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Metazoan Parasites of Catfish (*Silurus glanis,* Linnaeus,1758 *)* from Durusu (Terkos) Lake

Durusu (Terkos) Gölü Yayın Balığı (*Silurus glanis,* Linnaeus,1758)' nın Metazoan Parazitleri

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Abstract

Total 43 Silurus glanis samples were investigated in order to detect parasites from June 2002 to May 2003 taken from Durusu (Terkos) lake. Parasites belonging to six species were recorded; *Ancylodiscoides siluri* (Zandt, 1924) and *Ancylodiscoides vistulensis* (Sivak, 1932) from Monogenoidea, *Siluritaenia siluri* (Batsch, 1786) from Cestoidea, *Diplostomum sp.* from Trematoda, *Eustrongylides excisus* (Jagerskiöld, 1909) from Nematoda and *Argulus foliaceus* (Linnaeus, 1758) from Crustacea.

Keywords: Fish, parasites, Monogenea, Cestoda, Trematoda, Nematoda, Crustacea

Introduction

Metazoan parasites have harmful effect on the both fish health and fishery industry. Fish production has been processing and fish mortality deal with fish diseases become serious problem in Turkey.
In spite of having twenty seven fish species of Durusu Lake basin (Özuluğ, 2003) there is not any study on parasite fauna of the fish in Durusu Lake. This investigation is the first in Durusu lake.

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There are few studies on the parasites of *S. glanis* reported from Sapanca Lake (Soylu, 1991; 1995) and Iznik Lake (Aydoğdu *et al.*, 1966a) in Turkey.
Fish production in fresh water is performed both in ponds and net cages in natural or dam lakes.Hence studies of parasite fauna of the fish in the inland water are important. In this study metazoan parasites of *S. glanis* were studied and the number and percent of infected fish and infection rates were reported in Durusu Lake.

Material and Methods

Durusu Lake is located in the northwest of the Marmara Region in Turkey (Figure 1). Its surface area is 25 km^2 with an average depth of 5 m. Its altitude is 2.75 meter 12 km long and 5 km wide (Inandık, 1965; Gümüş, 1992). Water temperatures were recorded as maximum 28.3 ^oC in September and minumum 8.1 ^oC in March in the Durusu Lake (Figure 2).

