

Helminth parasites of sea bass (*Dicentrarchus labrax*, Linnaeus, 1758), gray mullet (*Chelon labrosus*, Aisso, 1826) from Bafa Lake, Turkey

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Abstract

In this study, sea bass (*Dicentrarchus labrax*, Linnaeus, 1758), gray mullet (*Chelon labrosus*, Aisso, 1826), bream (*Spanus aurata*, L. 1785) and carp (*Cyprinus carpio*, L. 1758) supplied from Bafa Lake from October 2013 to February 2014, underwent a parasitological examination for helminth parasites. In total 86 fish were examined and four helminth species (*Diplactanum aequans*, *Helicometra* sp., *Acanthostomum* sp., *Contracaecum* sp.) were found. *Diplactanum aequans* was found as a prominent specie for sea bass and *Acanthostomum* sp. was found as a prominent specie in general. *Contracaecum* sp. was found in only one fish.

Keywords: Bafa Lake, Helminth, Monogenea, Nematoda, Trematoda

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Introduction

Most of the helminth species develop on different organs and tissue of the fish, the parasitic effects are local and overall. Helminths on fresh water fish may cause serious damage to the national fishery economy.

Mass fish die-offs in Lake Bafa were seen in previous years, but the cause is as of yet not fully understood. Several speculative opinions were put forward. The analysis of the lake water, the decrease in the number of fish species, the number of effected fish and other seasonal factors could not be obtained as a result is able to give a precise idea. The fish production and serious hunting locations of Lake Bafa make this a very important site to research. Since there is water entering the lake, it is possible for different types of fish to enter the lake ecosystem (Müllenhoff *et al.*, 2004). Thus, the lake's parasitic fauna must be researched to identify the fish quantity and the quality and lake ecosystem.

The objective of the study is to determine the prevalence of helminth species on fish in Lake Bafa. Since the number of fish species in the lake is many, only four fish species (sea bass, mullet, sea bream and carp) will be researched and parasitic fauna on those fish has been omitted. Due to this factor average data has been obtained.

Materials and methods

For this research, 38 sea bass (*D. labrax*) with a full length of 24-31 cm

and weight of 199 to 244 grams, 41 blue mullet (*C. labrosus*) with a full length of 31-35 cm and weight of 329 to 473 grams, 6 sea bream (*S. aurata*) with a full length of 19-23 cm and weight of 195 to 244 g, and 1 carp (*C. Carpio*) with a full length of 25 cm and weight of 519 g. With the help of routine fishing, in total 86 fish were examined in Bafa Lake between October 2013 and February 2014.

The caught fish was brought to Adnan Menderes University, Faculty of Veterinary: Parasitology Department laboratory and the dissections were performed in 3-4 hours. Before starting the dissection, the fish were brought to the laboratory with the lake water where their length and weight were determined. Weight was measured with sensitive UWE brand scales. The length of fish was measured from the front of the fish to the tail beginning. After determining weight and length, they were examined with the naked eye and then with the skin and fins, were examined under binocular stereo microscope for ectoparasites. After this procedure, the dissection process began. The fish operculum and eyes were removed on both sides. Then, the gills, in accordance to the fish species were removed, and each severed gill was placed in petri dishes with 0.9% physiological saline serum. A thin needle was used to identify the parasites under a binocular stereo microscope, and small forceps on both sides of the operculum and gill lamellae were examined. The eyes were also

examined after the lens were removed. In searching for endoparasites, the fish were opened with small scissors on the abdomen from the anus to the mouth. Fish viscera, which have different shapes and sizes, depending on species were put into separate petri dishes. These were examined under a binocular stereo microscope using a fine needle to scrape samples for the microscopic examination. After checking the internal organs, muscle tissue was examined for parasites which may have migrated. After microscopic examination, the intensity and locations of found parasites were recorded. The parasite specimens were identified

using the reference keys of (Bauer, 1987; Chubb *et al.*, 1987; Hoffman, 1999).

Results

In this study, the exterior, fins, gills, eyes and tissue and the interior organs of 86 fish, 38 sea bass (*D. labrax*), 41 blue gray mullet (*C. labrosus*), six seabream (*S. aurata*) and one carp (*C. carpio*), were examined. *Diplectanum aequans* (Wagener, 1857), *Acanthostom sp.*, *Helicometra sp.* and *Contracaecum sp.* were found respectively on gills, following two in the guts and in the body cavity. The amounts and ratios of the parasites have shown in Table 1.

