Turk J Zool
28 (2004) 179-182

Trichodina puytoraci Lom, 1962 and *Trichodina lepsii* Lom, 1962 (Peritrichida: Ciliophora) Infestations on Mugilids Caught at the Black Sea Coast of Sinop in Turkey

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Received: 06.10.2003

Abstract: Two *trichodina* species, *Trichodina puytoraci* Lom, 1962 and *Trichodina lepsii* Lom, 1962, were identified for the first time on *Mugil cephalus* L., 1758 and *Liza aurata* Risso, 1810 caught in the Black Sea off Sinop in Turkey. Both parasite species were found to be specific for Mugilids and were not encountered on any other fish species found in the same sampling site. While the infestation prevalence (%) and mean intensity level were 100% and 188.5 ± 56.3 trichodina per infested fish, respectively, for *M. cephalus*, they were 40.6% and 5.46 ± 1.07 trichodina per infested fish for *L. aurata*. The taxonomic and morphometric data are also presented.

Key Words: *Trichodina puytoraci, Trichodina lepsii*, *Mugil cephalus, Liza aurata*, Black Sea

Türkiye'nin Karadeniz'deki Sinop Kıyılarından Yakalanan Kefal Balıklarındaki *Trichodina puytoraci* Lom, 1962 ve *Trichodina lepsii* Lom, 1962 (Peritrichida: Ciliophora) Enfestasyonları

Özet: İki *trichodina* türü olan *Trichodina puytoraci* Lom, 1962 and *Trichodina lepsii* Lom, 1962**,** Türkiye'de Karadeniz'deki Sinop kıyılarından yakalanan *Mugil cephalus* L., 1758 ve *Liza aurata* Risso, 1810 balıklarında ilk defa olarak belirlenmiştir. Her iki tür de aynı ortamda bulunan diğer balık türlerinde değil de sadece kefal balıklarında bulunmuştur. *M. cephalus* için enfestasyon oranı (%) ve ortalama parazit sayısı sırasıyla %100 ve 188,5 ± 56,3 olarak belirlenmişken, bu değerler *L. aurata* için %40.6 ve 5,46 ± 1,07 olarak tespit edilmiştir. Taksonomik ve morfometrik veriler de bu makalede sunulmuştur.

Anahtar Sözcükler: *Trichodina puytoraci, Trichodina lepsii*, *Mugil cephalus, Liza aurata*, Karadeniz

Introduction

Trichodinids are probably the most commonly encountered protozoan parasites on wild and cultured fishes in marine as well as freshwater environments (Urawa, 1992). About 70 species in marine fishes (Kinne, 1984) and more than 112 in the freshwater fishes (Lom and Dykova, 1992) were identified. Host specificity in trichodinids appears variable, with species such as *Trichodina acuta* Lom, 1961, *Trichodina nigra* Lom, 1961 in fresh water and *T. rectuncinata* Raabe, 1958 and *T. ovonucleata* Raabe, 1958 infecting a large number of marine host species and species such as *T. tenuidens* Faure-Fremiet, 1944 in fresh water and *T. jadranica* Haider, 1964 parasitising only a couple of marine host species (Lom, 1970; Grupcheva et al., 1989). However, studies on the occurrence of trichodinids in brackish water are quite rare (Bykovskaya-Pavlovskaya et al., 1964; Özer, 2003a,b). *Trichodina puytoraci* and *T. lepsii* have been reported from mugilids, such as the striped mullet, *Mugil cephalus* L., 1758, and the golden grey mullet, *Liza aurata* Risso, 1810 in brackish water (Bykovskaya-Pavlovskaya et al., 1964; Kinne, 1984; Grupcheva et al., 1989).

In this study, our aims were to contribute to the parasite fauna of fish hosts, establish a background for further studies on trichodinids and extend the knowledge on the distribution and morphological variability of these 2 *trichodina* species in a precise part of the Black sea coast at Sinop, Turkey.

