Evaluation of parasite fauna in Fish of Alborz Dam

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Abstract In this study on fish parasites of Alborz Dam in Iran, 202 fish were caught in years 2010–2011. Caught fish include *Leuciscus cephalus*, *Alburnoides bipunctatus*, *Neogobius flaviatilis*. Samples transferred alive to Babol University lab and after investigate, these parasites were identified. One species of Protozoan (*Ichthyophthirius*), 4 genus of Monogen (*Gyrodactylus. Sp*, *Dactylogyrus. sp*, *Diplozoon. sp*, *Paradiplozoon. Sp*), one species of Cestode (*Bothriocephalus gow kongensis*) and one genus of nematode (*Rhabdochona. Sp*). All of these above parasites were found for first time from Alborz Dam in Iran. *Rhabdochona* genus was reported from *Alburnoides bipunctatus* and *Bothriocephalus gowkongensis* species was reported from all 2 fish species for the first time. Percentage of Pollution was higher on spring season on fish species (79.2 %). Pollution percentage was higher in *Leuciscus cephalus* than other fish species (28.7 %). Besides the fish were examined in this study had lower species diversity but a high percentage of parasites was seen in investigated fish.

Keywords Parasite · Fish · Alborz Dam · Iran

Introduction

Aquaculture development in today's world and economy of various countries has an important role in the human food supply. One of the main conditions for suitable production is fish health and prevents disease among them, including parasitic diseases that affect the behavior of fish growth and reduce marketable yields. So recognizing these factors is essential to eliminate or minimize these problems (Seyed Mortezaei et al. 2000).

Dams have an essential role in the water supply for drinking and agricultural purposes and their importance is about society health and hygienic. Alborz dam is gravelly with 150 tank volume million/m³ and useful volume 116 million/m³ placed on Babolrod River on Confluence point of Gazo and Chackani branches. This region has a humid climate and contamination of fish in the water resources are considered because of the transmission risk to humans or other animals. Most native fish on this dam belong to *Cyprinidae* that they are the biggest family on fish with 210 genus and 2,010 species (Gholami 2009).

Researches on marine like Parasitology field isn't great antiquity and research activity of parasitology about fresh water fish of Iran back to Jalali 1998 were studied on fish parasites and were reported large numbers of them (Jalali 1998).

Because, until now there wasn't any study on fish contamination on this area, especially about parasite factors that directly or indirectly effective on human or fish health and hygiene, therefore, this study attempts to identify ways to prevent and control factors that if cultured farms constructed, this information could be help in order to avoid financial losses and increase production efficiency and consistent basic steps.

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Materials and methods

Area study

In this study that was taken in one year, from autumn 2010 to summer 2011 on Alborz Dam, Babol city (Latitude 36n14 and longitude 52e48, Mazandaran state, North of Iran).

Sampling method

202 fish samples were caught with gillnet trap and transferred alive to the lab with plastic tub. Samples were included *Neogobius fluviatilis*, *Leuciscus cephalus*, and *Alburnoides bipunctatus*.

In the laboratory, after fish identification, measure the total length and sex determination was performed by conventional autopsy methods. To study the parasite, the necessary tests were taken on the skin, gills, gut of the fish and parasites were isolated. Isolated Parasites were fixed by 70 % ethanol and formalin 10 % and painted by the storkarman color. We were used Lactophenol solution to clear nematodes, Azokarman solution for cestode and Azokarman colors for trematodes. At the end, the parasites were identified with diagnosis keys of Khalil and Jones and Moravec books (Khalili and Jones 1994; Moravec 1994).

Result

In a survey conducted on 202 fish, including 102 *Leuciscus cephalus*, 98 *Alburnoides bipunctatus*, 2 *Neogobius fluviatilis*, one type of protozoan parasite of *Ichthyophthirius* genus, 4 genera of Monogeneas (*Gyrodactylus*,

Dactylogyrus, *Diplozoon*, *Paradiplozoon*), one genus of *Rhabdochona* nematode and *Bothriocephalus gowkongensis* parasite, were separated, that.

Bothriocephalus gowkongensis parasite was reported for the first time from *Leuciscus cephalus* and *Alburnoides bipunctatus*. Names and characteristics of the studied fish species and their infection rate in each season were shown in Tables 1 and 2, respectively.

The results indicate that a higher percentage of infection was in spring (79.2 %) in fish; also infection in *Leuciscus cephalus* was higher than the other species.