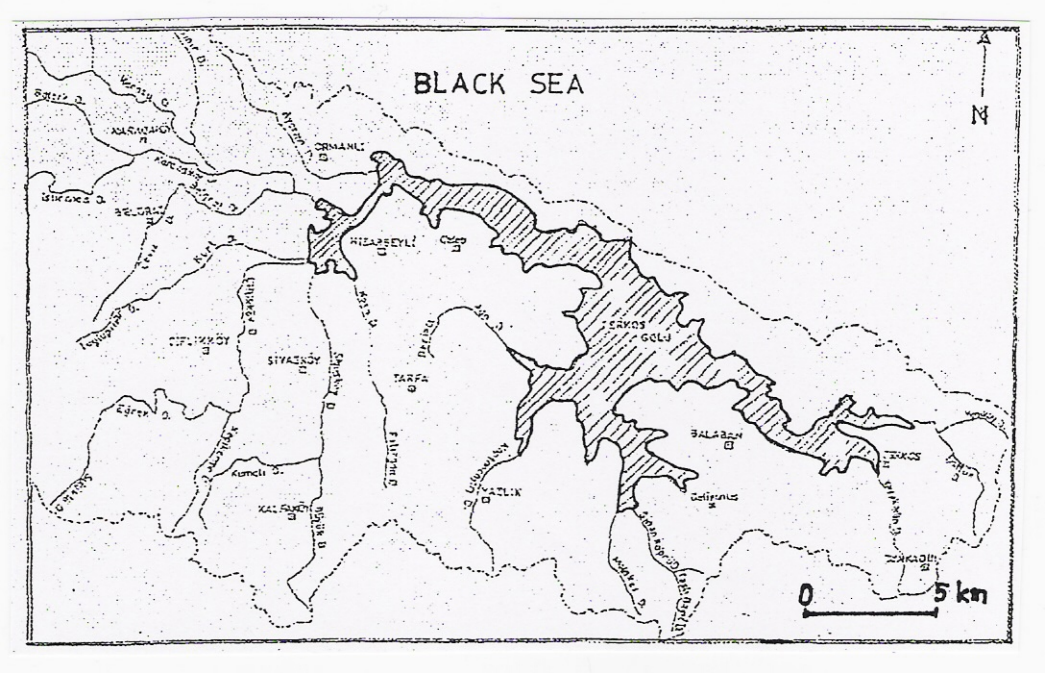

Figure 1. Lake Durusu (Terkos)

During the investigation fish samples were taken from fisherman monthly in the period between June 2002 to May 2003 . The weights of the fish were between 200 g and 1050 g. The fish were transported to the laboratory alive, in plastic bags supplied with oxygen. They were killed and then subjected to full parasitological examination extending to all organs, under stereomicroscope. Monogeneans collected from the fish were preserved as slide preparations in ammonium picrate solution or lactophenol under coverslip, sclerotised elements were measured. Cestod and Trematod samples were fixed under pressure with Bouin's fluid, after 24 h samples put into the saturated solution of Lithium carbonate up to remove yellowish colour because of fixative. After staining with aceto-carmine they were dehydrated with alcohol series and mounted in Canada balsam. Nematodes were killed in glacial acetic acid and were fixed in 70 % ethanol. The worms were cleared in lactophenol.
Crustacea samples were fixed in 70 % ethanol and cleared in lactophenol, mounted with glycerin-gelatine.
Slides were studied with Nikon Diaphot 300 Microscope and photographs were recorded to CD by Sony CCD Iris Color Video Camera Line. Preparation of slides were made according to (Bylund *et al.,* 1980) and (Fernando *et al.,* 1972). Parasite specimens identified according to Bykhovska-Pavlovskaya *et al.,* 1964; Markevich, 1951; Yamaguti, 1954; 1963.

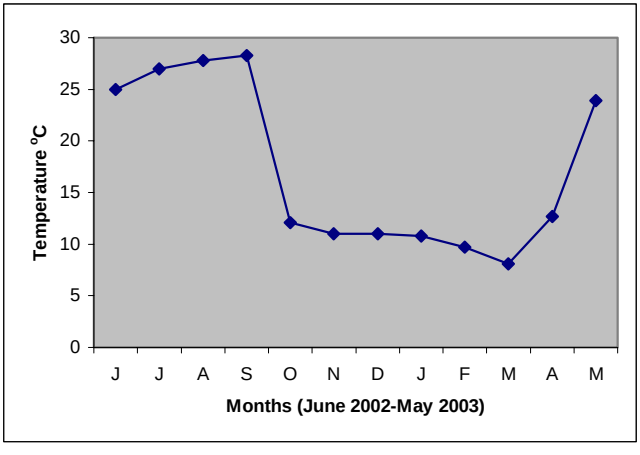

Figure 2. Surface Water Temperature of Lake Durusu

Results

During one year period 43 *S. glanis* were investigated. *Ancylodiscoides siluri* (Zandt, 1924) and *Ancylodiscoides vistulensis* (Sivak, 1932) from Monogenoidea, *Siluritaenia siluri* (Batsch, 1786) from Cestoidea, *Diplostomum sp.* from Trematoda, *Eustrongylides excisus* (Jagerskiöld, 1909) from Nematoda and *Argulus foliaceus* (Linnaeus, 1758) from Crustacea were recorded.

