

External Parasitic Worms and Protozoans of the Fish Caught in Shapour River and Seyyed Hossein Spring in Kazerun, Iran

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Abstract

In this study, 38 fish in four species of Shapour River and Seyyed Hossein Spring were caught in 2016, including: *Alburnus mossulensis*, *Cyprinion macrostomum*, *Capoeta barroisi persica* and *Garra rufa* and they were studied for external worm parasites and protozoans. Totally, 10 species of parasites were isolated and recognized, including: five species of monogenes (*Dactylogyrus alatus*, *Dactylogyrus carassobarbi*, *Dactylogyrus pulcher*, *Dactylogyrus holciki* and *Gyrodactylus* sp.), one species of digenes (*Centrocestus* sp.), one species of crustacean (*Lamproglena* sp.), two species of protozoan (*Ichthyophthirius multifiliis*, *Chilodonella* sp.) and one species of Myxozoa (*Myxobolus* sp.). The results showed that the highest percent of parasitic infection was for *Dactylogyrus carassobarbi* and the least amount was reported for *Lamproglena* sp. and *Myxobolus* sp. Moreover, *Capoeta barroisi persica* and *Alburnus mossulensis* had the highest and lowest percent of parasitic infection, respectively. There wasn't any meaningful relationship between the infection of different species of the fish and their infected organs ($P > 0/05$).

Keywords: Protozoa, Metazoa, Seyyed Hossein Spring, Shapour River, Fish

Introduction

Parasites in fish have been a great concern since they often produce disease conditions in fish which will lead to reduced growth, increase in the fishes' susceptibility to other diseases as well as fish loss. Parasites may be the cause of growth reduction, fatality, delayed puberty or infertility in the fish and they are often the reason for microbial, viral and fungal diseases. In some cases, parasites are the cause of high fatality of the fish (Abbasi, 2003). Studies on parasites of Iranian fish species date back to 1949, when Bychowsky reported three *Dactylogyrus* species and one *Ancyrocephalus* on the gills of fishes in Karkheh River. Since then other researchers reported more parasites from Iranian freshwater fish. Various studies have been conducted with respect to the study of parasite infection of freshwater fish in Mesopotamian and the other areas in Iran. The freshwater fish in western and southern areas belongs to Mesopotamian area which is located in Iraq, Turkey and Syria (Jalali, 1998). The most important studies in this area are as: Mortezaei et al, (2000) on parasite infection of freshwater fish in Hoorolazim and

Shadegan Sun, Farahnak et al, (2002) in Khuzestan Basins, Abbasi et al, (2003) and Barzegar et al, (2004) studying parasites of the Behesht Abad River, and Raissy et al, (2009) in identifying the parasites of 3 kinds of *Barbus capito* in Kiar and Behesht Abad Rivers in Chahar Mahal and Bakhtiari Basins. The importance of the identification of the parasites is that, on one hand, a large group of animals are studied and different kinds of parasites as infecting a host could be recognized and on the other hand, they can infect the farmed fish, as well.

Shapour River originates from Ranjan Spring and connects Sasan Spring in Tange Chowgan area and flows toward Bushehr. In Bushehr, this river touches Dalaki River and then finally joins Persian Gulf called Hilla River. Shapour River is very vital in Kazerun, providing this area's water which is consumed for agriculture. Seyyed Hossein Spring is located twenty-three kilometers away in Kazerun Road. The fish species in this river have nutritional value and are caught recreationally or for eating, thus recognizing their parasite gamut is very essential and this study has been carried out accordingly. This study, therefore, aimed at detecting the occurrence of parasites in fish in Shapour River and Seyyed Hossein Spring, Kazerun Province, with regard to the importance of native fish population in the river.

Material and Methods

Early morning, the fish were caught using gillnet and Sachuk Net and they were transferred alive to the Laboratory of Parasitology, Faculty of Veterinary Medicine, Islamic Azad University, Kazerun and were kept in the aquarium. The fish were anaesthetized using *Eugenia* sp. solution of 170 ppm (Rastiannasab et al, 2014). Immediately after anesthesia, they were identified based on recognition keys of Berg (1964), and Coad (1992). Their eyes, skin and gills were then examined for parasitological information. Using an optical microscope, the sample of their gills and skin was studied in order to separate metazoan parasites. The parasites were picked by Pastor Pipette and through using Ammonium Picrate, they were fixed on a slide following Fernando et al, (1972) and Gussev (1983) instructions. Identification of the kinds of isolated monogenes was based on recognition key by Gussev (1987). After gills' sampling, using Fernando et al, (1972) instruction in order to identify the protozoans, the sample was fixed and they were recognized using Lom and Dykova (1992) specification clue. Stabilizing and clearing parasite samples were performed using Fernando et al, (1972) instructions. In this study, the data were processed using SPSS 18 software. The frequency and one-way ANOVA were used to compare the infection among different kinds of fish and the organs.

