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## First Record of *Piscicola geometra* (Annelida, Hirudinea) on some Species of Cyprinidae from Euphrates-Tigris Basin in Turkey

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### ABSTRACT

The present study was conducted to identify the parasitic infections of *Piscicola geometra*, on three different species of Cyprinidae in two reservoirs of the Euphrates-Tigris basin, Turkey. The investigation was carried out from May to November, 2013 for Dumlu creek and from September, 2014 to April, 2015 for Goynük stream. Fourteen parasites were recorded on seven of the 94 examined fish specimens. This study is to be the first record of *P. geometra* parasitizing on *Capoeta capoeta*, *Alburnus mossulensis* and *Cyprinion macrostomum* for freshwater fish parasite fauna.

**Key words:** *Alburnus mossulensis*, *Cyprinion macrostomum*, *Capoeta capoeta*, dumlu creek, goynük stream, *Piscicola geometra*

### INTRODUCTION

The host fishes *Capoeta capoeta*, *Cyprinion macrostomum* and *Alburnus mossulensis* live in inland water of Eastern Turkey. Of these two species (*C. macrostomum* and *A. mossulensis*) are endemic in Euphrates and Tigris river system (Kuru, 2004). In general leeches (Hirudinea, Piscicolidae) are well known as ectoparasites and they are found nearly anywhere on the external body surface of fish. According to Epstein (2013) the first characteristic of the fish leeches of Palearctic was presented in the key to leeches by Johansson (1896) with additions. This work gives brief appearance characteristics of *Piscicola geometra*. The family Piscicolidae (fish leeches) introducing to the fish parasite fauna, began from publication of Johansson (1896) about "Necessity of studying the anatomy of the fish leeches to construct their classification".

Fish leeches can cause a negative effect on a host health. Undoubtedly, ulceration, hemorrhage and inflammation associated with leech attachment sites weaken the host and may predispose hosts to bacterial infections, tissue damage, osmoregulatory problems and act as vectors of pathogens (Ahne, 1985; Burreson, 2006). *Piscicola geometra* prefers oxygenated waters, mainly wave-washed shores of lakes and in fast-flowing streams and rivers. The aforementioned leeches use an reversible proboscis to penetrate the tissues of the host in order to suck their blood. This kind of leeches can move easily in most cases firmly attaches itself towards the gills or the base of host fins, where it remains for several days until it is satiated and then simply drops off. They can stay as a hunger for a long time. A satiated adult can remain unfed for 3-4 months in temperatures

Table 1: *Piscicola geometra* detected on some freshwater fish in Turkey

Host fishes	Location	Authors
<i>Rutilus rutilus</i>	Sapanca Lake	Soylu (1990) and Karabiber (2006)
	Uluabat Lake	Ceylan <i>et al.</i> (2010)
<i>Scardinius erythrophthalmus</i>	Sapanca Lake	Soylu (1990) and Kahveci (2004)
	Terkos Lake	Demirtas and Senel (2012b)
<i>Blicca bjoerkna</i>	Sapanca Lake	Soylu (1990)
<i>Esox lucius</i>	Sapanca Lake	Soylu (1990)
<i>Barbus rajanorum mystaceus</i>	Keban Dam Lake	Saglam (1992)
<i>Barbus pectoralis</i>	Keban Dam Lake	Ozdemir and Sarieyyuboglu (1993)
	Uluabat Lake	Ozturk (2002)
<i>Tinca tinca</i>	Terkos Lake	Demirtas (2011)
	Sapanca Lake	Demirtas and Senel (2012b), Soylu (1990) and Akbeniz and Soylu (2008)
<i>Abramis brama</i>	Terkos Lake	Karatoy (2004)
<i>Cyprinus carpio</i>	Çavuşçu Lake	Oktener <i>et al.</i> (2007)
	Terkos Lake	Demirtas and Senel (2012a)
<i>Carassius gibelio</i>	Uluabat Lake	Arslan and Emiroglu (2011)
<i>Capoeta umbla</i>	Murat River	Koyun (2011)

of 10-15°C or even as long as 6 months in temperatures as low as 6°C (Mann, 1962). According to Arslan and Oktener (2012) to date, from the parasitic leech species *P. geometra* has been studied from eleven freshwater host fishes in Turkey (Table 1).

