

FISH PARASITES OF THE SAKARYA RIVER, TURKEY

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ABSTRACT

This study was performed in the Sakarya River, Turkey and found 11 parasite species (*Trichodina* sp., *Dactylogyrus* sp., *Gyrodactylus elegans*, *Ancylodiscoides vistulensis*, *Paradiplozon homoion*, *Allocreadium lobatum*, *Caryophyllaeus laticeps*, *Raphidascaris acus*, *Neoechinorhynchus agilis*, *Pomphorhynchus leavis*, *Glochidia larvae*) on 9 out of 11 fish species (*Abramis brama*, *Blicca björkna*, *Rutilus rutilus*, *Silurus glanis*, *Esox lucius*, *Leuciscus cephalus*, *Barbus barbus*, *Scardinius erythrophthalmus*, *Perca fluviatilis*) in a total of 143 samples.

Key words: Sakarya River, Turkey, fish parasite, monogenea, cestoda

SAKARYA NEHRİ' NİN BALIK PARAZİTLERİ

ÖZET

Bu çalışma Sakarya nehrinde (Türkiye) gerçekleştirildi ve 143 balık örneğinde 11 balık türünün 9 türünde (*Abramis brama*, *Blicca björkna*, *Rutilus rutilus*, *Silurus glanis*, *Esox lucius*, *Leuciscus cephalus*, *Barbus barbus*, *Scardinius erythrophthalmus*, *Perca fluviatilis*) 11 parazit türü (*Trichodina* sp., *Dactylogyrus* sp., *Gyrodactylus elegans*, *Ancylodiscoides vistulensis*, *Paradiplozon homoion*, *Allocreadium lobatum*, *Caryophyllaeus laticeps*, *Raphidascaris acus*, *Neoechinorhynchus agilis*, *Pomphorhynchus leavis*, *Glochidia larvası*) bulundu.

Anahtar kelimeler: Sakarya Nehri, Türkiye, balık paraziti, monogenea, cestoda

INTRODUCTION

The large and long rivers are ecosystems that harbor communities with characteristic structures and functions and have a wide variety of habitats and species. The population dynamics of fish as well as their biological and physiological conditions are alterable, which may influence the structure and composition of their parasite fauna. In addition, physical and chemical characteristics of water such as pollution, temperature, dissolved oxygen can make a contribution to emergence or intensity of parasite species. A number of earlier investigations on the parasites of freshwater fishes in lake and rivers of Turkey have been done by Özer (1999), Aydoğdu and Altunel (2000), Öztürk and Kutlu (2006), Kartal and Öztürk (2009), Selver et al. (2010)

and Koyun (2001). The goal of this study was to investigate the incidence, prevalence and intensity of parasitic infection of fish from the Sakarya River, Turkey's third longest with a length of 824 km, arising from Bayat Plateau in the northeast of Afyon, Turkey and flowing into the Black Sea.

MATERIALS AND METHODS

Fish samples were caught with gill-net and fyke net from the lower zone of the Sakarya River, the Aegean Sea side of the Marmara Region, Turkey, from May 2011 to February 2013. The samples were transported alive to the laboratory for parasitological investigation. In the laboratory, the samples were dissected, the gills, intestine and stomach were removed

and then they were placed on separate petri dishes, and examined for parasites using a stereomicroscope under incandescent light. Live parasites were slightly compressed between a slide and a coverslip, examined under light microscope, and then were photographed. Some parasites were immediately mounted in glycerin-jelly or placed in 70% alcohol solution, AFA solution or 4% formol-saline. Measurements were taken using an ocular micrometer and BEL View software (BEL Photonics, Milan, Italy). Parasites samples recovered from fish samples were identified according to Khalil et al. (1994), Bray et al. (2001), Anderson et al. (2009) and Pugachec et al. (2010). Infections rates of parasites were calculated according to Bush et al. (1997).

RESULTS

In this study, a total of 143 individual fish belonging to 11 different fish species were investigated for parasitic infection and 11 parasites species were detected from 9 fish species. Parasite species, the site

of infection in the respective host and their prevalence are given in Table 1.

