

A preliminary observations on *Trichodina* sp. (Ciliophora: Peritricha) on the Gills of Limpets (*Patella* spp.) in Antalya (Turkey)

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Abstract. Trichodinids are well-known protozoa associated with invertebrates as well as freshwater and marine fish. *Trichodina* sp. (Ciliophora: Peritricha) was found associated with the limpet species known as *Patella* sp. along the coast of Antalya Bay. Limpet gills were studied on scanning electron microscope and morphology of the protist was studied in detail. The existence of this protist was considered as an indication of organic pollution in sea water in the area.

Key Words: *Trichodina* sp., limpets, gills, pollution, Antalya.

Introduction

Trichodinids have so far been well-documented protozoon parasites associated with freshwater and marine fish and invertebrates (Kristmundsson & Helgason 2007, Van As & Basson 1987, Van As L.L. & Van As J.G. 2001, 2002). *Trichodina* spp. are common ciliophoran species, characterized by their body morphology and circular rings of cilia on oral and basal regions.

Studies on trichodinids in Turkey are limited mainly to their occurrence on fish (Altunel 1983, Özer 2000, 2003a, 2003b, 2007, Özer & Öztürk 2004, Ögüt & Palm 2005, Toksen 2004, Koyuncu 2006).

The present study is a first discovery of trichodinid existence on limpets in Turkey. Here the detailed microscopic morphology of *Trichodina* sp. is presented. This protist was obtained during a survey carried out as a part of a comprehensive study on *Patella rustica* and *P. caerulea*, common limpets along the coast of Antalya Bay. The town centre

is located on the cliffs by the sea shore in the Mediterranean.

Materials and Methods

Samples of *Patella rustica* and *P. caerulea* were collected from the tidal zones of the rocky shore of Antalya Inner Harbor and were taken to the laboratory in the Faculty of Aquatic Sciences and Fisheries of Akdeniz University. Gills were dissected and placed on a microscope slide. Wet smears were prepared and examined under a compound microscope.

For scanning electron microscope (SEM) gills were fixed in 2.5% glutaraldehyde, post fixed in 1% OsO₄, both in Sorensen buffer, dehydrated in graded ethanol/amyl acetate and critical-point dried. Gills were mounted on aluminium stubs, sputter coated with gold-palladium and studied at 15 kV, using Zeiss Leo 1430 SEM, and electron micrographs were taken.

Results

Trichodina sp. was first detected on the gills of *Patella rustica*. The gills of *P. caerulea* specimens were also found to be

infected. Earlier observations showed a rare appearance on the gills, only one *Trichodina* on each gill filament (Fig. 1). Interestingly, their prevalence increased later, more than one protist was seen on each gill filament (Fig. 2). Scanning electron micrograph clearly shows the morphology of the protist (Fig. 3).

The barrel-shaped cell body was about 55 µm in diameter. Its height measured 60 µm. In the anterior part, the organism had three oral rings which show a fairly uniform ciliation. In the posterior part, internal to the aboral ring of cilia, a well developed adhesive disk with a denticulated skeletal complex could be seen (Fig. 2) for the body support on settlement.

No abnormal conditions were observed in the epithelial tissue of the host gills indicating any pathological lesions. So, this ciliate appeared to have an ecto-symbiotic character rather than a parasitic nature. On the other hand, this may be because *Trichodina* are present in low numbers. Although there was no exact quantitative study about the population size, there was a prominent decrease in number of *Patella rustica*, as well as a small decrease in *P. caerulea* in the survey area.

As this was a preliminary observation, the systematics of the genus *Trichodina* was not analyzed and no discriminated species of this protist exist up until now.

