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An investigation on gyrodactylid fauna of *Cobitis simplicispinna* Hanko, 1924 from çıldırım water source, Turkey

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Abstract

In this study, *Gyrodactylus* parasite fauna of 49 *Cobitis simplicispinna* from Çıldırım water source, Turkey were investigated. 267 parasite specimens belonging to the *Gyrodactylus cobitis* were found on the fins and gills of *Cobitis simplicispinna*. General infection prevalence value of the parasite was recorded as 58.0% and the mean intensity value was recorded as 9.2 ± 10.1 . Microhabitat distribution of the parasite species is as follows. While the values of the average parasite intensity on gills and fins were close to each other, the frequency of infection and the maximum number of parasites on fins were found to be much higher than on gills of the host fishes. On the other hand, ectoparasitic fauna of *Cobitis simplicispinna* from the study area, which has not been subjected to any parasitological researches, was examined and one parasitic species determined. Thus, a new locality was added to the global geographical spread of the mentioned parasite species in direction of the present study.

Keywords: *Cobitis simplicispinna*, *Gyrodactylus cobitis*, ectoparasite

1. Introduction

The fishes of the Cobitidae family are living organisms commonly found in freshwater systems in Europe and Asia Minor (Ergens *et al.* 1975 [4], Bohlen and Rab 2001 [2], Moravec 2001 [14], Erk'akan *et al.* 2002 [5], Küçük ve İkiz 2004 [11], İlhan ve Balık 2008 [8], Popiolek 2002 [16], Popiolek and Kotusz 2008 [18], Küçük *et al.* 2009 [12], Karaca *et al.* 2010 [9]).

Until today, there were several studies on parasitic infections of the *Cobitis* genus. It was defined one parasite species, *Allocreadium transversale* in the intestine of *C. taenia* by Robotham and Thomas (1982) [21]. Bauer (1985) [1] prepared a list of protozoan and metazoan parasites of the *Cobitis* genus. *Ligula colymbia*, a flat strip worm, was detected in *Cobitis elongatoides* (Halačka *et al.* 2000) [7]. Six trematode species (*Diplostomum* sp., *Echinostomatidae* sp., *Tylodelphys clavata*, *Posthodiplostomum cuticola*, *Metorchis xanthosomus*, *Allocreadium transversale* and a nematode species (*Rhabdochona ergensi*) were recorded in *Cobitis elongatoides* and *Cobitis taenia*. (Popiolek *et al.* 2003) [17]. Scholz *et al.* (2004) [22] *Neogryporhynchus cheilancristrotus* (cestoda) found in *Cobitis taenia*. Zrnčić *et al.* (2009) [23] found *Gyrodactylus cobitis* and *Ligula colymbi* species in three species of *Cobitis* (*C.elongata*, *C.elongatoides*, *C.bilineata*). *Gyrodactylus cobitis* species was recorded in the gills and fins of *Cobitis simplicispinna* (Kartal ve Öztürk 2009) [10].

The habitats inhabited by fishes of the Cobitidae family are rich in invertebrate fauna and are stagnant or slow-flowing and eutrophic (Geldiay and Balık 1999) [6]. These habitats are the best environments for parasites to survive or complete their development (Marcogliese and Cone 1997) [13]. So, determination of parasitic fauna of *Cobitis* in different environments is important to identify similarities and differences in parasite fauna between local host populations. In this context, ectoparasitic fauna of *Cobitis simplicispinna* in the study area, Çıldırım water source, which has not been subjected to any parasitological researches. The aim of the study is to identify the gyrodactylid parasite fauna of *Cobitis simplicispinna* and contribute to the global geographical distribution of the parasite species.

2. Materials and Methods

Çıldırım water source is located within the geographic borders of the Afyonkarahisar City's Emirdağ County. 49 *Cobitis simplicispinna* specimens were caught with trammel nets, September

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2010 to October 2011. The fish specimens were placed in plastic tanks with local water and transferred to the research laboratory where they were kept in an aquarium. A parasitological examination was carried out within 24 hours: After dispatch the fins, gills and skin were dissected and placed in separate petri dishes with physiological water. To determine the presence of the parasites, all parts were thoroughly examined under a binocular microscope. Parasites which were found on the host fish were removed using a preparation needle. The parasite specimens were fixed in formaldehyde. It was stained with Mayer's haematoxylin (Pritchard and Kruse 1982) [20], and identified using the reference keys of Bychovskaya-Pavlovskaya *et al.* (1962) [3].

3. Results

In this study, ectoparasitic fauna of *Cobitis simplicispinna* Hanko, 1924 in Çıldırım water source stream was investigated. *Gyrodactylus cobitis* Bychowsky, 1933 was found on the fins and gills of *Cobitis simplicispinna*. The average infection prevalence value of the parasite was recorded as 58.0% and the mean intensity value was recorded as 9.2 ± 10.1 . In addition, the maximum number of parasites found in a fish was found to be 40. The distribution of the parasitic species on the gills and fins is given in table 1. According to this, while the values of the average parasite intensity on gills and fins were close to each other, the frequency of infection and the maximum number of parasites on fins were found to be much higher than on gills.

Table 1: Infection values of *Gyrodactylus cobitis* recorded in *Cobitis simplicispinna* Hanko, 1924, from Çıldırım water source (Emirdağ, Afyonkarahisar). N: number of parasitic fishes, infection prevalence (%), M: minimum-maximum number of parasites, mean density and standard deviation.

Parasite Species	Microhabitat	N & (%)	M & (X±S.D.)
	gills	12 (24)	3-14 (7.2±3.7)
<i>Gyrodactylus</i>	fins	24 (48)	1-30 (7.5±7.1)
<i>cobitis</i>	gills & fins	29 (58)	1-40 (9.2±10.1)

4. Discussion

It is known that the species that bring up the current parasite list of the fishes of the Cobitidae is 25 (Bohlen and Rab 2001) [2]. Some parasites such as *Gyrodactylus misgurni* and *Gyrodactylus strelkovi* are specific to *Misgurnus fossilis* and *Misgurnus anguillicaudatus* from cobitidae and are recorded in the gills and fins of the host fish (Popielek and Kotusz 2008) [18]. Similarly, *Gyrodactylus fossilis* on *Nemacheilus angorae*, *Gyrodactylus gobitis* is mostly parasitic on *Cobitis taenia* (Bauer 1985) [1]. On the other hand, some species such as *Gyrodactylus elegans* and *Gyrodactylus medius*, which live as parasites on *Cobitis*, have low host specificity, and these are usually found on cyprinid fishes (Bychovskaya-Pavlovskaya *et al.*, 1962) [3]. Similar to the present study results, Kartal and Öztürk (2009) [10] identified *Gyrodactylus cobitis* on the fins and gills of *Cobitis simplicispinna*. According to Poulin (2007) [19] and Öztürk (2017) [15] local conditions and the biotic or abiotic ecological properties of the geographic location are the main elements effective on parasite communities.

5. Conclusion

In conclusion, determination of parasitic fauna of *Cobitis* in different environments is important to identify similarities and differences in parasite fauna between local host populations. In this context, to day, the parasite fauna of *Cobitis*

simplicispinna in Çıldırım water source, which has not been subjected to any parasitological researches was examined and one parasite species was determined. Thus, a new locality was added to the global geographical spread of the mentioned parasite species in direction of the present study.

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