Trichodina sp. Ehrenberg, 1831 (Figure1)

Trichodina sp. is a medium sized species with a cell diameter of 35-40 μ . Its adhesive disc diameter is 8-30 μ , denticle length 5-6 μ and number of denticles 25-27. Trichodinid shaving more than 200 species display geographically a wide distribution and are reported from a variety of habitats and a range of hosts, including fishes, amphibians, hydroids, mollusks and crustaceans in different ecosystem such as marine, freshwater etc. In this study, *Trichodina* sp. was found from *Abramis brama* and *Blicca bjoerkna*. In the previous studies in Turkey, many species of trichonids were reported from various fish species such as *Mugil spp.*, *Aphanius spp.*, *Neogobius* and cyprinidae etc. from various localities including Sapanca Lake, Sarikum lake and the Black Sea coasts of Sinop (Soylu 1991, Özer and Erdem 1999, Öztürk and Özer 2007).

Table 1. Parasite species, the site of infection in the respective host and their prevalence

	Parasite species	Host	Site	NIF	Prevalance %	
Protozoa	<i>Trichodina</i> sp.	<i>Abramis brama</i>	Skin	48	10.42	
		<i>Blicca björkna</i>	Skin	38	18.42	
		<i>Rutilus rutilus</i>	Skin	6	16.67	
Monogenea	<i>Dactylogyrus</i> sp.	<i>Rutilus rutilus</i>	Gill	6	16.67	
		<i>Abramis brama</i>	Gill	48	4.17	
		<i>Gyrodactylus elegans</i>	Skin	48	6.25	
		<i>Ancylo-discoides vistulensis</i>	Silurus glanis	Gill	7	42.86
		<i>Paradiplozoon homoion</i>	<i>Abramis brama</i>	Gill	48	39.58
		<i>Blicca björkna</i>	Gill	38	55.26	
Digenea	<i>Allocreadium lobatum</i>	<i>Blicca björkna</i>	Intestine	38	5.26	
Cestoda	<i>Caryophyllaeus laticeps</i>	<i>Abramis brama</i>	Intestine	48	8.33	
		<i>Blicca björkna</i>	Intestine	38	7.89	
		<i>Esox lucius</i>	Intestine	11	18.18	
Nematoda	<i>Rhapidascaris acus</i>	<i>Esox lucius</i>	Intestine	11	18.18	
Acanthocephala	<i>Neoechinorhynchus rutili</i>	<i>Mugil soiyu</i>	Intestine	2	50.00	
		<i>Barbus barbus</i>	Intestine	21	90.48	
		<i>Silurus glanis</i>	Intestine	7	14.29	
Bivalvia	<i>Glochidia larvae</i>	<i>Abramis brama</i>	Gill	48	18.18	
		<i>Silurus glanis</i>	Gill	7	28.57	
		<i>Blicca bjoerkna</i>	Gill	38	14.59	
		<i>Esox lucius</i>	Gill	11	7.89	
		<i>Lecuisus cephalus</i>	Gill	3	33.33	
		<i>Barbus barbus</i>	Gill	21	9.52	
		<i>Scardinius erythrophthalmus</i>	Gill	5	20.00	

NIF: number of investigated fish



Figure 1. Total view of *Trichodina* sp.

Paradiplozoon homoion Bychowskyet and Nagibina, 1959 (Figure 2).

Body (3-5 mm in length and 0.9-1.2 mm breadth) is divided into two parts; the anterior part being 2-4 mm length and the posterior part being 1.5-3 mm length. There are four pairs of clamps in the posterior part. The first clamps are smaller than the others. First clamp widths are 0.09-0.11 mm whereas the others' are 0.11-0.14 mm. This species found on *Abramis brama* and *Blicca björkna* in this study is within the monogenean parasites living mainly on the gills of cyprinid fishes and has been reported from various

fish species such as *B. björkna*, *Cyprinus carpio*, *A. brama*, *Vimba vimba* and *Pseudophoxinus antalyae* in the different geographic regions including Manyas, Sapanca and Antalya (Soylu 2007, Öztürk 2011).

Ancylodiscoides vistulensis Sivak, 1932 (Figure 3)

Body length and breadth are 0.7-0.8 mm and 0.25-0.3 mm, respectively. There are two pairs of anchors. The ventral anchors are smaller than the dorsal anchors. This parasite, a specific parasite of *Silurus glanis*, was previously recorded on *S. glanis* from Sapanca Lake (Soylu 1991) and from Terkos Lake (Soylu 2005).

