

First Record of Epibionts Peritrichids and Suctorians (Protozoa, Ciliophora) on *Pomacea lineata* (Spix, 1827)

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ABSTRACT

This study made a survey on the ciliate protozoans from Peritrichid and Suctorian taxa, epibionts of *Pomacea lineata* (Spix, 1827) (Ampullariidae). Fifty mollusks were collected in places of irrigation ditches and shell was scraped with a scalpel and the extracted material was analyzed in vivo by light microscopy. All examined mollusks presented epibiont ciliates on their shells. For the first time epibiont ciliates in *P. lineata* was record. Seven genera of ciliates: two peritrichids and five suctorians, were identified and classified within the subclass Peritrichia: *Carchesium* Ehrenberg, 1838 (Vorticellidae), *Epistylis* Ehrenberg, 1830 (Epistylidae), *Opercularia* Stein, 1854 (Operculariidae), *Vaginicola* Lamarck, 1816 (Vaginicolidae) and *Vorticella* Linnaeus, 1767 (Vorticellidae); and Suctorina: *Acineta* Ehrenberg, 1834 (Acinetidae) and *Tokophrya* Bütschli, 1889 (Tokophryidae). The results showed that *P. lineata* constitute the microenvironment of a ciliate protozoan community that presents complex trophic interactions.

Key words: Epizoic ciliates, prosobranch snail, freshwater environment

INTRODUCTION

Several ciliate protozoans live as epibionts on animals and plants, using them as substrate (Sleigh, 1979; Dragesco and Dragesco-Kernéis, 1986; Fenchel, 1987). This association involves specialized groups such as peritrichids and suctorians, which occur in a variety or strict range of hosts. The associations may not be obligatory, and the epizoic communities are generally characterized by a high number of species which may occupy very specialized niches (Fenchel, 1987). Although most of these ciliate protozoans

are not harmful to their hosts, in high densities they can interfere in host's mobility (Görtz, 1996), or cause stress, which makes the host more susceptible to contaminants and possibly other natural stressors such as food limitation (Puckett and Carman, 2002). Epibiont ciliates can live on several metazoan species, including cnidarians, ctenophores, rotifers, annelid worms, crustaceans, insect larvae, mollusks, fishes and tadpoles (Henebry and Ridgeway, 1979; Görtz, 1996; Foissner et al., 1999; Moss et al., 2001). Several authors have emphasized the lack of studies about the distribution and the occurrence of ciliate protozoans associated with freshwater organisms

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in natural conditions, as well as the lack of information on the ecology and the interactions between epibionts and hosts (Fernández-Leborans et al., 1997; Aladro-Lubel and Martínez-Murillo, 1999; Mayén-Estrada and Aladro-Lubel, 2001). This study aimed to survey Peritrichid and Suctorian ciliates, epibionts on *Pomacea lineata* (Spix, 1827) (Ampullariidae).

MATERIAL AND METHODS

Fifty mollusks were collected in places of irrigation ditches at Granjas Irmãos Fernandes under the geographical coordinates of 21°39'6" S and 43°25'54" W, Juiz de Fora county, state of Minas Gerais, Brazil. In this locality several pesticides such as herbicides, pyrethroids,

fungicides, organophosphate insecticides, molluscicides and acaricides are used (Cardoso et al., 2001). In order to examine epibionts, mollusk's shell was scraped with a scalpel. The extracted material was analyzed *in vivo* using bright field and phase contrast microscopy. Two preparations of each mollusk were analyzed, totaling up 100 preparations.