Discussion and Conclusion

Biodiversity of a certain ecosystem depends, among many other factors, on both biotic and abiotic factors as well as on the opportunity for a new species to colonize the ecosystem. During the last

decade, parasites inhabiting host species in an ecosystem have drawn great attention. This is mainly because these parasites could be used to determine the effects of pollutants on ecosystems, as an alternative to studying other parameters (e.g. of the water, Marcogliese & Cone 1997, La Rosa et al. 2001). Investigations of key parasites present in a habitat can provide information about the health of the environment. It was indicated that if a site is organically polluted, the bacteria and trichodinid populations in that area are more abundant and therefore *Trichodina* sp. presumably could be used as a pollution indicator (Palm & Dobberstein 1999).

Looking at some of the studies on freshwater and marine fish (e.g. Özer & Öztürk 2004, Ögüt & Palm 2005, Koyuncu 2006, Kristmundsson & Helgason 2007), it is possible to say *Trichodina* sp. stands out as an opportunistic invader of some invertebrates when compared to other parasites in these studies. (Basson & Van As 1992, Boussid et al. 1999, Xiao et al. 2005).

Limpets were previously found to be infested by different ciliophorans. *Licnophora limpetae* (VanAs et al. 1999) and *Mantosphidia patellae* (Van As et al. 1998, Botes et al. 2001) were reported to co-exist with *Trichodina* sp. on the gills of *Patella* spp. and of other limpets. *Trichodina patellae*, Cuenot 1891 was listed as a synonym of *Leiotrocha patellae* (Hansson 1997).

The observed infestation of the gills of limpets with *Trichodina* sp. is probably a result of some operative factors. The limpet species *Patella rustica* and *P. caerulea* were sampled in 2007. Because we found no evidence whatsoever of the protist in the histological sections of the

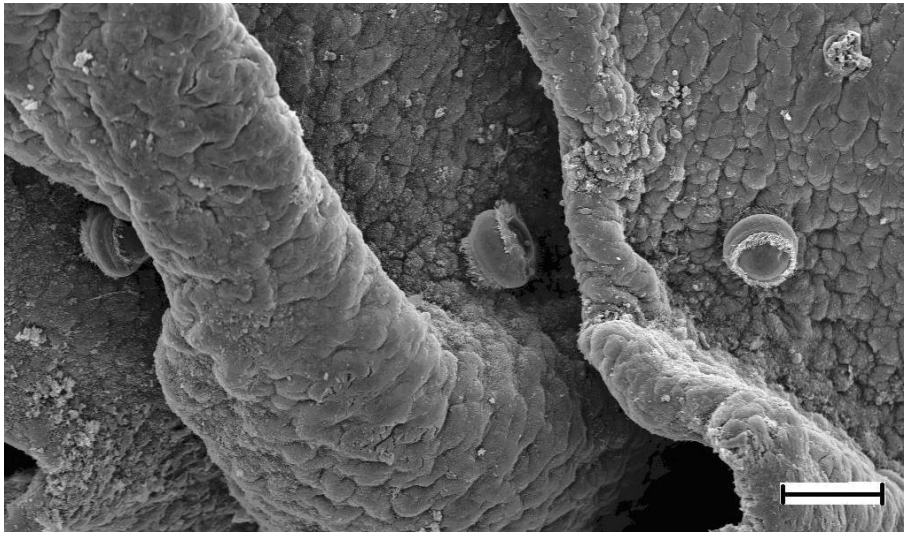


Figure 1. One *Trichodina* sp. has been found on each gill filament of *Patella caerulea* Scale bar: 60 μ m.