Results

Totally, 10 external parasites were isolated from the skin and gill of 4 fish species caught in the river. They were identified for their sex and species, including: five Monogenes (*Dactylogyrus holciki*, *Dactylogyrus pulcher*, *Dactylogyrus carassobarbi*, *Dactylogyrus alatus*, frequency 65.7 %), (*Gyrodactylus* sp., frequency 31.5 %). one Digene (*Centrocestus* sp., frequency 31.5 %), one crustacean (*Lamproglena* sp., frequency 10.5 %), 2 protozoans (*Ichthyophthirius multifiliis* and *chilodonella* sp., frequency 21% and 13.1%, respectively) and one Myxozoa (*Myxobolus* sp., frequency 10.5 %). Therefore as the results showed, *Dactylogyrus carassobarbi* demonstrated the highest and *Lamproglena* sp. and *Myxobolus* sp. presented the lowest frequencies. The highest infection was detected in *Capoeta barroisi persica* with 100 % frequency and the least infection was observed in *Alburnus*

mossulensis with 60 percent frequency. The average intensity of infection in *Capoeta barroisi persica* with 2.74 (± 2.43), *Cyprinion macrostomum* with 2.9 (± 4), *Alburnus mossulensis* with 0.72 (± 1.24), and *Garra rufa* with 0.48 (± 0.48) was calculated. Using one-way ANOVA, the infection among different kinds of the fish and the infected organs was evaluated. As the findings showed, no meaningful relationship was detected ($P > 0/05$).

Table 1 represents data related to the isolated parasites, their isolated organs and hosts. Diagram 1 and 2 represent the amount of infection identified in fish under study, and also the frequency percentage of the isolated parasites. Diagram 3 represents the infection average.

Table 1. Isolated external metazoan and protozoans of the fish in Shapour River and Seyyed Hossein Spring based on the infected organ and its host

| Parasite | Infected Organ | Fish Species |
|-------------------------------------|----------------|---------------------------------|
| <i>Ichthyophthirius multifiliis</i> | Gill | <i>Capoeta barroisi persica</i> |
| <i>Dactylogyrus pulcher</i> | | |
| <i>Centrocestus sp.</i> | | |
| <i>Myxobolus sp.</i> | | |
| <i>Ichthyophthirius multifiliis</i> | Skin | |
| <i>Dactylogyrus carassobarbi</i> | | |
| <i>Gyrodactylus sp.</i> | | |
| <i>Chilodonella sp.</i> | | |
| <i>Ichthyophthirius multifiliis</i> | Gill | <i>Alburnus mossulensis</i> |
| <i>Dactylogyrus alatus</i> | | |
| <i>Dactylogyrus holciki</i> | | |
| <i>Chilodonella sp.</i> | | |
| <i>Myxobolus sp.</i> | | |
| <i>Ichthyophthirius multifiliis</i> | Skin | <i>Cyprinion macrostomum</i> |
| <i>Dactylogyrus carassobarbi</i> | | |
| <i>Gyrodactylus sp.</i> | | |
| <i>Chilodonella sp.</i> | | |
| <i>Centrocestus sp.</i> | Gill | |
| <i>Ichthyophthirius multifiliis</i> | | |
| <i>Chilodonella sp.</i> | | |
| <i>Myxobolus sp.</i> | | |
| <i>Lamproglana sp.</i> | Skin | |
| <i>Ichthyophthirius multifiliis</i> | | |
| <i>Dactylogyrus carassobarbi</i> | | |
| <i>Gyrodactylus sp.</i> | | |
| <i>Chilodonella sp.</i> | Gill | <i>Garra rufa</i> |
| <i>Dactylogyrus alatus</i> | | |
| <i>Gyrodactylus sp.</i> | Skin | |