The aim of present study was to investigate and identify of *P. geometra* on some freshwater Cyprinid fish, naturally living in Dumlu creek (Karasu River, Erzurum) and Goynük stream (Bingol) from Euphrates-Tigris basin in Turkey.

## MATERIALS AND METHODS

Ninety four samples were caught with gill nets (22-24 mm width) and casting nets, from May, 2013 to November, 2013 at Dumlu creek on Erzurum-Artvin Highway 21th km (40°01'52"N, 41°18'49"E, 1763 m) and from September, 2014 to April, 2015 at Goynük stream, Bingol (38°77'74"N, 40°57'70"E, 992 m) of Euphrates-Tigris basin, Turkey. The sampling area is shown in Fig. 1. Leeches has been examined with stereo microscope to identify the occurrence of *P. geometra*. The parasites were removed with the aid of some tools. First, they were kept in a refrigerator at +4°C for one day to resting and then killed in warm formaldehyde solution of 4% (not boiled), preserved in 70% ethanol for later examinations. Total length and total weight of examined fish and total number of parasites were recorded. Identification of *P. geometra* species was made based on Burreson (2006). The parasite on host fish was also photographed.

## RESULTS

According to the available literature data, 11 host freshwater fish species were infected with this parasite in Turkey given before. In this study, totally 94 host sample were caught, 24 specimens from Dumlu creek and 70 specimens from Goynük stream. The fish were weighed, measured and examined for the presence of any parasites. *Piscicola geometra* was detected on the gill of *Capoeta capoeta* and the other fish (*Alburnus mossulensis* and *Cyprinion macrostomum*) on dorsal, ventral, anal and caudal fins and totally eleven parasite samples were recorded (Fig. 2 and 3). During the study from Dumlu creek and Goynük stream infested fish were found at early spring and autumn seasons. In this time water average temperature in November was 21°C for Dumlu creek and 14°C in March for Goynük stream. The detail data for this study are given in Table 2.

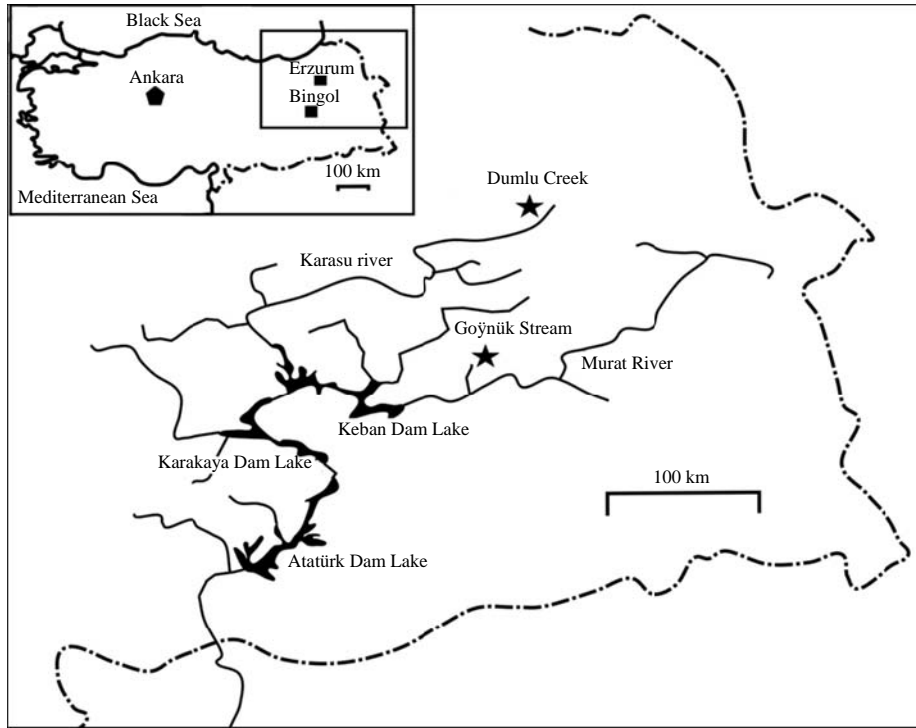


Fig. 1: Study sampling sites of Dumlu creek and Goynük stream from Euphrates-Tigris basin, Turkey