Ancylodiscoides siluri (Zandt, 1924) Figure 3 (a,b)
Location :Gill flaments
Nr. of specimens : 10
Description : Medium sized worms, length to 0,8 width 0,21 mm, length of marginal hooks 0,016, ventral median hooks long and narrow, total length 0,031-0,036 mm. Total length of dorsal median hooks 0,081-0,092 mm. Accessory pieces 0,007-0,009 x 0,025-0,030 mm. Connecting bar of ventral hooks (half) 0,004 x 0,025, of dorsal hooks 0,007 x 0,042 mm. Total length of capulatory organ 0,081 x 0,15, length of tube 0,37 x 0,41 diameter 0,003-0,004 mm, length of supporting bar 0,027 x 0,046mm.

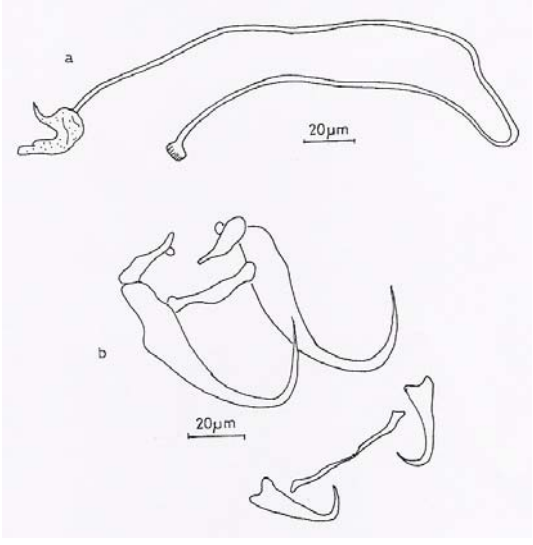

Figure 3. *Ancylodiscoides siluri* (Zandt, 1924)
a. Chitineous parts of the capulator organs b. Chitineous parts of the haptor

Ancylodiscoides vistulensis (Sivak, 1932) Figure 4(a,b)
Location : Gill flaments
Nr. of specimens : 12
Description : Medium sized worms, length to 0,77, width 0,28, length of marginal hooks about 0,015 mm. Ventral median hooks short and broad, total length 0,025-0,027. total length of median hooks 0,068-0,076, accessorial piece 0,006-0,007 x 0,022-0,025 mm. Connecting bars: ventral hooks (half) about 0,003 x 0,023, dorsal hooks 0,005 x 0,033-0,040 mm. Total length of capulatory organ 0,15, length of tube 0,61-0,90, diameter 0,001, length of supporting bar 0,065 x 0,110 mm. Length of convoluted tube about 0,23mm.

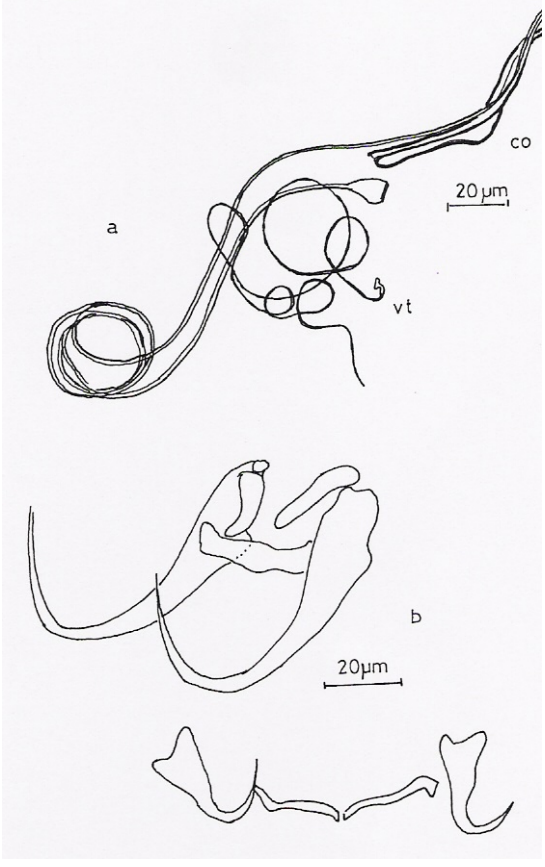

Figure 4. *Ancylodiscoides vistulensis* (Sivak, 1932)
a. Chitineous parts of the genital organs b. Chitineous parts of the haptor.
co : copulator organ vt : vaginal tube