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Materials and Methods

Fish samples were collected by a hand and/or cast net from Sırakırkağaçlar stream, which connects with the Black Sea at Sinop, Turkey. Sırakırkağaçlar stream is characteristically slightly brackish during the late autumn and early spring months (October to March) when the water level rises and connects with the Black Sea. In summer and early autumn, however, the water level drops, the connection is broken and the stream becomes freshwater. Sırakırkağaçlar stream is inhabited by 7 fish species: *Vimba vimba tenella* Nordmann, 1840, *Gasterosteus aculeatus* L., 1758, *Neogobius melanostomus* Pallas, 1811, *Atherina boyeri Risso*, 1810, *Aphanius chantrei Gaillard, 1895*, *Mugil cephalus* L., 1758 and *Liza aurata* Risso, 1810. On a rare occasion when the connection was assured by man-made efforts to prevent putrefaction in the stream, 32 *Liza aurata* and 10 *Mugil cephalus* specimens were caught and examined during June and July in 2000.

Fish were transported alive in local water directly to the Sinop Fisheries Faculty Laboratory for parasitological examinations. Air dried smears were prepared from the gills and skin and impregnated with $AgNO_3$ (Lom and Dykova, 1992). Measurements were carried out according to Lom and Dykova (1992) on 20 individuals of each *trichodina* species. Prevalence (%) and mean intensity levels were determined according to Bush et al. (1997).

Results

Throughout the investigation period, *Trichodina puytoraci* and *T. lepsii* were the only species identified. The denticle of *T. puytoraci* individuals from the skin, fins and gills of *L. aurata* and the gills of *M. cephalus* have a clear zone in the centre of the adhesive disc dotted with small irregular spots. The blade is slightly curved and the thorn is longer than the blades (Figure 1a). All the biometric data measured are given in the Table. *Trichodina puytoraci* mainly infested *L. aurata* but it was rarely determined on *M. cephalus*. Infestation prevalence (%) and mean intensity level determined in *L. aurata* were 40.6% and 5.46 ± 1.07 *trichodina* per infested fish, respectively.

The specimens of *T. lepsii* from the gills of *M. cephalus* were easily discriminated from the other trichodina species identified in the same sampling site by their smaller size. The central circle had a large clear area and blades were larger than the thorns (Figure 1b). All the biometric data measured are given in the Table. *Trichodina lepsii* mainly infested *M. cephalus* but it was rarely determined on *L. aurata*. Infestation prevalence (%) and mean intensity level determined in *M. cephalus* were 100% and 188.5 ± 56.3 *trichodina* per infested fish, respectively.

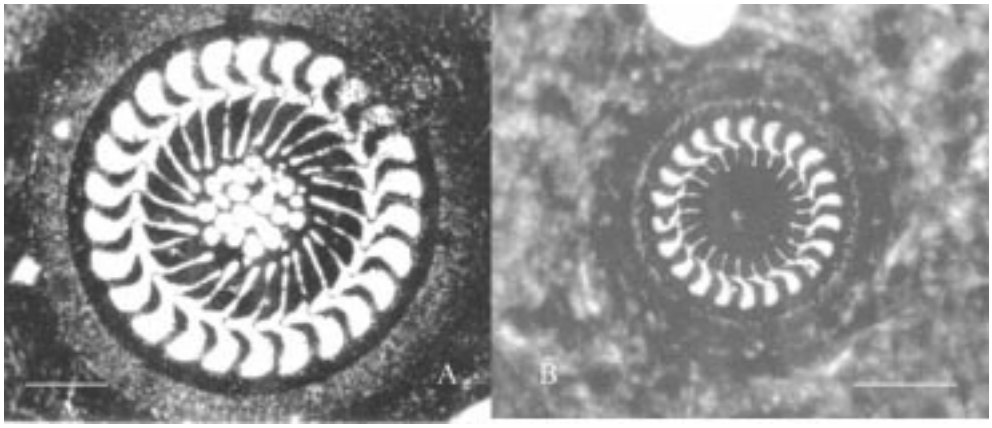

Figure 1. Klien's silver nitrate stained specimens of *Trichodina* spp.
a. *Trichodina puytoraci* Lom, 1962
b. *Trichodina lepsii* Lom, 1962

Table. The biometric data (µm) of *Trichodina* spp.