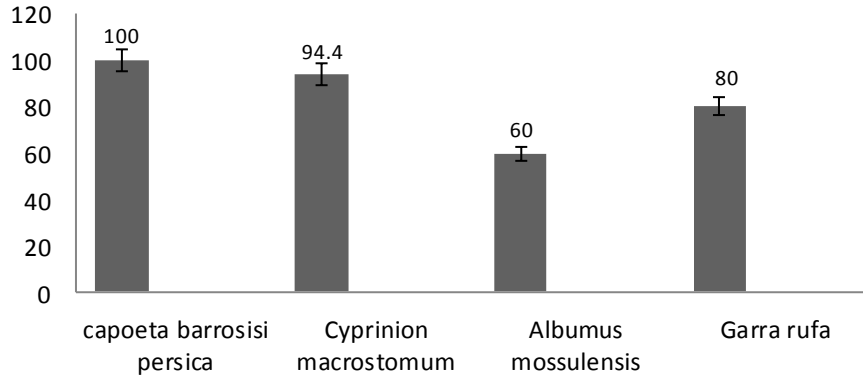


Diagram 1. Infection Percent of the Fish Caught in Shapour River and Seyyed Hossein Spring

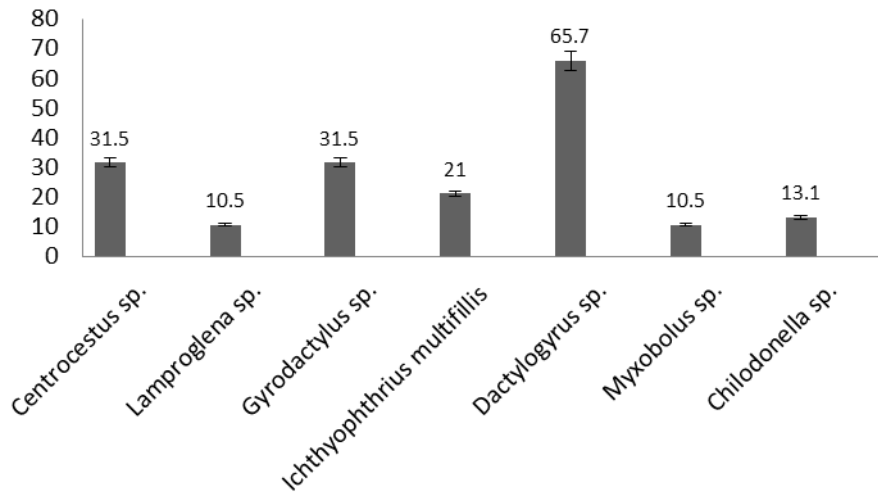


Diagram 2. Infection Frequency Percent of the isolated Parasites of the Fish in Shapour River and Seyyed Hossein Spring

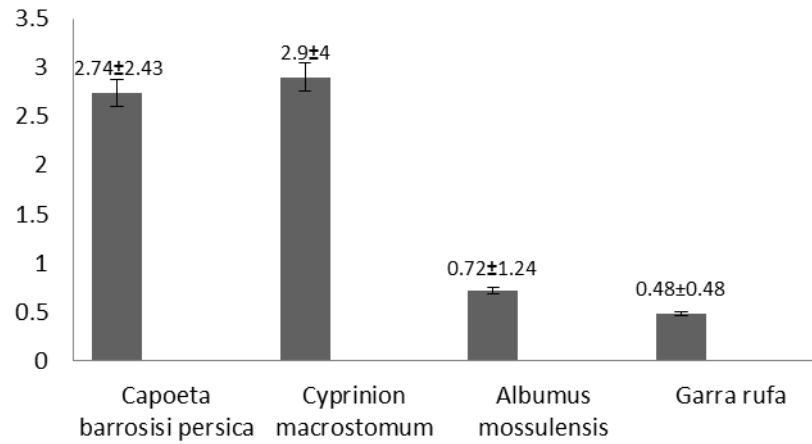


Diagram 3. The Average Intensity of the Infected Fish in Four Studied Groups



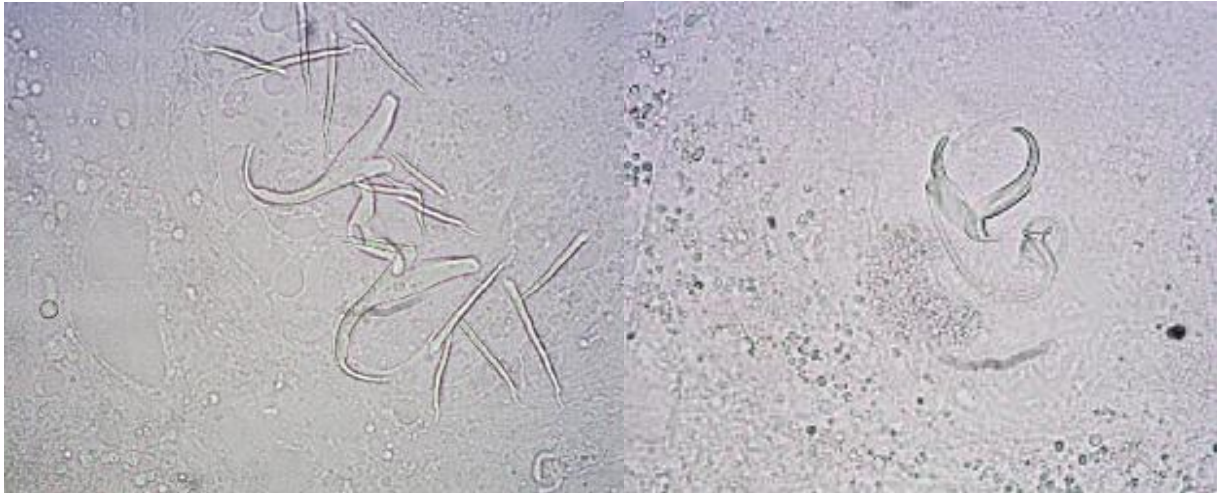
Figure 1. *Gyrodactylus* sp. (×3000)



