Occurrence of parasites in selected fish species in Gandoman Lagoon, Iran

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Abstract

This study was carried out to investigate occurrence of parasites in selected cyprinid fish species in Gandoman Lagoon, in the vicinity of Gandoman City, Chaharmahal and Bakhtyari Province. A total of 90 fish specimens, including *Cyprinus carpio, Carassius auratus gibelio, Capoeta aculeata*, *C. damascina, Chondrostoma regium* and *Alburnus alburnus* from Gandoman were examined during spring and summer 2007. Ten species of parasites were found, including *Ichthyophthirius multifiliis, Trichodina* sp. (Cilliophora), *Myxobolus musayevi*, *Myxobolus* sp. (Myxozoa), *Dactylogyrus extensus*, *D. lenkorani* (Monogenea), *Diplostomum spathaceum*, *Tylodelphys clavata* (Digenea), *Argulus foliaceus* and *Lernea cyprinacea* (Crustaceans). 77.7% of fishes were infected to at least one of these parasites.. *Chondrostoma regium* and *Alburnus alburnus* are reported as new hosts for *D. extensus,* in the present study.

Keywords: Fish parasites, Gandoman Lagoon, Chaharmahal and Bakhtyari, Iran.

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Introduction

Study on parasites of Iranian fishes dates 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 (Eslami and Mokhayer, 1977; Williams et al., 1980; Mokhayer, 1981 Jalali and Molnar 1990; Molnar and Jalali, 1992 Jalali et al., 2000; Malmberg et al., 2007. In addition to the rivers, various parasites have been reported from reserves and lakes in Iran (for example, Rouhani, 1995; Fadaei et al., 2001; Barzegar and Jalali, 2004 Jalali and Barzegar, 2006 Raissy et al., 2006; 2007; 2010a, b). Gandoman Lagoon is a small freshwater body with an area of 900 ha in western Iran (Mesopotamian sub region, Tigris basin) which is situated in Chaharmahal and Bakhtyari Province, close to the Gandoman City. The existence of the Lagoon is mostly dependent upon the quantity of water coming up through natural spring from the Lagoon's bottom. Ichthyophauna of the Lagoon comprises native fishes and two non-native fish species including *Cyprinus carpio* and *Carassius auratus gibelio* which have entered from the neighboring Lagoon, Choghakhor Lagoon. These two species have been introduced to Choghakhor Lagoon previously. No previous study on ichthyofauna and parasitofauna of fishes in Gandoman Lagoon was carried out. The aim of the present study was to investigate parasitic infections in fishes of Gandoman Lagoon.

Materials and methods

Fishes were caught by gillnet and bagnet by local fishermen during spring and summer 2007 and were transported alive to the laboratory. In total 90 fish specimens belonged to five genera and six species were examined, including *Cyprinus carpio, Carassius auratus gibelio, Capoeta aculeata*, *C. damascina, Chondrostoma regium* and *Alburnus alburnus*. Methods used for collecting, fixing, staining and mounting of parasite specimens were according to standard protocols (Fernando et al., 1972; Gussev, 1983; Lom and Dykova, 1992). Parasites were identified according to Gussev (1985); Bauer (1987); Jalali (1997); Kabata (1988) and Shulman (1990). Identification of the fishes was according to Berg (1964) and Abdoli (1999).

Results

In total ten protozoan and metazoan parasites were found in/on 6 species of fishes inhabiting in Gandoman Lagoon (Table 1). The collected parasites were shown in Figures 1-8.

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Table 1: Parasitic fauna in Gandoman Lagoon according to this study

Host	Number of fish	Parasites	Infected organ	Percent of infected fish
Alburnus alburnus	7	*Dactylogyrus extensus* (Mueller and van Clive, 1932)	Gills	85.7
		Diplostomum spathaceum (Rudolphi, 1819)	Lens	85.7
Capoeta aculeata	13	*Dactylogyrus extensus* (Mueller and van Clive, 1932)	Gills	64.1
		Tylodelphys clavata (Von Nordmann 1832)	Vitreous humor of eyes	61.5
		Copepodid stage of *Lernea cyprinacea* (Linnaus,1758)	Gills	61.5
Carassius auratus gibelio	23	*Dactylogyrus extensus* Mueller and van Clive, 1932	Gills	65.2
		Myxobolus sp. (Buetchli, 1882)	Gills	17.3
		Argulus foliaceus (Muller, 1785)	Gills	56.2
Chondrostoma regium	14	*Ichthyophthirius multifiliis* (Fouquet, 1876)	Gills	28.5
		Trichodina sp. (Ehrenberg, 1838)	Skin	85.7
		Dactylogyrus extensus (Mueller and Van clive, 1932)	Gills	21.4
Cyprinus carpio	15	*Dactylogyrus extensus* (Mueller and Van clive, 1932)	Gills	100
		Tylodelphys clavata (Von Nordmann 1832)	Vitreous humor of eyes	33.3
		Copepodid stage of *Lernea cyprinacea* (Linnaus,1758)	Gills	40
Capoeta damascina	18	*Ichthyophthirius multifiliis* (Fouquet, 1876)	Gills	55.5
		Myxobolus musayevi (Kandilov, 1963)	Gills	33.3
		Dactylogyrus lenkorani (Mikhailov, 1967)	Gills	77.7