Table 1. Amounts and ratios of parasites.

	TF	<i>Acanthostomum sp.</i>		<i>Contracaecum sp.</i>		<i>Helicometra sp.</i>		<i>D. aequans</i>	
		+	%	+	%	+	%	+	%
Sea Bass	38	26	68.42	1	2.63	10	26.31	30	78.94
Blue Gray Mullet	41	22	53.65	-	-	8	19.51	-	-
Seabream	6	-	-	-	-	-	-	-	-
Carp	1	-	-	-	-	-	-	-	-

Diplectanum aequans, a specific parasite for the sea bass, in the Monogenea class, Platyhelminthes was found on the gills of 30 of the 38 sea bass fish (34.88%). Another two parasites from Platyhelminthes's Trematoda were found on the sea bass and mullet fish. *Acanthostom sp.*, the primary species was found on 26 sea bass fish (68.42%) and on 22 gray mullet (53.65%) making 48 in a total. The other Trematoda, *Helicometra sp.* was found on ten bass (26.31%) and eight mullet (19.51%). Both types of parasites were found in the digestive

tract. *Contracaecum sp.* from nematodes, were found in only one of sea bass body cavity. No parasites were found on the carp and bream species.

Discussion

Diplectanum aequans, specific to seabass, were reported to be found in Norway (Sterud, 2002), Adriatic Sea (Mladineo, 2005), Greece (Vagianou *et al.*, 2006) and in Italy (Dezfuli *et al.*, 2007; Fioravanti *et al.*, 2006). In Turkey the parasite was found by (Oktener *et al.*, 2009) in Vona Bay, and in Ordu at two different seabass

businesses. *Diplectanum aequans* has the highest recorded prevalence at 34.88% for all fish. This parasite was also reported in the other researches such as (Mladineo, 2005) 62.3%, (Dezfuli *et al.*, 2007) 73.6%, (Sterud, 2002) 100% and in Turkey (Oktener *et al.*, 2009) 100%. *Diplectanum aequans* is specific to bass fish, with the ratio of 78.94% is found as most prevalent species. The results obtained by the present study demonstrate a parallel average with findings in other studies.

Acanthostom sp. was identified as the primary species due to the maximum number of fish species effected by the parasite. The parasite was found in 48 of 86 fish (55.8%) in this study, effecting 26 of the sea bass (68.42%) and 22 of the mullet (53.65%). The quantity found for the fall and winter average is 45% in Turkey (Emre, 2010) and has an even higher density in Lake Bafa. However, in a study conducted by Luangpha and friends, the parasite was found in China at a 78% rate.

In this study, *Helicometra sp.* was found in the gut of ten sea bass and eight mullet. The total infection rate was determined to be 20.93% in all fish. The parasite has been found in 26.31% of the sea bass and 19.51% of the mullet. However this was not observed in carp and bream. In a 2012 study, Tepe and friends showed the this parasite at a rate of 15% in the *Scorpaena porcus* (scorpion fish) in the Black Sea in Turkey. In a 2012 study

the parasite has been identified a low ratio of 3.85% near Gökçeada.

Contracaecum sp. was recorded for the first time in *Vimba vimba* fish in Turkey. The parasite species could not be identified since it was at larval period. Adult individuals of this parasite was seen on fish-eating birds and marine mammals. Fish serve as paratenic hosts to this species' larva. *Contracaecum* larvae is usually found as *Contracaecum sp.*, especially from cyprinids into Bream, Rutilus, Alburnus and Barbus species and most commonly have been identified into *Vimba vimba* as helminth parasites. This parasite's larval form was reported by (Aydoğdu *et al.*, 2002), in *Barbus plebejus escherichia* in Doğancı Dam and Selver and (Aydoğdu and Selver, 2005) also reported in Kocadere River. Parasite was found in Black Sea as well (Oytun, 1963). According to (Oktener, 2003), this parasite have also been reported synonymously (*Hysterothylaci sp.*) in different fish species in Turkey.

In this study *Contracaecum sp.* was found at a rate of 1.16% in the total fish, while 2.63% have been found in sea bass fish species. (Selver and Aydoğdu, 2005) was found in a study conducted by the rate and 3.44% in the rudd fish. In the search of (Aydoğdu *et al.*, 2007)'s 4.84% rate was determined in Gölbaşı Dam Lake. (Salgado-Maldonado *et al.*, 2004) have also found similar results. In the light of the other researches the intensity of this species could have considered in low rate.