All of these parasites were reported for the first time in Iran from Alborz dam. *Bothriocephalus gowkongensis* was reported from all above fish and *Rhabdochona* parasite from *Alburnoides bipunctatus* for the first time.

Discussion

Certainly, Fish contamination issues, particularly parasitic infections in fish is effective in stocks changes in water resources, considering that restructuring of natural resources through introducing new fish species to extract more fish to supply a portion of the protein needs to be fully felt, so detailed studies of parasitic infections in fish species has important role (Mirhashemi Nasab and Pazooki 2002).

In this study Infestation to *Dactylogyrus*. *Sp.* had high percentage (16.6 %) on *Leuciscus cephalus* in summer, which is considered as one of the most dangerous parasites on *Alburnoides bipunctatus* from Siahrood River (Pazooki et al. 2007).

Alburnoides bipunctatus with 23.8 % had a higher percentage of foreign-parasite infestation.

Gyrodactylus. *sp* that cause severe corrosion of the caudal fin, anal and dorsal and was reported by (Pazooki et al. 2004) from *Alburnoides bipunctatus* in Sajarood river placed in Zanzan state.

Paradiplozoon parasites were seen just in summer on *Leuciscus cephalus* and *Alburnoides bipunctatus*. The parasite is characterized by the presence of four pairs of hook bonding in the structure of their opisthaptor that is look like X. This parasite was reported by (Mirhashemi Nasab and Pazooki 2002) from Makoo and Mahabad Dam (Gholami 2009; Mirhashemi and Pazooki 2002).

Ichthyophthirius parasitic protozoa were isolated from the fish that Pollution to this parasite had a higher percentage on *Leuciscus cephalus* in spring. These parasites are Prevalent in reared cyprinidae in farms and had global emissions and was reported by (Mehdipour et al. 2004) from Zayanderood River on *Leuciscus cephalus* and by (Masoumian et al. 2002) from *Alburnoides bipunctatus* in Aras Dam placed in Azarbaiejan gharbi state.

From *Nematods*, *Rhabdochona* separated from *Leuciscus cephalus*. This parasite lives in intestine, liver, abdominal area, muscles and blood vessels and was reported by (Pazooki et al. 2007) from Tajan River Pazooki and Aghlmandi (2002).

Table 1 Names and characteristics of the studied fish species in Alborz dam 2010–2011

Host scientific name	Catch place	Catch fish total number	Medium length (cm)
<i>Alburnoides bipunctatus</i>	Alborz dam lake	98	9–13
<i>Leuciscus cephalus</i>	Alborz dam lake	102	12–18
<i>Neogobius fluviatilis</i>	Alborz dam lake	2	13

Table 2 Studied fish total number and infection rate in each season

Season	Studied fish total number	Fish length	Infected fish number	Infection percentage
Autumn 2010	50	9.2–16	9	18
Winter 2010	51	10–18	14	27.4
Spring 2011	53	10–17	42	79.2
Summer 2011	48	10.4–18	35	72.9

Among cestodes *Bothriocephalus gowkongensis* was separated from *Leuciscus cephalus*, *Alburnoides bipunctatus*, which this parasite has not been reported from mentioned fish until now and was, reported in *Negobius fluviatilis* in Alborz dam (Hosseinifard 2011). This cestode is the most dangerous warm water fish parasites that severe infection with the parasite causes intestinal obstruction or perforation it. Fortunately, the chemical treatment of contaminated fish can be fought to the cestode. However, due to the large Volume of water in the dam and the use of water as a source of drinking water can't action this affair (Jalali Jafari 1998).

Totally, the most pollution observed on spring with rate 79.2 %. For one of the reason for increasing pollution in spring can be pointed to increased fish feeding. Also, the most pollution was reported on *Leuciscus cephalus* with rate 28.7 %. On this study the pollution on fish with bigger size was more than the other type, and one of the reasons is that biggest fish live in the deeper area during most of their life time, that Crustaceans such as amphipod and decapod are abundant in the bed and they are the origin of the pollution with cephalus and cestode in fish (Mortazavi Kafshgari 2007).

Considering that, one of the hypotheses of this research was that Parasitic infections has less diversity and more intensity on closed environment, we understand correctness of this hypotheses on this study and specified that examined fish had less parasite diversity, but intensity of parasitic infection had high percentage among examined fish.

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