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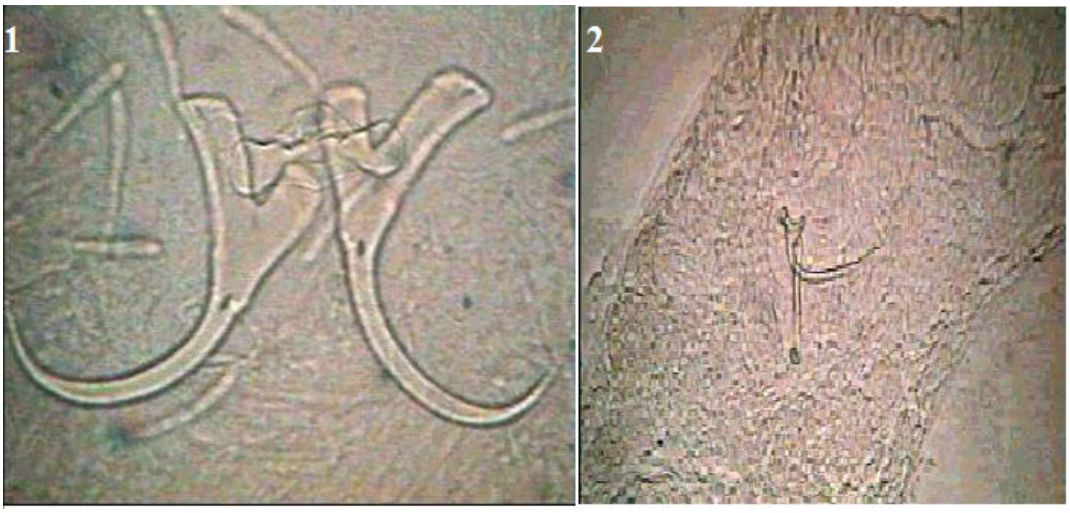

Figure1: Anchors of *Dactylogyrus extensus* (X 320)
Figure 2: Reproductive organ of *Dactylogyrus extensus* (X 244)

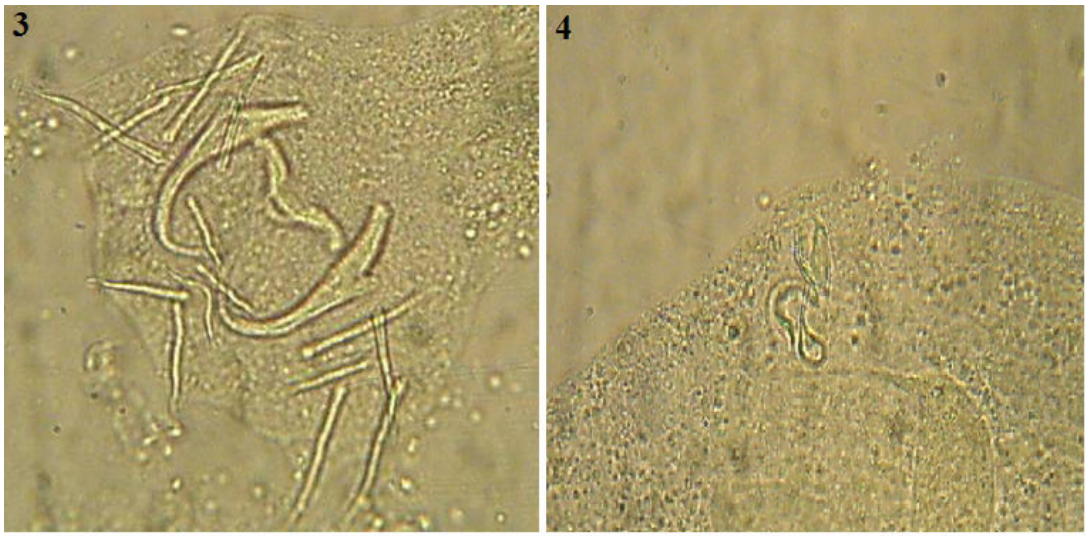

Figure 3: Anchors of *Dactylogyrus lenkorani* (X 298)
Figure 4: Reproduction organ of *Dactylogyrus lenkorani* (X 142)



Figure 5: *Trichodina* sp. (X 186)
Figure 6: *Myxobolus musayevi* (X 769)