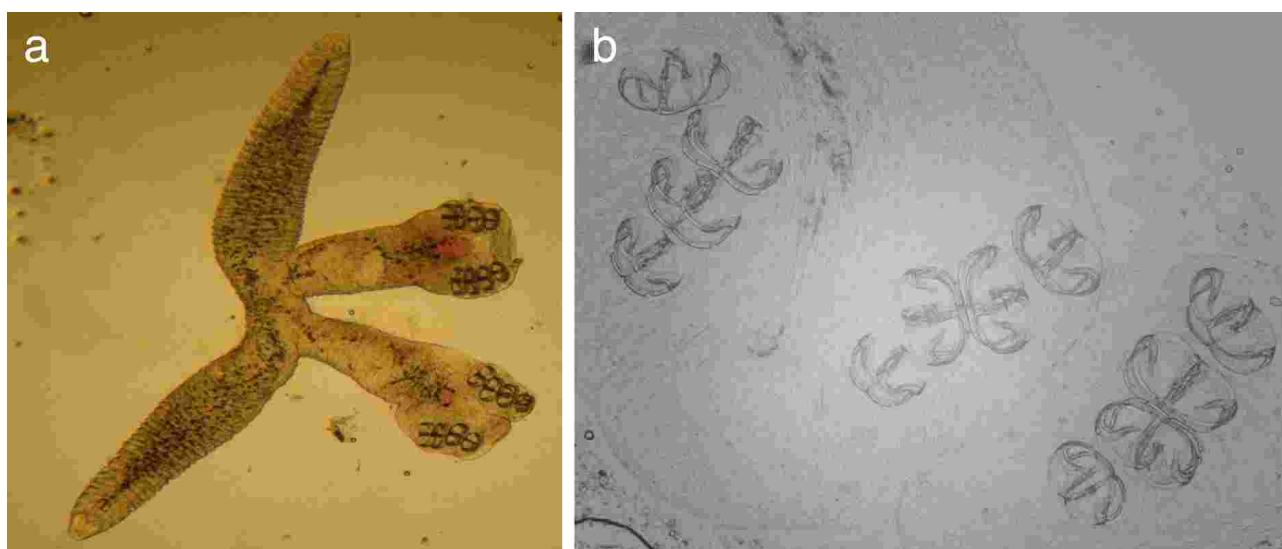


Figure 2. *Paradiplozoon homoion* a) Total view b) Structure of clamps

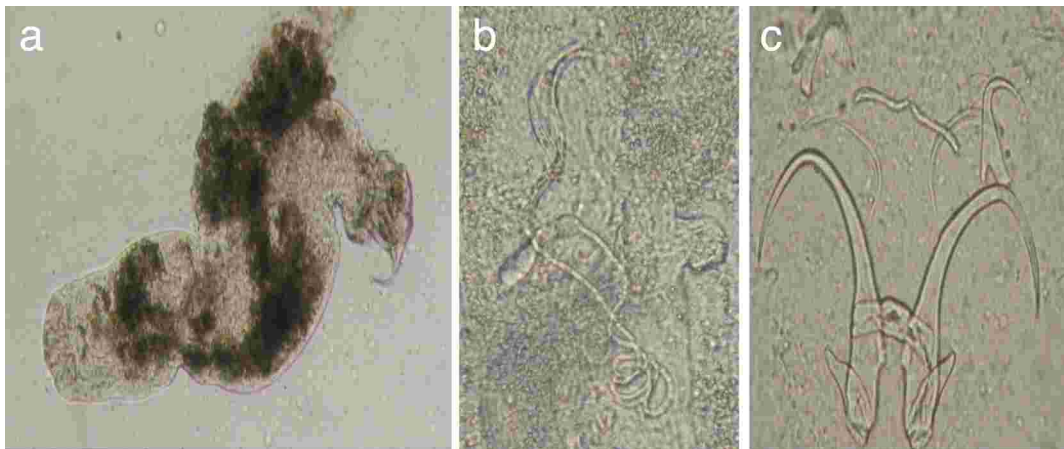


Figure 3. a) Total view b) Chitinous parts of the genital organs c) Anchors



Figure 4. *Gyrodactylus elegans* a) Total view b) Anchor

Gyrodactylus elegans Nordmann, 1832 (Figure 4)