Fig. 2: *Piscicola geometra* on anal fin of *C. macrostomum*



Fig. 3: *Piscicola geometra* on caudal fin of *A. mossulensis*



Fig. 4: *Piscicola geometra* total view

Table 2: *Piscicola geometra* on some Cyprinid fishes from Euphrates-tigris system Turkey

Locations	Studied fish species	MW (g±SE)	ML (cm±SE)	NIF	NTP
Dumlu creek (Erzurum)	<i>Capoeta capoeta</i> (n = 24)	62.60±33.96	18.20±3.96	1	2
Goynük stream (Bingöl)	<i>Alburnus mossulensis</i> (n = 30)	25.28±8.16	14.76±1.76	4	8
	<i>Cyprinion macrostomum</i> (n = 40)	22.12±9.78	12.49±2.14	2	4

MW: Mean weight, ML: Mean length, SE: Standard error, NIF: Number of infected fish, NTP: Number of total parasite

## DISCUSSION

The parasitic leech fauna in aquatic ecosystems still has not been studied sufficiently in Turkey and further studies are necessary. Only there are a few records for *P. geometra* from the eastern and southern parts of Turkey. It is necessary to intensify the studies on parasitic leeches from various lentic or lotic habitats of these different regions of Turkey. *Piscicola geometra* studies in Turkey were reported in only some fish species belonging to Cyprinidae and Esocidae families. Studied fishes (*C. capoeta*, *C. macrostomum* and *A. mossulensis*) in this study are also from Cyprinidae family. In this study, *P. geometra* was given as a first record in three fish species from two different locations (Dumlu creek and Goynük stream). Karatoy and Soylu (2006), in Terkos lake, detected the infestation rate of *P. geometra* on *A. brama* resembles to that of this study. Up to the present, *P. geometra* records in Cyprinus fishes in Turkey were only reported by Oktener *et al.* (2007) and Demirtas and Senel (2012a) in Çavuşçu and Terkos lakes, respectively. Average annual infestation percentages for aforementioned fish (*C. carpio*) were 8.3% in Çavuşçu Lake and 25.9% in Terkos Lake, the percentage reached up to 50% in August with the maximum value. These results for *C. carpio* differed from both our study and data from the other studies related to this parasite.

However, in the same study for *Tinca tinca* were accorded with our study. Because, parasitism of *P. geometra* in fishes was generally reported in seasons that have low water temperature and high dissolved oxygen rate (Mann, 1962). The present study accorded with Table 1 except for *C. carpio* in Terkos Lake (Demirtas and Senel, 2012a). Infestation rates for *P. geometra* were



given from some foreign countries. Willomitzer (1980) worked on *Ctenopharyngodon idella* in Yugoslavia, Opara and Okon (2004) on *Oreochromis niloticus*, which was cultured in South-eastern Nigeria Rainforest ponds and Rolbiecki *et al.* (2009) on a lake-trout (*Salmo trutta lacustris*), Bielecki and Dzika (2000) on roaches (*R. rutilus*) From the lake Ukiel, in Poland.

This study was carried in May, 2013 to November, 2013 in Dumlu Creek and in September, 2014 to April, 2015 in Goynük Stream and first records were given for *P. geometra* in three fish species (*C. capoeta*, *C. macrostomum*, *A. mossulensis*) these belong to Cyprinidae family and we encountered with this parasite only in spring and winter months.

Finding of this parasite in *A. mossulensis* in Goynük Stream on winter season could be proceeded from continually contributing of thermal waters that sustains the temperature of this water source above +10°C. According to the literature review, when leeches live freely, they prefer demersal area of the water and this situation depends on seasonal changing. Mann (1962), therefore, they cannot be detected in highest temperature months of summer and in winters when the water is quite cold, except some fish (*C. carpio* and *A. brama*). These reasons indicate that *P. geometra* has no parasitic effect on fish when the season is too hot and too cold.

Present study shows that *P. geometra*, on three different species of Cyprinidae (*C. capoeta*, *C. macrostomum* and *A. mossulensis*) in the Euphrates-Tigris basin for the first time. Up to this day according to the obtained literature data, 11 host freshwater fish species were infected with this parasite in Turkey given before (Table 1). This study is given in addition to previous studies (Fig. 4).

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