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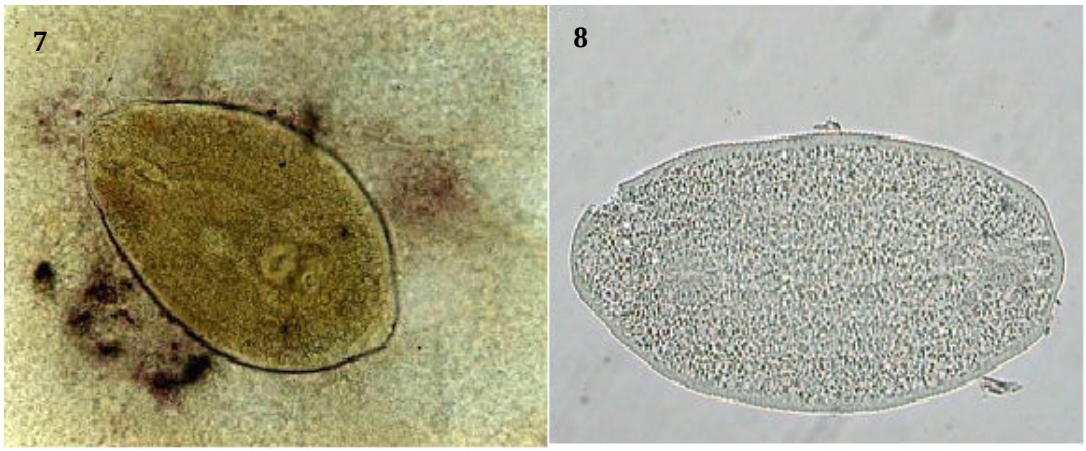

Figure 7: Metacercaria of *Diplostomum spathaceum* (194 X)
Figure 8: Metacercaria of *Tylodelphys clavata* (165 X)

Discussion

In total 10 parasitic species were collected from studied fishes and 77.7 percent of fishes had parasitic infection. The mean percent of parasitic infection in native and introduced fishes was 80 and 71.42 percent, respectively which shows higher rate of infection compare to native fishes. All samples of two native fish *Capoeta aculeata* and *Alburnus alburnus* were infected at least to one parasite species. This high rate of infection may have adverse impact on the population of native fishes in the future. Infection with monogenean parasites was observed in all species of studied fish. Although infection with *Dactylogyrus* is not a fatal danger for host fish in many cases occurrence of monogeniasis in a non specific host can be considered as a rare phenomenon. *Dactylogyrus extensus* is typically belonged to the Caspian region which entered to Gandoman Lagoon trough introduced fish species, such as *Cyprinus carpio* and *Carassius auratus* and could infect a non-specific host (new family, new genus and new species). *D. extensus* which is a specific parasite of *Cyprinus carpio* was found in three native fishes including *Capoeta aculeata*, *Alburnus alburnus* and *Chondrostoma regium*. This parasite had been reported from different fish species previously (Gibson et al., 1996) and from *Capoeta aculeata* (Raissy et al., 2006) in Choghakhor Lagoon which is located in the same region. It shows that the parasite can spend at least a part of its life in these fishes. Although only a few fishes were infected with this parasite but occurrence of parasitosis by exotic parasitic species which are specific to cyprinids may endanger the population of native fishes in Gandoman Lagoon and will reveal the on-going dangers to the Lagoon in near future. Two digenean parasites *Diplostomum spathaceum* and *Tylodelphys clavata* were also collected from studied fishes. *Diplostomum* is now widespread throughout Iran (Masoumian, 2001; Pazooki, 2007 and Barzegar et al., 2008) and has been reported frequently from fishes in different areas of Iran, such as neighboring lagoons, Choghakhor and Sooleghan Lagoon (Raissy et al., 2007 , 2010b). The other species, *Tylodelphys clavata* was reported for the first time in 2007 in the fishes of Choghakhor Lagoon

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by Raissy et al. (2007) and was collected from vitreous humor of eyes in 3 native and introduced fishes. It seems that flying the fish eating birds between two Lagoons has an important role in transmission of the metacercaria to the new environment, Gandoman Lagoon. More than 85% of *Alburnus* fishes were infected to *Diplostomum spathaceum* and the percent of infection with *Tylodelphys clavata* was 61.5 and 40 percent in *Capoeta aculeata* and *Cyprinus carpio*, respectively. The high rate of infection with digenean parasites should be considered as a danger for the fishes of Lagoon. The other important parasite can cause mortality in fishes is *Lernaea.* The percent of infection with this parasite ranged from40 to 61.5 in *Capoeta aculeata* and *Cyprinus carpio*, respectively. Although only copepodid stage of parasite was found in fishes but transforming the copepods to adult form in warm seasons and the sever skin lesions of the adult Lernaea is memorable.

In general, it can be stated that introduction of exotic species to a new habitat is bringing controversial results while there is no doubt on positive influence of some introduced fishes in aquaculture. The situation is more complicated in natural water bodies. There are however some examples of unsuccessful fish introduction in new areas. In these cases, parasites introduced by already new fish attach to endemic fishes more severely than those already exist in place. Some sorrowful instances can prove these statements. (Dogiel et al., 1961) described that Caspian sturgeon introduced the monogenean *Nitzschia sturionis* after being transferred to the Aral Sea which caused heavy mortalities in the endemic sturgeon and almost exterminated the whole population. Although introducing non native fish species to new habitat such as lakes will encourage fishery activities but the influence of the exotic fishes on the environment should be studied before and the possibility of parasitic transmission should be considered.

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