Silurotaenia siluri (Batsch, 1786) Figure 5 (a,b)
Location : Intestine
Nr. of specimens : 5
Description : Small worms, head rounded with 4 suckers, an muscular sincipital organ, numerous testes, cirral bursa small and round. Adults 100-330 mm long, 1,5-2,5 mm wide, head 0,21-0,27 mm wide, suckers round 0,10-0,13 mm in diameter. Testes 195-235 unit in one layer. Cirral bursa 0,22-0,29 x 0,15-0,17 mm. Ovary bilobed.

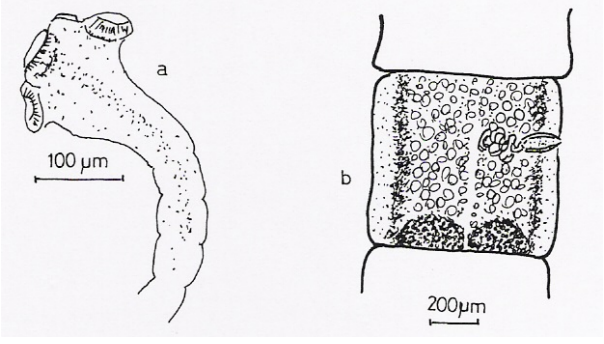

Figure 5. *Siluritaenia silurii* (Batsch, 1786)

a. Head and 4 suckers b. Mature proglottis

Diplostomum sp. Metacercariae Figure 6
Location : In optic lens
Nr. os specimens : 10
Description : Body broad 0.23 mm, the length of the body about 0,52 mm, anterior end of the body with angular lappetlike protrusions. Mobility not much. Brander's organ somewhat extended transversely.

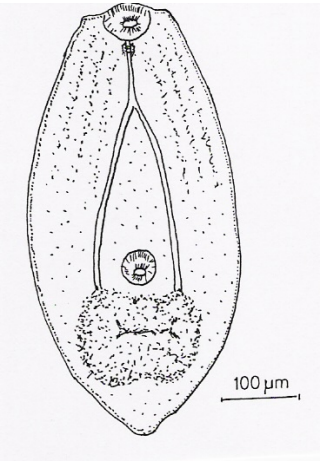

Figure 6. *Diplostomum sp.* metacercariae

Eustrongylides excisus (Jagerskiöld, 1909) Figure 7
Location : Coelom
Nr. of specimens : 10
Description : Mounth surrounded by 12 papillae lying in two rows, cuticule transversary striate. Eusophagus extremely long, lacking dilatation. Males with one long spicule. Vulva of female closely adjacent to anal aparture. Body of larvae surrounded by thick capsule colored brown. Length 29-35 mm.

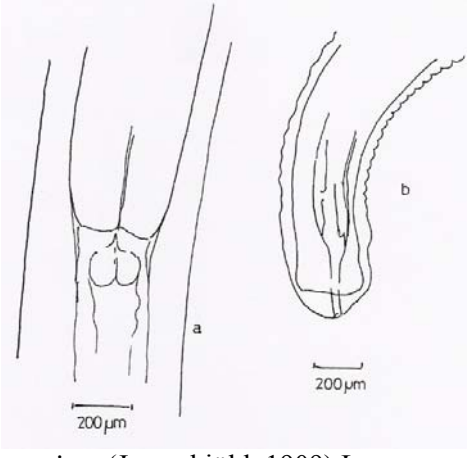

Figure 7. *Eustrongylides excisus* (Jagerskiöld, 1909) Larvae
a. Junction between oesophagus and intestine b. Posterior end of the male larvae

Argulus foliaceus (Linnaeus, 1758) Figure 8
Location : Gill and skin
Nr. of specimens : 4
Description : Urosome with rounded lobes, covered with small spines. Length of body 5-6 mm. Cephalotorax oval, posterior lobes of cephalothoracic carapace not extending beyond beginning of urosome.