RESULTS AND DISCUSSION

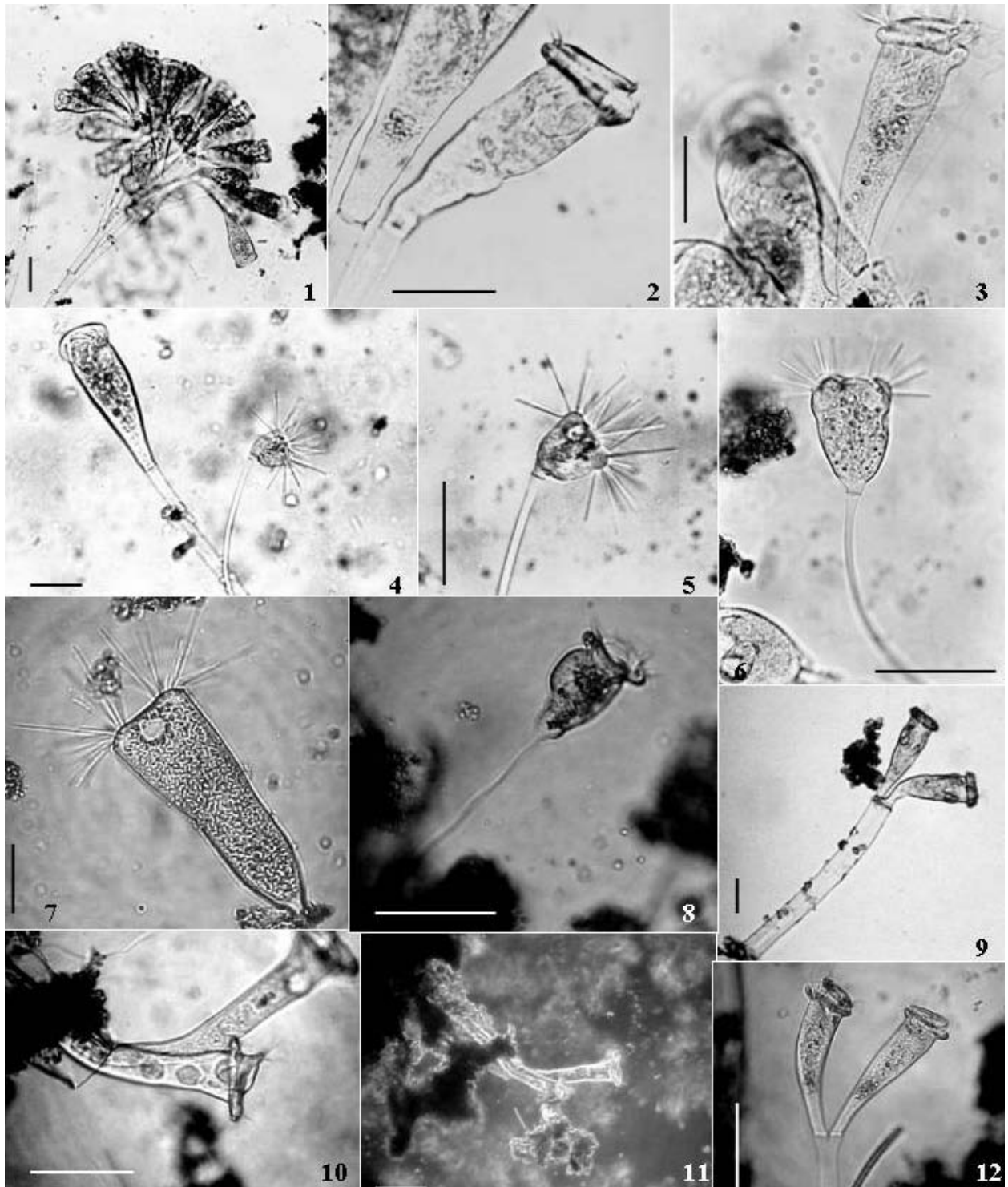
All examined mollusks presented epibiont ciliates on their shells. Seven genera of ciliates: two peritrichids and five suctorians, were identified and classified according to Lynn and Small (2002) (Table 1).