	Trichodina puytoraci	*Trichodina lepsii*
Host	*Liza aurata*	*M. cephalus*
Location	skin, gills, fins	gills
Adhesive disc diameter	45.0 (40-52)	22.5 (19.2-27.0)
Border membrane width	4.5 (4.1-5.0)	2.8 (2.3-3.4)
Denticle ring diameter	28.5 (24.5-32.0)	14.1 (13.4-15.0)
Denticle number	26.0 (24-29)	22 (19-24)
Number of radial pins / denticle	7-8	4 -5
Denticle length	13.7 (13.0-14.7)	5.6 (5.2-6.0)
Blade length	5.1 (4.6-5.6)	3.1 (2.8-3.4)
Thorn length	6.3 (5.8-6.7)	1.7 (1.4-2.0)
Central part width	2.3 (2.0-3.0)	0.8 (0.6-1.0)
Central circle diameter	13.7 (12.8-14.6)	10.1 (9.4-10.9)

Discussion

Trichodinids are widely studied and well-documented parasites of fishes and their importance is reflected by the reported literature on several aspects of the biology of these parasites, such as distribution (Lom, 1962; Lom and Hoffman, 1964; Lom, 1970; Gaze and Wootten, 1998; Özer and Erdem, 1998, 1999; Özer, 2000; Özer, 2003a, 2003b), behaviour (Ahmed, 1977; Van As and Basson, 1987; Özer and Erdem, 1999), the impact of environmental factors (Calenius, 1980; Sanmartin Duran et al., 1991; Özer and Erdem, 1999) and their pathogenicity (Lom, 1973).

Studies on the trichodinids in Turkey are, however, very limited and generally give very little information on the extent of their occurrence (Altunel, 1983; Burgu et al., 1988; Doğanay et al., 1989). Altunel (1983) presented little information on the *trichodina* infestations on *Mugil* spp. (*Liza ramada* and *Chelon labrosus* Risso, 1826) and reported 2.3% infestation prevalence from a *Trichodina* sp. Burgu et al. (1988) presented *Trichodina* spp. infestation on several fish species, though none was a member of Mugilidae. However, Özer and Erdem (1998, 1999), Özer (2000, 2003a, 2003b) conducted comprehensive studies on several *trichodina* species, namely *T. acuta, T. mutabilis, T. nigra, T. domerguei* and *T. tenuidens*, in different environments as well as host species. *Trichodina puytoraci* and *T. lepsii* have been studied in only a couple of studies (Lom, 1962; Bykovskaya-Pavlovskaya et al., 1964; Kinne, 1984; Grupcheva et al., 1989) but here it is the first record of both *trichodina* species in Turkey. The denticle morphology and dimensions recorded for both species in the present study are confirmed by those reported in the literature (Lom, 1962; Bykovskaya-Pavlovskaya et al., 1964; Kinne, 1984; Grupcheva et al., 1989). One exception should be stated here: Kinne (1984) presented data obtained from only one *T. puytoraci* specimen displaying very small dimensions when compared with those recorded here.

The infestation prevalence (%) and mean intensity levels recorded for these 2 species fall within the range reported for general levels but represented a different pattern, having very low infestation intensity by *T. puytoraci* (5.46 ± 1.07 *trichodina* per infested fish) and a high level of infestation by *T. lepsii* (188.5 ± 56.3 *trichodina* per infested fish) in 2 different species of Mugilidae living in the same environment. In the same sampling site, Özer (2003a, 2003b) obtained similar infestation prevalence and mean intensity levels for *T. domerguei* on *Neogobius melanostomus* Pallas, 1811 (prevalence of 77.9% and mean intensity of 156 ± 43.7 *trichodina* per infested fish) and for *T. domerguei* and *T. tenuidens* on 3-spined sticklebacks, *Gasterosteus aculeatus* L., 1758 (overall prevalence of 60.9% and mean intensity of 109.1 ± 21.5 *trichodina* per fish). It must be noted that none of the above mentioned *trichodina* species were recorded on any of the *Mugil* spp.

examined in this study. In addition, neither *T. puytoraci* nor *T. lepsii* was recorded on any of the above mentioned fish species even though they inhabite the same sampling site.

Acknowledgement

This study was financed by Ondokuz Mayıs University under project number S-076.

References

Ahmed, A.T.A. 1977. Morphology and life history of *Trichodina reticulata* from goldfish and other carps. Fish Pathol. 12: 21-31.

Altunel F.N. 1983. Parasitism in *Mugil* spp. E.U. Faculty of Science Journal, Series B, Supplement. 364-378 (in Turkish).

Burgu A., Oğuz T., Körting W. and Güralp, N. 1988. Parasites of freshwater fishes in some areas of Central Anatolia. Etlik Vet. and Mikrobiyol. Derg. 6: 143-165 (in Turkish).

Bush, A.O., Lafferty, K.D., Lotz, J.M. and Shostak, A,W. 1997. Parasitology meets ecology on its own terms: Margolis et al. Revisited. J. Parasitol. 83: 575-583.