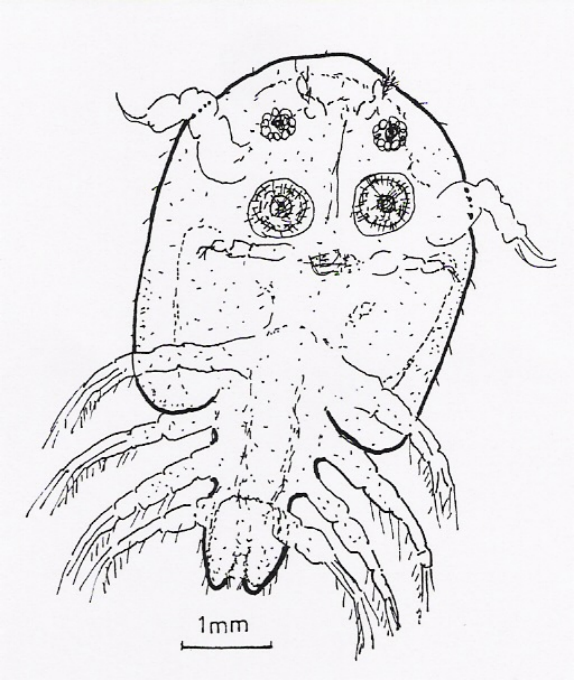

Figure 8. *Argulus foliaceus* (Linnaeus, 1758)

Discussion

A. siluri and *A. vistulensis* were found as the most common species in *S. glanis* during one year. Both of them were found on the gills, external specialities and size being not so different. Identification was made after studying slide with microscope by investigating copulatory organs, for this reason numbers of these parasites were not given separately. However parasites values of isolated from samples were recorded as 60 % *A. vistulensis* and 40 % *A. siluri*. These both monogeneans were recorded in *S. glanis* from Sapanca Lake (Soylu,

1991). Aydoğdu *et al.,* (1996a) were recorded *A. siluri* in *S. glanis* from İznik Lake. Barysheva and Bauer, (1957) remarks only *A. siluri* and *Proteocephalus osculatus* as specific parasites of *S. glanis*.

Siluritaenia siluri was recorded in spring and autumn months totally 11 specimens. Soylu (1995) remarked *S. siluri* in *S. glanis* from Sapanca Lake.

The infection rates of *Diplostomum sp.* metacercariae in *S. glanis* were relatively lower in Durusu Lake. Parasites in the lens of eyes were feebly mobile. When the eye of the fish infested by *Diplostomum sp.* the larvae cause to opacity and blindness. In some fish species like *Perca fluvialitis* number of parasites exceed 100 (Barysheva and Bauer, 1957).

The identification of many *Diplostomum* species is difficult due to their high morphological similarity. Phylogenetic analyses of six *Diplostomum* species; *D.spathaceum, D.parviventosum, D.mergi, D.paracaudum, D.pseudospathaceum* and *D.baeri* were based on morphological data and sequences of

ITS1 region of the rDNA. Morphological data are obtained from cercarial, metacercarial and adult stage. *Diplostomum* species readily distinguishable on the basis of morphology at adult stage. Cercarial stage of *Diplostomum* species is developed in lymnaeid snails and several species of *Diplostomum* may infect the same snail species and even the same specimen. Almost all freshwater fish and some Petromyzoniformes are suitable hosts for metacercariae. Birds of various groups are hosts for adult parasite (Niewiadomska and Kiseliene, 1994, Niewiadomska and Laskowski, 2002).

