

Parasites of Some Native Fish from Kaaj River, Chaharmahal Va Bakhtiari Province, Iran

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Abstract: The occurrence of parasites was studied in native fish (*Capoeta capoeta*, *C. damascina*, *Chondrostoma regium*) caught from the Kaaj River, Chaharmahal va Bakhtiari Province, Iran. More than 76 percent of the examined fish were infested with parasites and 7 parasite species were collected including *Ichthyophthirius multifiliis*, *Trichodina* sp., *Myxobolus musayevi*, *Dactylogyrus lenkorani*, *Gyrodactylus* sp., *Allocreadium isoporum* and *Rhabdochona* sp. The highest infection rate was found in *C. damascina* with mean of 81.6%. The infection rate was significantly different in four seasons ($p < 0.05$) although no significant difference was found among fishes with different weight and length.

Key words: Fish Parasite • Kaaj River • Chaharmahal va Bakhtiari Province

INTRODUCTION

The study on Iran's fishes parasites dates back to 1949, when Bychowsky [1] reported three *Dactylogyrus* species and one *Ancyrocephalus* on the gills of fishes in Karkheh River. Since then other researchers have reported more parasites from Iranian freshwater fish [2-7]. Parasites in fish have been a great concern since they often produce disease conditions in fish which will lead to an increase in the fishes' susceptibility to other diseases, causing nutritive devaluation of fish as well as fish loss. Kaaj River which is located in Chaharmahal va Bakhtiari Province, West Iran is one of the small branches of Karoon River which finally along with Karoon River joins Persian Gulf. The aforementioned river has been paid little attention disregarding its ecologic and economical importance. Ichthyofauna of the River comprises native fishes including genus *Capoeta* and *Chondrostoma*. No previous study on ichthyofauna and parasitofauna of fishes in Kaaj River was carried out. This study was done to study the parasites in fish from Kaaj River, Chaharmahal va Bakhtiari Province, Iran.

MATERIALS AND METHODS

A total of 152 fish specimens from 3 species including *Capoeta aculeata* (n=74), *C. damascina* (n=60),

Chondrostoma regium (n=18) were examined between autumn 2011 and summer 2012. Fishes caught by local fisherman using gill nets then were carried alive to the laboratory in aerated tanks of water. In the laboratory, each specimen was individually measured for the length, weight and age (Table 1). Identification of the fish species was made according to Coad [8]. Parasitology investigation was done in Fisheries Research Center, IAU, Shahrekord. For this purpose, external surfaces of individuals including skin and fins were examined for ectoparasites using a stereomicroscope. Gills were examined for monogenean and protozoan parasites immediately after the fish was taken out of water. The buccal cavity, opercula and eyes were examined separately. Internal organs (heart, liver, spleen, gall bladder, digestive tract, gonads, swim bladder and kidney, as well as the entire body cavity and mesentery) were inspected for free or encapsulated parasites by compressing between glass plates and examination for parasites. The intestine was also opened longitudinally and was inspected carefully under stereomicroscope and light microscope. The parasites were preserved in 4% formaldehyde or 70% alcohol (Digenea, Cestoda and Crustacea), in a mixture of ammonium picrate and glycerin (Monogenea) or in a mixture of glycerin and alcohol (Nematoda). Parasites were identified in accordance with the diagnostic keys [9-12], using a light microscope.

Table 1: Age, weight and length of studied fishes

Fish species	No. of fish	Weight (g)		Age (yr)		Total length (cm)	
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		Range	Mean±SD	Range	Mean±SD	Range	Mean±SD
<i>Capoeta aculeata</i>	74	49-520	156.6±107.5	1-3	1.6±0.6	16-39	22.8±5.4
<i>Capoeta damascina</i>	60	38-560	172.8±117.8	1-3	1.7±0.8	11-41	23.8±6.6
<i>Chondrostoma regium</i>	18	37-163	70.9±38.2	1-2	1.2±0.4	15-23	18±2.7