Table 1 - Protist ciliates epibionts on *Pomacea lineata* Spix, 1827

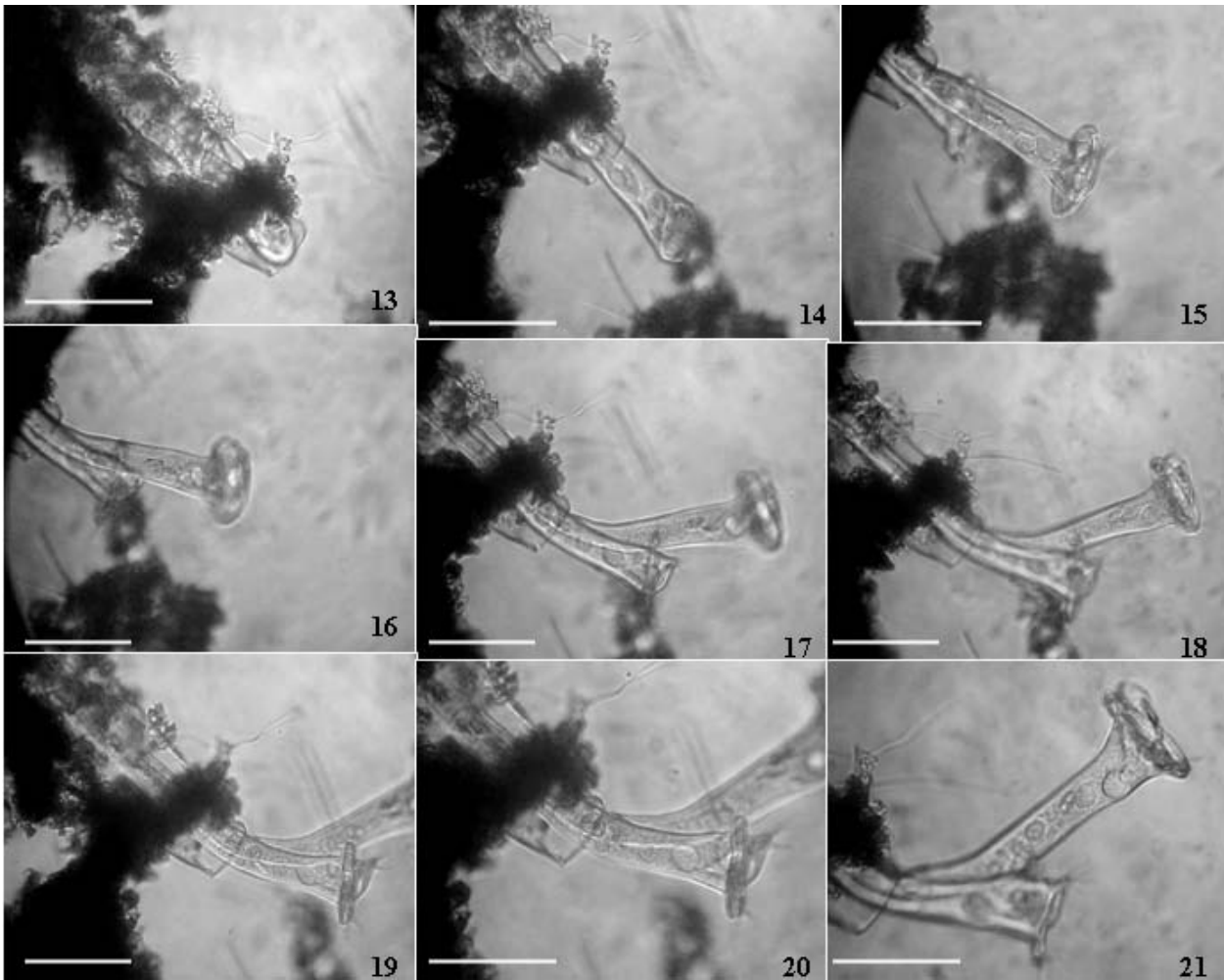
Subclass Peritrichia Stein, 1859
Family Epistylidae Kahl, 1935
<i>Epistylis</i> Ehrenberg, 1830 (Figs. 1-4, 9, 12)
Family Operculariidae Fauré-Fremiet in Corliss, 1979
<i>Opercularia</i> Stein, 1854
Family Vaginicolidae De Fromentel, 1874
<i>Vaginicola</i> Lamarck, 1816 (Figs. 10, 11, 13-21)
Family Vorticellidae Ehrenberg, 1838
<i>Carchesium</i> Ehrenberg, 1838
<i>Vorticella</i> Linnaeus, 1767 (Fig. 8)
Subclass Suctorina Claparède and Lachmann, 1858
Family Acinetidae Stein, 1859
<i>Acineta</i> Ehrenberg, 1834 (Fig. 7)
Family Tokophryidae Bütschli
<i>Tokophrya</i> Bütschli, 1889 (Figs. 4-6)

Ciliates in the subclass Peritrichia provided many examples of epizoic way of life, living over planktonic and benthonic metazoans both in marine and freshwater environments (Corliss, 1979; Puytorac, 1994; Foissner et al., 1999). The sessile way of life and the colonial organization showed by peritrichids were among their main characteristics. Among peritrichids' adaptations to the epizoic way of life was the free-swimming stage (telotrochs) in which they were able to establish colonies on new hosts (Fenchel, 1987). Protozoans in the Suctorina subclass are deprived of cilia or other locomotory organelles in their adult stage. They did not present oral opening, using

