

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

Raissy M.^{1*}; Ansari M.²; Lashkari A.¹; Jalali B.^{3†}

Received: April 2009

Accepted: August 2009

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 *Lerneia 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.

1- Faculty of Veterinary Medicine, Islamic Azad University- Shahrekord Branch.Iran.

2- Young Researchers Club, Islamic Azad University- Shahrekord Branch, Iran.

3-Department of Aquatic Animal Health and Diseases, Faculty of Veterinary Medicine, Islamic Azad University- Science and Research Branch, Tehran.Iran.

*Corresponding author's email: mehdi.raissy@iaushk.ac.ir

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. Ichthyofauna 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.

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

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

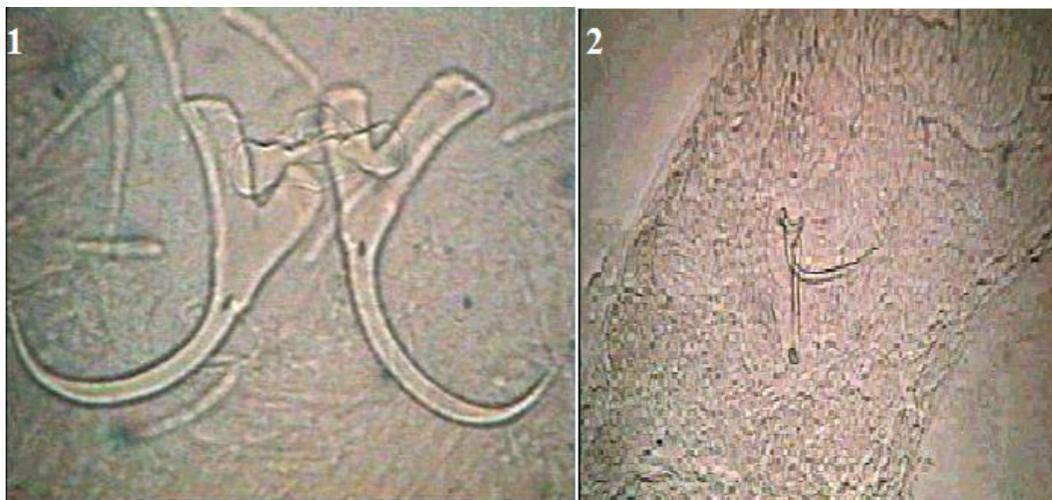


Figure 1: Anchors of *Dactylogyrus extensus* (X 320)

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

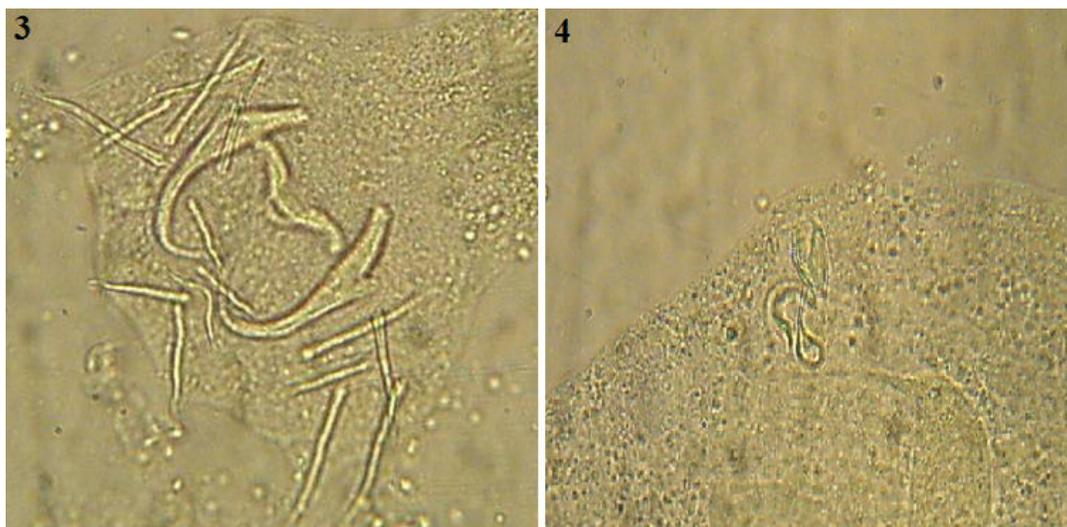


Figure 3: Anchors of *Dactylogyrus lenkorani* (X 298)

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



Figure 5: *Trichodina* sp. (X 186)

Figure 6: *Myxobolus musayevi* (X 769)



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

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 from 40 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.

References

- Abdoli, A., 1999.** Inland water Fishes of Iran. Naghshe mana publications, pp. 38-54. (In Persian)
- Barzegar, M. and Jalali, B., 2004.** [Helminthes, Acanthocephala and crustacean parasites of fishes in Vahdat reservoir]. *Iranian Journal of Veterinary Sciences*, 2(3), 229-234. (In Persian)
- Barzegar, M., Raissy, M., and Jalali, B., 2008.** Parasites of the eyes of brackish and freshwater fishes in Iran. *Journal of Veterinary Research and science*, 9(3), 256-261.
- Bauer, O. N., 1987.** Key to the Parasites of the Freshwater Fish Fauna of the USSR. Vol. 3. Parasitic Metazoans (Second Part). Izdat. Nauka, Leningrad, pp. 300-312 (In Russian).
- Berg, L. S., 1964.** Freshwater Fishes of USSR and adjacent countries. Vol. 3. Nauka, pp. 123- 139.
- Bychowsky, B. E., 1949.** Monogenetic trematodes of some fish of Iran collected by E. N. Pavlowsky. *Trudi Zoologicheskovo Instituta Akademiya*, 8(4), 870-878.
- Dogiel, V.A., 1961.** Ecology of parasites of freshwater fishes, In V.A. Dogiel., G.K. Petrushevski and Y.U.I.