A: Main Hook and Mini Hooks

B: Sexual Organ

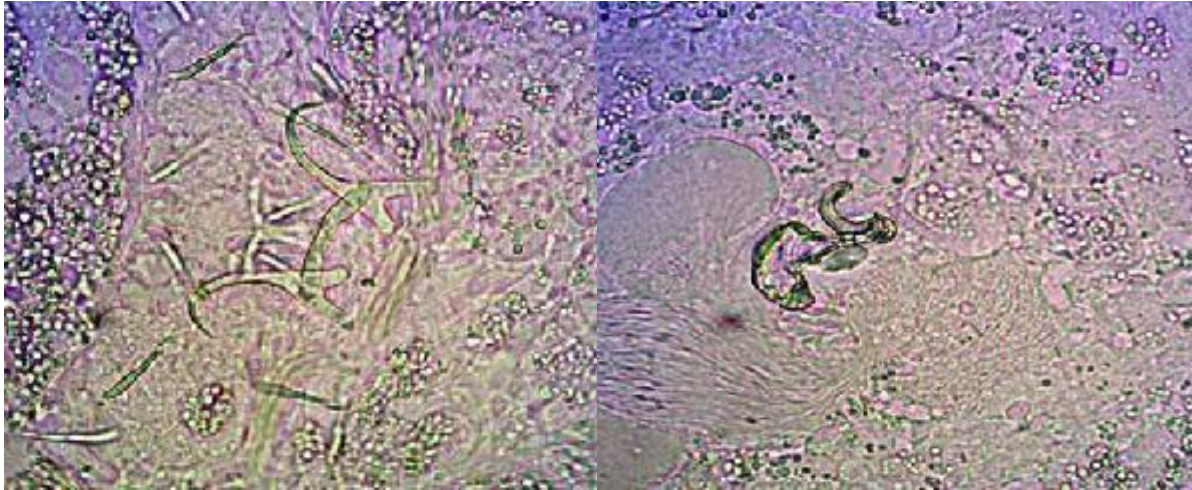
Figure 2. *Dactylogyus* sp. ($\times 7500$)



A: Main Hook and Mini Hooks

B: Sexual Organ

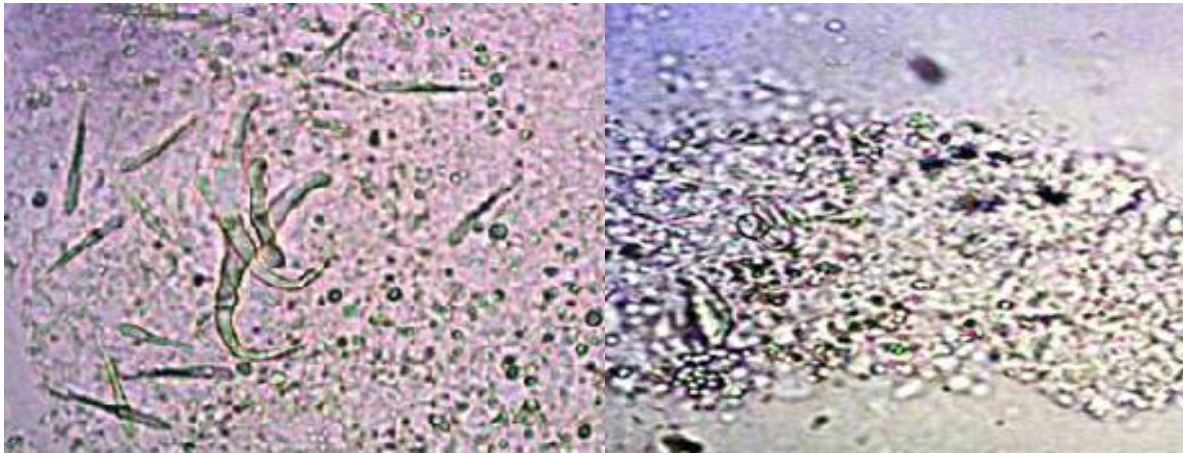
Figure 3. *Dactylogyus carassobarbi* ($\times 3000$)