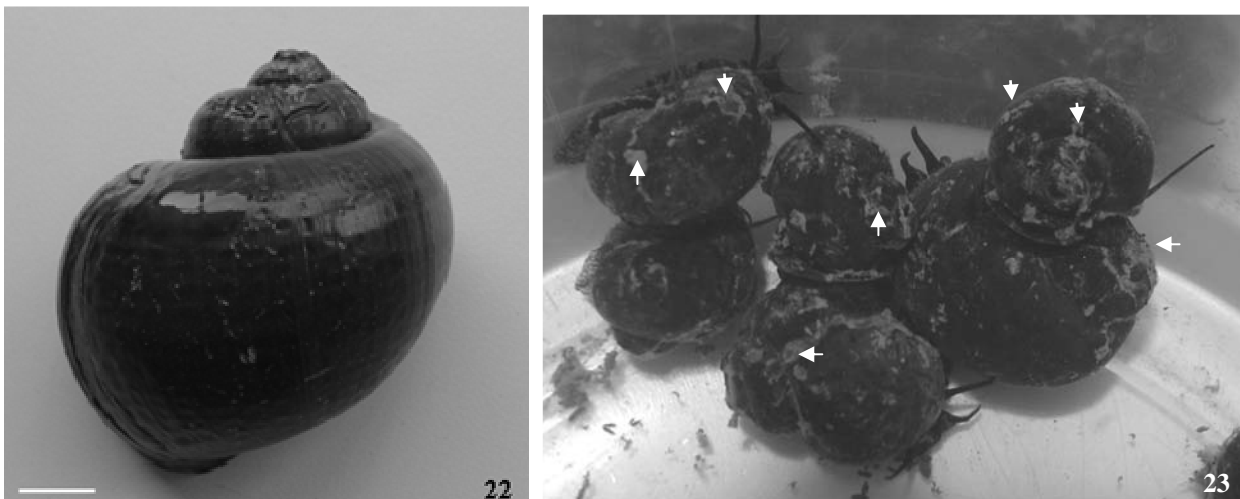
tentacles to capture their preys (Puytorac, 1994). Suctorians are very common both in marine and freshwater environments, frequently as epibionts on a variety of animals (Foissner et al., 1999). These protozoans attach to their hosts directly or by using stalks, and they feed mainly on other ciliates (Verni and Gualtieri, 1997). Among epibiont suctorians, a hard competition could exist, as was observed by Mayén-Estrada and Aladro-Lubel (2001) for *Acineta tuberosa* Ehrenberg, 1838; *Podophrya sandi* Collin, 1911 and *Tokophrya quadripartita* (Claparède and Lachmann, 1859) Bütschli, 1889.



Figures 1-12 - Epibiont ciliates on *Pomacea lineata* (Spix) (Ampullariidae). **1-3, 9, 12.** *Epistylis* spp. (Epistylidae) (peritrich); **4.** *Epistylis* sp. (peritrich) as a substrate to *Tokophrya* sp. 1 (Tokophryidae) (suctorian). **5.** *Tokophrya* sp. 1. **6.** *Tokophrya* sp. 2. **7.** *Acineta* sp. (Acinetidae) (suctorian). **8.** *Vorticella* sp. (Vorticellidae) (peritrich). **10-11.** *Vaginicola* sp. (Vaginicolidae) (peritrich) *in vivo*. Bars = 50µm.



Figures 13-21 - Ciliate epibiont *Vaginicola* sp. (Vaginicolidae) coming out of the lorica. Bars = 50µm.



Figures 22-23 - *Pomacea lineata* (Spix 1827). **22.** Shell of *Pomacea lineata*. **23.** Aggregative behaviour of *Pomacea lineata*. The arrows show the accumulation of algae and bacteria the place where the ciliates live. Bar = 1 cm.

The frequent occurrence of ciliate epibionts observed in the current study might have been favored by the host behavior, such as its preference for places abundant with food, their gregarious behavior and their attempt to avoid adverse environmental conditions or fatal events such as desiccation or the grazing of its surface by animals as suggested by Fenchel (1987).

The mollusk's shell was a substrate in which there was an accumulation of algae and bacteria (Figs. 22, 23), which were used as food by ciliate species of peritrichids, which are food for predator ciliates of suctorians. Therefore, *P. lineata* constituted the microenvironment of a ciliate protozoan community that presents complex trophic interactions.

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RESUMO

O objetivo do presente estudo foi realizar um levantamento dos protozoários ciliados dos táxons Peritrichia e Suctoria, epibiontes de *Pomacea lineata* (Spix, 1827) (Ampullariidae). Cinquenta moluscos foram coletados em ambientes de vala de irrigação, em Juiz de Fora, Minas Gerais. As conchas dos moluscos foram raspadas com bisturi e o material extraído analisado *in vivo* sob o microscópio de luz. Todos os moluscos examinados apresentaram ciliados epibiontes em suas conchas. Registra-se pela primeira vez ciliados epibiontes em *P. lineata*. Sete gêneros de ciliados: dois peritríquios e cinco suctórios foram identificados e classificados nas subclasses Peritrichia: *Carchesium* Ehrenberg, 1838 (Vorticellidae), *Epistylis* Ehrenberg, 1830 (Epistylidae), *Opercularia* Stein, 1854 (Operculariidae), *Vaginicola* Lamarck, 1816 (Vaginicolidae) e *Vorticella* Linnaeus, 1767 (Vorticellidae); e Suctoria: *Acineta* Ehrenberg, 1834 (Acinetidae) e *Tokophrya* Bütschli, 1889 (Tokophryidae). Os resultados deste estudo demonstraram que *P. lineata* constitui o microambiente de uma comunidade de

protozoários ciliados que exibem interações tróficas complexas.

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