Bykovskaya-Pavlovskaya, I.E., Gusev, A.V., Dubinina, N.A., Izyumova, T.S., Smirnova, I.L., Sokolovskaya, G.A., Shtein, G.A., Shulman, S.S. and Epshtein, V.M. 1964. Key to parasites of freshwater fish of the U.S.S.R. Part I, Translated by Israel Program for Scientific Translations, Jerusalem, pp. 180-218.

Calenius, G. 1980. Parasites of fish in Finland. III. Ciliates of the family *Urceolariidae* (Dujardin, 1851). Acta Acad. Aboensis, Ser. B, 40, nr. 3.

Doğanay A., Bozan H. and Öge S. 1989. Parasitological examination of some aquarium fishes in Ankara. A.U. Vet. Fak. Derg. 36: 795-806 (in Turkish).

Gaze, W.H. and Wootten, R. 1998. Ectoparasitic species of the genus *Trichodina* (Ciliophora: Peritrichida) parasitising British freshwater fish. Folia Parasitol. (Praha). 45: 177-190.

Grupcheva, G., Lom, J. and Dykova, I. 1989. Trichodinids (Ciliata: Urceolariidae) from gills of some marine fishes with the description of *Trichodina zaikai* sp.n. Folia Parasitol. 36: 193-207.

Kinne, O. 1984. Diseases of Marine Animals. Biologische Anstalt Helgoland, Hamburg, pp. 157-161.

Lom, J. 1962. Trichodinid ciliates from fishes of the Rumanian Black sea coast. Parasitol. 52: 49-61.

Lom, J. 1970. Trichodinid ciliates (Peritrichida: Urceolariidae) from some marine fishes. Folia Parasitol. (Praha). 17: 113-125.

Lom J. 1973. Adhesive disc of *Trichodinella epizootica* - ultrastructure and injury to the host tissue. Folia Parasitol. 20: 193-202.

Lom J. and Hoffman G.L. 1964. Geographic distribution of some species of trichodinids (Ciliata: Peritricha) parasitic on fishes. J. Parasitol. 50: 30-35.

Lom, J. and Dykova, I. 1992. Protozoan parasites of fish. Elsevier, Amsterdam.

Özer, A. 2000. The occurrence of three species of *Trichodina* (Ciliophora: Peritrichia) on *Cyprinus carpio* in relation to culture conditions, seasonality and host characteristics. Acta Protozol. 39: 61-66.

Özer, A. 2003a. The occurrence of *Trichodina domerguei* Wallengren, 1897 and *Trichodina tenuidens* Faure-Fremiet, 1944 on three spined stickleback, *Gasterosteus aculeatus* L., 1758 found in a brackish and freshwater environment. Acta Protozool. 42: 41-46.

Özer, A. 2003b. *Trichodina domerguei* Wallengren, 1897 (Ciliophora: Peritrichia) Infestations on the Round Goby, *Neogobius melanostomus* Pallas, 1811 in Relation to Seasonality and Host Factors. Comp. Parasitol. 70 (2): 132-135.

Özer, A. and Erdem, O. 1998. Ectoparasitic protozoa fauna of the common carp (*Cyprinus carpio* L., 1758) caught in the Sinop region of Turkey. J. Nat. Hist. 32: 441-454.

Özer, A. and Erdem, O. 1999. The relationship between occurrence of ectoparasites, temperature and culture conditions; a comparison of farmed and wild common carp (*Cyprinus carpio* L., 1758) in the Sinop region of northern Turkey. J. Nat. Hist. 33: 483-491.

Sanmartin Duran, M.L. Fernandez Casal, J. Tojo, J.L. Santomarina, M.T. Esrevez, J. and Ubeira, F. 1991. *Trichodina* sp.; Effects on the growth of farmed turbot (*Scopthalmus maximus*). Bull. Eur. Assoc. Fish Pathol. 11: 89-91.

Urawa S. 1992. *Trichodina truttae* Mueller, 1937 (Ciliophora: Peritrichida) on juvenile chum salmon (*Onchorhynchus keta*): Pathogenicity and Host-Parasite Interactions. Gyobyo Kenkyu. 27: 29 - 37.

Van As, J.G. and Basson, L. 1987. Host specificity of trichodinid ectoparasites of freshwater fish. Parasitol. Today. 3: 88-90.