μm . The anterior part of the ciliate body was extended into two long, flat, leaf-like, peristomal lobes with rounded tips. Specimens were attached to the crayfish by a narrow base. The character of the macronucleus was not investigated, and hence specimen classification to genus level was not possible.

Folliculinids were attached to the crayfish at a number of locations, including the carapace, rostrum, abdomen, telson, walking pereopods, chelipeds and gill area. The most colonized anatomical areas were the gills and the underneath of the abdomen and telson. Although epibiotic protozoans are commonly observed on the chitinous exoskeleton of aquatic crustaceans, relatively little is known about their ecological significance (Puckett&Carman

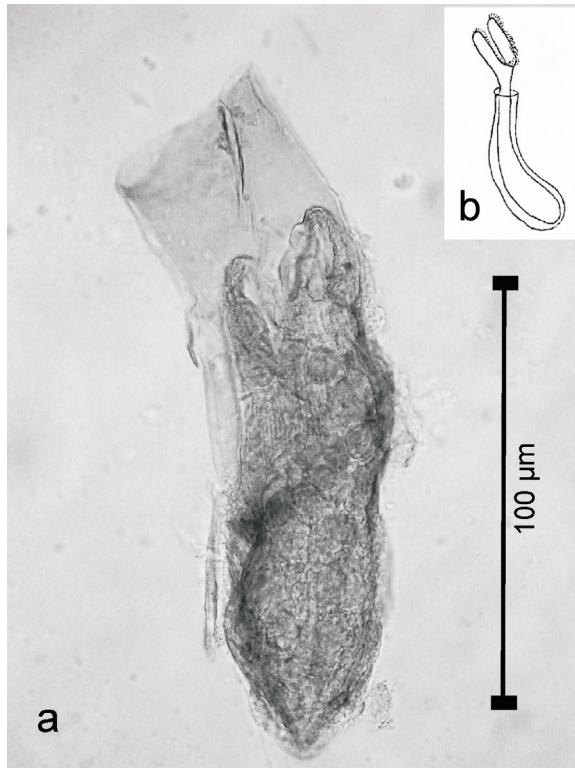


Fig. 1. Folliculinid from Puck Bay: magnification 760x (a), folliculinid when fully extended (b).

2002). However, ciliate epibionts can lower the overall fitness of individual animals (Xu&Burns 1991, Weissman et al. 1993) and cause additional stress. The presence of folliculinids on juvenile crayfish can impact on their fitness because the mobility of those carrying ciliates is lower than that of those without.

Literature concerning folliculinid occurrences in Puck Bay is very limited and relatively old. Until now one species of folliculinid, *Folliculina ampulla*, has been reported in Puck Bay, Biernacka reporting its presence at Rewa station (1962) and Gdynia station (1963). At Rewa station it was associated with algae of the genus *Polysiphonia*, whilst information about substrata was not given in the Gdynia station report. Biernacka's investigations excluded the littoral waters of the bay adjoining the Hel Peninsula. No further investigations on the occurrence and distribution of Folliculinidae in the bay have been reported since Biernacka's publications.

REFERENCES

- Biernacka, I. (1962). Protozoans in the Gulf of Gdansk. I. Protozoans in several coastal ecosystems. *Pol. Arch. Hydrobiol.* 10, 39-109.
- Biernacka, I. (1963). Protozoans in the Gulf of Gdansk. II. Characteristics of Protozoans from investigated coastal ecosystems. *Pol. Arch. Hydrobiol.* 11, 17-75.
- Corliss, J.O. (1979). *The Ciliated Protozoa: Characterization, Classification and Guide to the Literature*. Oxford: Pergamon Press.
- Das, S.M. (1949). British Folliculinidae (Ciliata, Heterotricha). *J. Mar. Biol. Assoc. UK*, 28(2), 381-93.
- Hadži, J. (1951). Studies on Folliculinids. *Dela Slov. Acad. Znan. Umet. Hist. Nat.* 4, 1-390.
- Puckett, G.L. & Carman K.R. (2002). Ciliate epibiont effects on feeding, energy reserves and sensitivity to hydrocarbon contaminants in an estuarine harpacticoid copepod. *Estuaries*, 25(3), 372-81. DOI: 10.1007/BF02695980.
- Prime-Habdija, B. & Matoničkin R. (2005). A new freshwater folliculinid (Ciliophora) from the karstic region of Croatia. *Eur. J. Protistol.* 41, 37-43. DOI: 10.1016/j.ejop.2004.09.004.
- Weissman P., Lonsdale D.J. & Yen J. (1993). The effect of peritrich ciliates on the production of *Acartia hudsonica* in Long Island Sound. *Limnol. Oceanogr.* 38(3), 613-22.
- Xu, Z. & Burns C.W. (1991). Effects of the epizoic ciliate, *Epistylis daphniae*, on growth, reproduction and mortality of *Boeckella triarticulata* (Thomson) (Copepoda, Calanoida). *Hydrobiologia*, 209(3), 183-89. DOI: 10.1007/BF00015341.