Gyrodactylus elegans are small, elongate and viviparous worms. Body is 0.5-0.6 mm in length and 0.17-0.22 mm in breadth. The haptor has a pair of anchors (0.04-0.05 mm in length) and 16 marginal hooks. *Gyrodactylus* species usually parasitize the Cyprinidae. They are, however, also found on the other freshwater fish such as burbot and trout.

***Dactylogyrus* sp.** Diesing, 1850

Dactylogyrus is oviparous monogenean with four eye-spots, 14 marginal hooks, two anchors, one to two connective bars and two needle-like structures and spindle-shaped dactylogyrid-type seminal vesicles. *Dactylogyrus* species are specific to the Cyprinidae and they have been reported by former studies done in Europe. *Dactylogyrus* spp. have also been previously reported by many studies from Turkey (Aydođdu et al. 2003, Karatoy and Soylu 2006, Özan et al. 2008).

Allocreadium lobatum Wallin, 1909 (Figure 5)

Body is small (2.2 mm in length and 0.5 mm in breadth), elongated and dorsoventrally flattened. The suckers well developed, prepharynx absent, pharynx globular and esophagus long. The testes and ovary lobed. The vitellaria extend to the pharynx.



Figure 5. Total view of *Allocreadium lobatum*

Caryophyllaeus laticeps Pallas, 1781 (Figure 6)

Body is (20-40 mm in length and 1-3 mm in breadth) elongated without proglottization but with a single set of reproductive organs. The scolex flabellate. The ovary H shaped. This species being a common parasite in Europe, Asia, Africa are usually found in cyprinids and have been previously reported in many cyprinid species such as tench, carp, roach and vimba from a variety of geographical regions in Turkey (Cengizler et al 2001, Kır and Özkan 2005, Özkan et al. 2006, Aydoğdu et al. 2008, Demirtaş 2011).

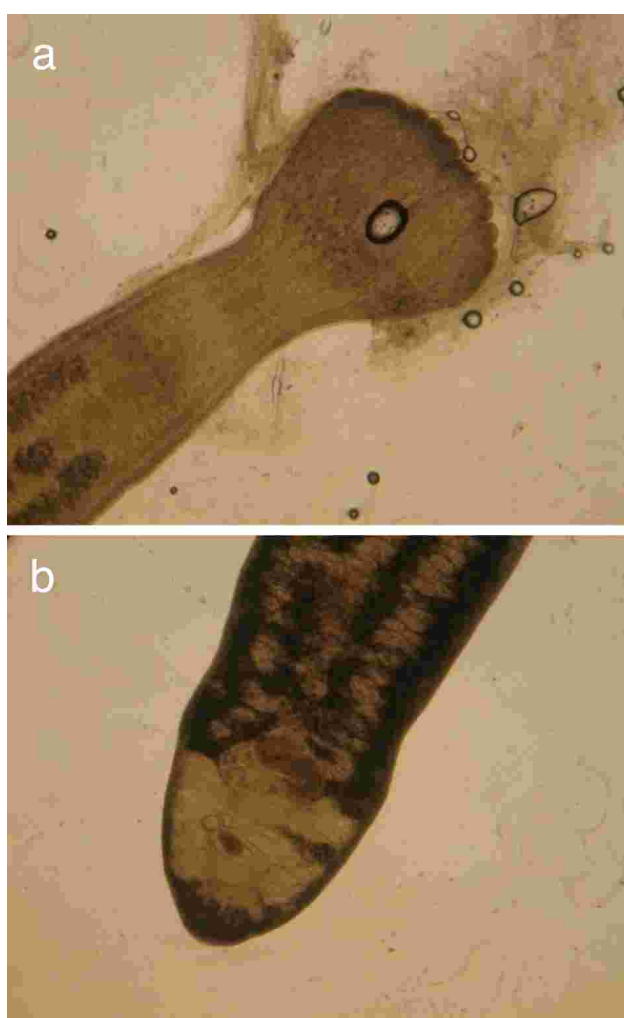


Figure 6. *Caryophyllaeus laticeps* a) Anterior region
b) Posterior region

Raphidascaris acus Bloch, 1779

This parasite was recovered from the intestine of pike. Length and breadth were 12-27 and 0.2-0.3 mm, respectively. The esophageal caecum is present but the intestinal caecum is absent. While this parasite uses