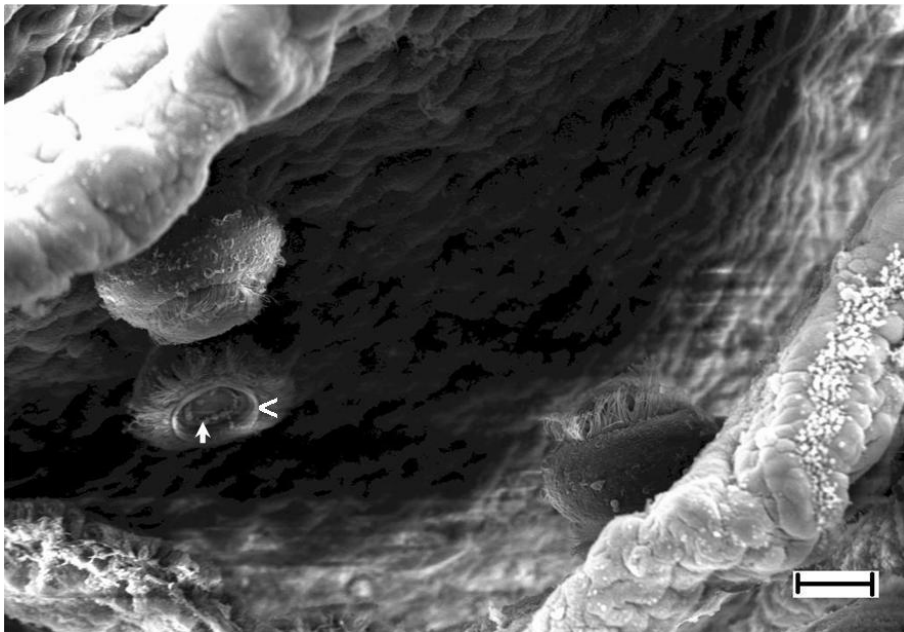


Figure 2. Scanning electron micrograph of three *Trichodina* on one gill filament of *Patella caerulea* (→) adherence disk (←): skeletal disk. Scale bar: 20 μ m.

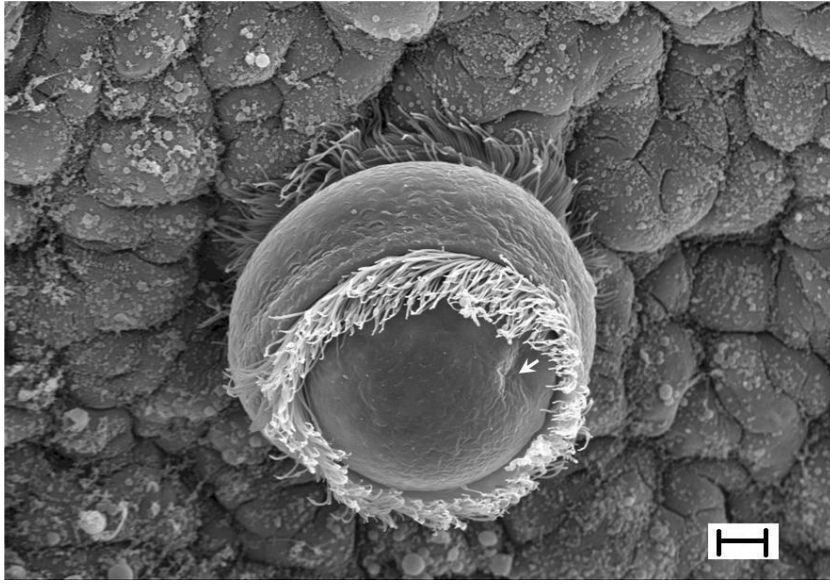


Figure 3. Scanning electron micrograph showing general morphology of the protist on *Patella caerulea*. (→): Oral groove. Scale bar: 18 μm

gills of *Patella* sp. in our earlier study (Akşit & Falakalı-Mutaf 2007), the settlement of the parasite in such a short period of time is an important indication of organic pollution in the town centre of Antalya according to previous researches in this context (Palm & Dobberstein 1999).

There are no reports concerning any salt water fish or any invertebrates from the Mediterranean coast of Turkey. The only studies are on aquarium fish in the region (Koyuncu 2006). *Trichodina* sp. was previously recorded from the fish caught along the Black Sea coast (Özer & Öztürk 2004; Ögüt & Palm 2005, Özer 2007).

We conclude that as a reflection of an organic pollution, leaking from the inefficient sewage system of the city, the limpets become more susceptible to the

stress of this parasitic/or symbiotic organism, hence *Trichodina* sp. flourishes in their gills. The study will advance with further density and diversity analysis in the same site.

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