Table 2: Parasites of fishes in Kaaj River

Parasite group	Parasite species	Host	Infected Organ
Ciliophora	<i>Ichthyophthirius multifiliis</i> Fouquet, 1876	<i>Capoeta aculeata</i> <i>Capoeta damascina</i> <i>Chondrostoma regium</i>	Gill and skin
Myxozoa	<i>Myxobolus musayevi</i> Kandilov, 1963	<i>Capoeta aculeata</i>	Gill
Monogenea	<i>Dactylogyrus lenkorani</i> Mikhailov, 1967	<i>Capoeta aculeata</i> <i>Capoeta damascina</i>	Gill
	<i>Gyrodactylus</i> sp. Diesing, 1850	<i>Capoeta damascina</i>	Gill
Digenea	<i>Allocreadium isoporum</i> Loss, 1894	<i>Capoeta aculeata</i> <i>Capoeta damascina</i>	Intestine
Nematoda	<i>Rhabdochona</i> sp. Dujardin, 1845	<i>Capoeta aculeata</i> <i>Capoeta damascina</i> <i>Chondrostoma regium</i>	Intestine

An analysis of variance (ANOVA) among the sampling seasons, biometric characteristics and host species was performed in order to test for the differences in parasite abundance between different fishes.

RESULTS

A total of 7 species in 3 fish species was recorded including: *Ichthyophthirius multifiliis*, *Trichodina* sp., *Myxobolus musayevi*, *Dactylogyrus lenkorani*, *Gyrodactylus* sp., *Allocreadium isoporum* and *Rhabdochona* sp. Biometric characteristics of studied fishes are shown in table 1 and the parasites, their hosts and prevalence for each species are presented in Table 2. A total of 117 fish (76.9%) out of 152 studied fish were infected with parasites. The highest infection rate was observed in *C. damascina*, 81.6% (49/60) and the lowest was in *C. regium* with 22.2% (4/18). The infection rate in *C. aculeata* was 78.3% (58/74). The most frequent species was *Dactylogyrus lenkorani*, found infecting both *C. damascina* and *C. aculeata*.

Infection rate was 87.5, 55, 74, 88.8% for autumn 2011, winter 2011, spring 2012 and summer 2012, respectively with a statistical difference ($p < 0.05$). No statistical relation was found between infection with age and biometric characteristics of fish host and parasitic infection.

DISCUSSION

This research is aimed to study parasite fauna of fish from Kaaj, Chaharmahal va Bakhtiari Province, West Iran for the first time. The results show that fishes are

infested with 7 parasite species (5 external parasites and 2 intestinal parasites). The results showed that 117/152 studied fish (76.9%) are infested with parasites. The infection rate was significantly higher in *C. damascina*. The difference in infection rate in studied fish species may be due to differences in biology, nutrition, behavior of fish and also environmental conditions. There are different views on the effect of length and weight of the fish on parasitic infection rate. In some studies, smaller fishes had more parasitic infection rate [13-15] while some other researchers believe infection rate increases with increasing weight and length [16, 17]. In this study no statistical relation was found between the infection rate and biometric characteristics of the examined fish in this study.

In this study 2 species of monogenea (*Dactylogyrus lenkorani* and *Gyrodactylus* sp.) were found in the studied fish. Monogenea is the group that has presented the greatest number of species so far. Monogeneans are a diverse group of parasites that exhibit a relatively high degree of host specificity comparing to other groups of parasites [18]. The selection of certain host species by monogenean must be involved mainly with factors in the host surface. Thus, chemical stimuli emitted from the host, mechanical and behavioral mechanisms have been suggested to explain this host specificity [19, 20]. *D. lenkorani* is specific to genus *Capoeta* and had been collected from *C. aculeata* and *C. damascina* before [7, 12]. This parasite is also reported from *Barbus lacerta* [9]. In this study the parasite was collected from both *C. aculeata* and *C. damascina*.

Low specific parasite *Ichthyophthirius multifiliis* was also found in 3 studied species fish. The disease due to *I. multifiliis*, commonly known as "Ich" or white spot disease (Ichthyophthiriasis), is widespread and has been reported from different countries [21]. Ichthyophthiriasis is recognized as one of the most pathogenic diseases of fish resulting in significant economic losses in the affected fish species [22]. Severe damages of the gills and skin epithelium occur due to the break of the parasites through host skin and gill during infection. This damage might lead to concession of osmoregulatory process and ion regulation leading eventually to death of host fish [23, 24]. For example, natural outbreak of the Ich was blamed for the deaths of 18 million *Orestias agassii* in Lake Titicaca, Peru [25]. High infection rate to this parasite will have negative influence on native fish population.

To understand the role of the community of parasites in an ecosystem, previous knowledge of the species composing them is required. Continuing such studies using taxonomic and systematic approaches is the key to understanding of how biotic and abiotic factors affect fish species, since there is no way to understand the effects on native fish population without knowing the parasites species.

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