In this study, *Eustrongylides excisus* were not found in winter months except on one fish from Durusu Lake. Findings about *Eustrongylides* have been reported by some workers in Turkey; Aydoğdu *et al.,* (1996a) *Eustrongylides sp* in *S. glanis*, Aydoğdu *et al.,* (1996b) *Eustrongylides sp*. in *Tinca tinca* and Aydoğdu *et al.,* (1997) *Eustrongylides sp*. in *Rutilis frisii* from Iznik Lake, Öztürk, (2000) *Eustrongylides excisus* in *Gobius fluvialitis* from Manyas Lake, Öztürk *et al.,* (2002) *E. excisus* in *G. fluviatilis* from Uluabat Lake.

The eggs of *E. excisus* are shed into the ambient water via the faeces of the final host. The first intermediate host which ingests the eggs is an oligochaeta. In the blood vessels of oligochaeta the larvae complete its second and third stage. The second intermediate host of this parasite is usually a fish. Adult specimens of *E. excisus* are recorded in fish eating birds (Fagerholm, 1982).

In this study, *Argulus foliaceus* was found during July and August on the gills and skin. *A. foliaceus* was found on different fish by some workers; Soylu (1990) on *T. tinca* and *S. glanis*, Öztürk *et al.,* (2002) on *Esox lucius*, Öztürk (2002) on *T. tinca*.

In the present study, as a result *A. vistulensis* and *A. siluri* were found as dominant parasite species in *S. glanis*. Diplostomum sp. was found as the second dominant parasite species (Table 1).There was no risk related to epidemic level of values of parasite species in Silurus glanis from Durusu Lake.

Özet

Araştırmalar Durusu Gölünde Haziran 2002 den Mayıs 2003'e kadar aylık olarak yapıldı ve kırküç *Silurus glanis* örneğinde altı parazit türü tesbit edildi. Bunlar; *Ancylodiscoides siluri* (Zandt, 1924) ve *Ancylodiscoides vistulensis* (Sivak, 1932) (Monogenoidea), *Siluritaenia siluri* (Batsch, 1786) (Cestoidea), *Diplostomum sp. (*Trematoda), *Eustrongylides excisus* (Jagerskiöld, 1909) (Nematoda) ve *Argulus foliaceus* (Linnaeus, 1758) (Crustacea) dır.

Table 1. The parasitism values of *Silurus glanis* from Durusu (Terkos) Lake

	Number of Fish Examined	*A.vistulensis* *A.siluri*	*S.siluri*	*Diplostomum sp.*	*E.excisus*	*A.foliaceus*	*A.vistulensis* *A.siluri*	*S.siluri*	*Diplostomum sp.*	*E.excisus*	*A.foliaceus*	*A.vistulensis* *A.siluri*	*S.siluri*	*Diplostomum sp.*	*E.excisus*	*A.foliaceus*
		Number of Infected Fish					Prevalence of Infected Fish					Infection Rate				
02 June	5	5	3	2	4	-	100	60	40	80	-	150	4	7	24	-
02 July	4	4	-	2	2	2	100	-	50	50	50	396	-	8	16	5
02 Aug.	6	6	-	4	5	1	100	-	66.6	83.3	16.6	390	-	19	28	1
02 Sept.	4	4	-	1	1	-	100	-	25	25	-	201	-	5	13	-
02 Oct.	3	3	-	-	1	-	100	-	-	33.3	-	84	-	-	2	-
02 Nov.	3	3	2	1	-	-	100	66.6	33.3	-	-	101	2	4	-	-
02 Dec.	4	4	1	1	1	-	100	25	25	25	-	82	1	4	7	-
03 Jan.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
03 Feb.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
03 Mar.	3	2	-	2	-	-	66.6	-	66.6	-	-	95	-	7	-	-
03 Apr.	5	5	2	3	1	-	100	40	60	20	-	110	3	11	5	-
03 May	3	3	1	3	3	-	100	33.3	100	100	-	189	1	14	16	-
Total	43	39	9	19	18	3	90.6	20.9	44.1	41.8	6.9	1798	11	79	111	6

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