References

- Aydogdu, A., Altunel, F. and Yildirimhan, H., 2002.** The occurrence of helminth parasites in barbel (*Barbus plebejus escherichi* Stendachner, 1897) of the Doganci (Bursa) Dam Lake, Turkey. *Acta veterinaria*, 525-6, 369-380.
- Aydođdu, A. and Selver, M., 2005.** An investigation of helminth fauna of the bleak (*Alburnus alburnus* L.) from the Mustafakemalpaşa Stream, Bursa, Turkey. *Turkish Journal of Parasitology*, 301, 68-71.
- Aydođdu, A., Emence, H. and Innal, D., 2007.** The occurrence of helminth parasites in vimba (*Vimba vimba* L. 1758) of Golbasi (Bursa) Dam Lake, Turkey. *Turkish Journal of Parasitology*, 321, 86-90.
- Bauer, O.N., 1987.** Key to the Parasites of Freshwater Fishes in the Fauna of the USSR.
- Chubb, J.C., Pool, D.W. and Veltkamp, C.J., 1987.** A key to the species of cestodes (tapeworms) parasitic in British and Irish freshwater fishes. *Journal of Fish Biology*, 314, 517-543.
- Dezfuli, B.S., Giari, L., Simoni, E., Menegatti, R., Shinn, A.P. and Manera, M., 2007.** Gill histopathology of cultured European sea bass, *Dicentrarchus labrax* (L.), infected with *Diplectanum aequans* (Wagener 1857) Diesing 1958 (Diplectanidae: Monogenea). *Parasitology Research*, 1004, 707-713.
- Emre, N., 2010.** Determination of helminth fauna on european sea bass (*Dicentrarchus labrax* 1.1758) in beymelek lagoon Postgraduate Thesis, Suleyman Demirel University, Institute of Science, Isparta, Turkey.
- Fioravanti, M.L., Caffara, M., Florio, D., Gustinelli, A. and Marcer, F., 2006.** A parasitological survey of European sea bass (*Dicentrarchus labrax*) and gilthead sea bream (*Sparus aurata*) cultured in Italy. *Veterinary Research Communications*, 30, 249-252.
- Hoffman, G.L., 1999.** Parasites of North American freshwater fishes, Cornell University Press.
- Mladineo, I., 2005.** Parasite communities of Adriatic cage-reared fish. *Diseases of Aquatic Organisms*, 641, 77-83.
- Müllenhoff, M., Handl, M., Knipping, M. and Brückner, H., 2004.** The evolution of Lake Bafa (Western Turkey)–Sedimentological, microfaunal and palynological results. *Coastline Reports*, 1, 55-66.
- Oktener, A., 2003.** A checklist of metazoan parasites recorded in freshwater fish from Turkey. *Zootaxa*, 3941, 1-28.
- Oktener, A., Koc, H.T. and Erdogan, Z., 2009.** Fish/Parasites interrelationships in Turkey: a review. *Ittiopatologia*, 6, 121-139.
- Oytun, H.Ş., 1963.** Nematodes found in the intestines and muscles of anchovies (*Engraulis encrasicolus*) caught in the Black Sea are

identified as *Contracaecum* sp. A.U. *Journal of Veterinary Fac.*, 10, 201-205.

Salgado-Maldonado, G., Cabañas-Carranza, G., Soto-Galera, E., Pineda-López, R.F., Caspeta-Mandujano, J.M., Aguilar-Castellanos, E. and Mercado-Silva, N., 2004. Helminth parasites of freshwater fishes of the Pánuco river basin, east central Mexico. *Comparative Parasitology*, 712, 190-202.

Selver, M. and Aydoğdu, A., 2005. Occurrence of helminths during Spring and Autumn months on Rudd (*Scardinius erythrophthalmus* L. 1758) from Kocadere Stream

(Bursa). *Turkish Journal of Parasitology*, 302, 151-154.

Sterud, E., 2002. Parasites of wild sea bass *Dicentrarchus labrax* from Norway. *Diseases of Aquatic Organisms*, 483, 209-212.

Vagianou, S., Athanassopoulou, F., Ragias, V., Di Cave, D., Leontides, L. and Golomazou, E., 2006. Prevalence and pathology of ectoparasites of Mediterranean Sea bream and sea bass reared under different environmental and aquaculture conditions. *Israeli Journal of Aquaculture Bamidgeh*, 58, 78-88.