herbivorous fishes as intermediate host, its definitive hosts are the piscivorous fishes. *Raphidascaris acus* occurring in a variety of fishes in Europe, Asia and North America was previously reported only from pike in Turkey (Soylu 1991, Kır and Özkan 2005, Öztürk and Altunel 2001).

Neoechinorhynchus agilis Rud, 1819 (Figure 7).

The trunk aspinoase, cylindrical. Body 6-12 mm in length and 0.6-0.7 mm in breadth. The proboscis short and globular (0.16 mm in length and 0.11-0.13 mm in breadth). The proboscis hooks in three circles of six hooks each. This parasite being specific for mullets shows a broad distribution in the world and also has been previously reported in Turkey by Altunel (1982), Keser et al. (2007) and Özer and Kırca (2013).



Figure 7. Anterior region of *Neoechinorhynchus agilis*

Pomphorhynchus leaves Müller, 1776 (Figure 8)

Body is (9-15 mm in length and 2-2.5 mm in breadth) cylindrical and orange yellow in colour. The proboscis long (0.5-0.6 mm in length and 0.3-0.4 mm in breadth), the neck with bulbous part with 12-15 longitudinal rows of 10-13 hooks each. *Pomphorhynchus leaves* is a common parasite for several species of freshwater and marine fishes. It was reported from Turkey in several species such as *Alburnus alburnus* from Enne Dam Lake (Koyun 2001), in *Alburnus nasreddini* from Akşehir Lake (Buhurcu and Öztürk 2007) and in *Leuciscus cephalus* from Örenler Dam Lake (Kurupınar and Öztürk 2009).

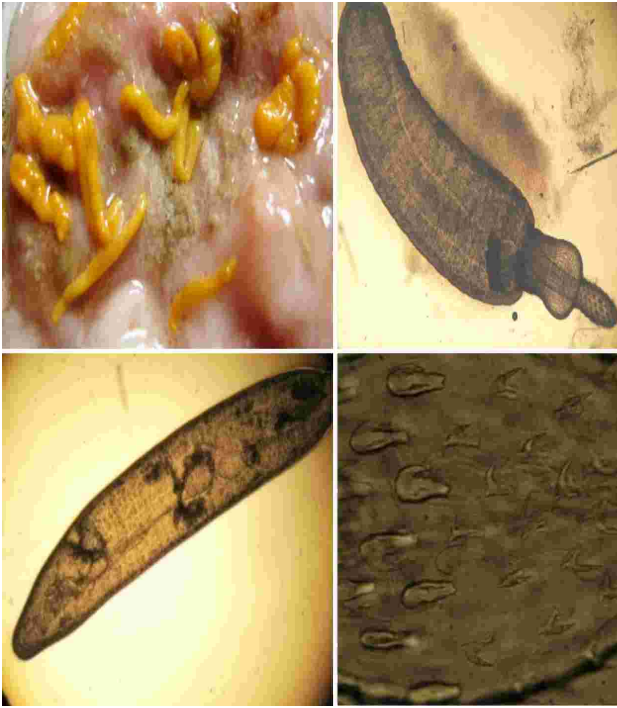


Figure 8. *Pomphorhynchus leaves* a) Total view b) Female c) Male d) Hooks on proboscis

Glochidia larvae (Figure 9)

Glochidia larvae consist of two shells (0.35-0.45 mm in length and 0.3-0.4 mm in breadth). The freshwater mussels include a free-living adult and an obligatory ectoparasite larval phase. Glochidia, the larval stage of bivalves, are frequent parasites of many fish species. Glochidia larvae found on the gills of seven fish species in the present study has been previously reported in carp, vimba, roach and white sea bream from Sapanca Lake (Soylu 1991, Akmirza and Soyly 2008).



Figure 9. Total view of *Glochidia larvae*

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