A: Main Hook and Mini Hooks

B: Sexual Organ

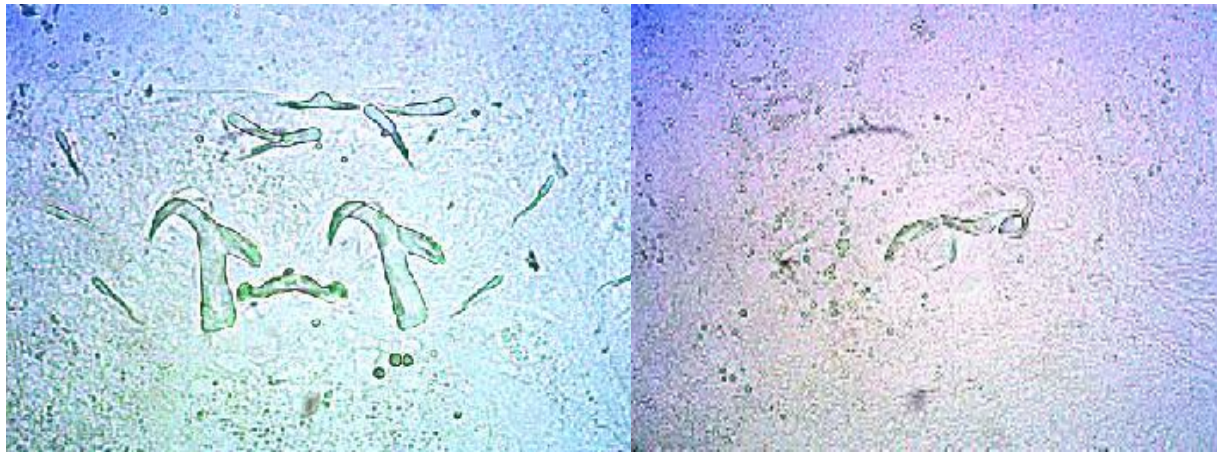
Figure 4. *Dactylogyrus holciki* (×3000)



A: Main Hook and Mini Hooks

B: Sexual Organ

Figure 5. *Dactylogyrus pulcher* (×3000)



A: Main Hook and Mini Hooks

B: Sexual Organ

Figure 6. *Dactylogyrus alatus* (×3000)



Figure 7. *Myxobolus* sp. (×3000)

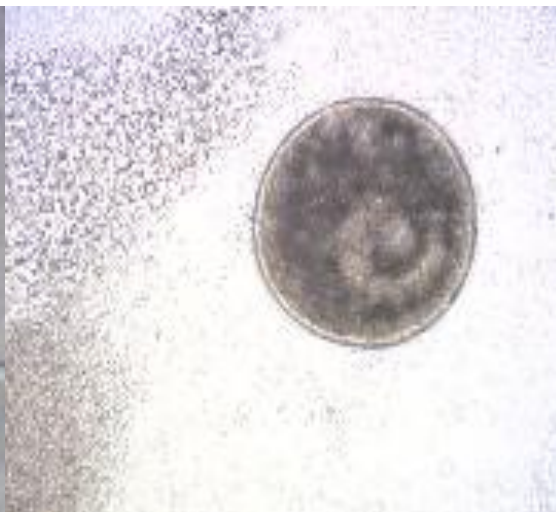


Figure 8. *Ichthyophthirius multifiliis* (×750)



Figure 9. Metacercaria of the *Centrocestus* sp. (×3000)



Figure 10. Cystic Stage of the *Centrocestus* sp. (×3000)



Figure 11. *Lamproglena* sp. (×40)

Discussion

Throughout the time, a balanced condition would be developed among parasites and the host in natural environments, but in high fish density in cultural and environmental stressful conditions, parasites would make many problems for the reproduction (Bush et al, 2001) and despite parasitic infection of the fish, no clinical signs of the disease were observed which confirm the balance of parasite and the host in natural environments. Among the reported parasites in this study, a Ciliated Protozoan (*Ichthyophthirius multifiliis*) is found to be very important. This parasite lacks the host specificity and infects different species of the fish and kills them or decreases their growth.

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