- Polanski (eds): Parasitology of fishes. Boyed, pp. 214-216.
- Eslami, A., Anwar, M., and Khatiby, S.H., 1972.** Incidence and intensity of helminthoses in pike (*Esox lucius*) of Caspian Sea (Northern of Iran). *Ichthyopathology*, 7(1), 23-31.
- Fadaei, F., Mokhayer, B., and Ghorbani, H., 2001.** [Identification of fishes and their parasites in Choghakhor Lagoon]. *Journal of Faculty of Veterinary Medicine*. University of Tehran. 56(3), 109-113. (In Persian)
- Fernando, C. H., Furtado, J. I., Gussev, A. V., and Kakong, S. A., 1972.** Methods for the study of fresh water fish parasites. University of Waterloo. Biology series. PP. 23-24.
- Gibson, T., Feeva, A. T., and Grasev, I. P., 1996.** A catalogue of the nominal species of the monogenean genus *Dactylogyrus* (Diesing, 1850) and the host genera. *Systematic Parasitology*. 35, 3-48.
- Gussev, A. V., 1983.** The methods of collection and processing of fish parasitic monogenean. *Nauka*, 114-116. (In Russian)
- Gussev, A. V., 1985.** Parasitic metazoan. Class monogenea. In O.N. Bauer (ed.): [Key to the parasites of freshwater fishes of the USSR]. Vol. 2, *Nauka*, Leningrad, pp. 96-98 (In Russian).
- Jalali, B., and Molnar, K., 1990.** Occurrence of monogeneans in freshwater fishes of Iran. I. *Dactylogyridae* from fish of natural waters and description of *Dogielius mokhayeri* n.sp. *Parasitology*. 23, 27-32.
- Jalali, B., 1997.** [Parasites and parasitic diseases of freshwater fishes of Iran]. Iranian fisheries research organization, pp. 105-112. (In Persian)
- Jalali, B., Shamsi, S., and Molnar, K., 2000.** New *Dactylogyrus* species (Monogenea, Dactylogyridae) from cyprinid fishes of the Bahu-Kalat River in Southeast Iran. *Acta Parasitologica*. 45, 289-294.
- Jalali, B., Barzegar, M., Shamsi, S., 2001.** Occurrence and redescription of *Dactylogyrus sphyrna* Linstow 1878 (Monogenea: Dactylogyridae) on the gills of an Iranian endemic fish *Leusiscus persidis* Coad 1981 as a new host. *Iranian Journal of Fisheries Sciences*. 2(2), 71-76.
- Jalali, B., and Barzegar, M., 2006.** Parasites of fishes in Zarivar Lake. *Journal of Agricultural Science and Technology*. 8, 45-58. (In Persian)
- Kabata, Z., 1988.** Copepoda and Branchiura. In: L. Margolis and Z. Kabata, 1988: Guide to the Parasites of Fishes of Canada. Part 2, Crustacea. Canadian Special Publication of Fisheries and Aquatic Sciences, pp. 81-96.
- Lom, J and Dykova, I., 1992.** Protozoan Parasites of Fishes. *Developments in Aquaculture and Fisheries Science*. Elsevier Science, pp. 108-114.
- Malmberg, G., Collins, C.M., Cunningham, C.O. and Jalali B., 2007.** *Gyrodactylus derjavinoidea* (Monogenea, Platyhelminthes) on *Salmo trutta* and *G.derjavini* Mikailov, 1975 on *S. caspius*, two different species of *Gyrodactylus*-combined

- morphological and molecular investigations. *Acta Parasitologica*, 52(2), 89-103.
- Masoumian, M., Mehdizadeh, J., and Mokhayer, B., 2001.** Study on parasitic infestation of *Rutilus rutilus caspius* in south east of Caspian Sea. *Iranian Journal of Fisheries Science*, 4, 61-74.
- Mokhayer, B., 1981.** Habitat of spiny eel in Iranian water with a note on their helminthic infection. *Journal of Faculty of Veterinary Medicine. University of Tehran*, 36, 35-48. (in Persian)
- Molnar, K. and Jalali, B., 1992.** Further monogeneans from Iranian freshwater fishes. *Acta Veterinaria*, 40, 55-61.
- Pazooki, J., Masoumian, M., Yahyazadeh, H. M., and Abbasi, K., 2007.** Metazoan parasites from freshwater fishes of northeast Iran. *Iranian Journal of Fisheries Science*, 9, 25-33.
- Raissy, M., Barzegar, M., Alimardani, K. and Jalali, B., 2006.** [Parasites of gills of fishes in Choghakhor Lagoon and introducing *Dactylogyrus spiralis* in Common carp]. *Iranian Journal of Veterinary Sciences*, 1(3), 411-418. (in Persian)
- Raissy, M., Barzegar, M., and Jalali, B., 2007.** [Worm parasites of fishes in Choghakhor lagoon and introducing *Tyloodelphys clavata*]. *Iranian Journal of Veterinary Sciences*, 4(4), 251-258. (in Persian)
- Raissy, M., Ansari, M., and Jalali, B., 2010a.** [Parasites of three species of *Capoeta* spp. From Beheshtabad River, Iran]. *Journal of veterinary pathobiology*, 1(1), 38-43. (in Persian)
- Raissy, M., Fadaeifard, F., Ansari, M., Tajizadegan, H., and Hosseini, R., 2010b.** [Parasites of fish in Sooleghan Lagoon]. *Veterinary Journal of Islamic Azad University, Garmsar Branch*, 5 (1), 143-148. (in Persian)
- Rouhani, M., 1995.** Study on Infestations and parasitic diseases in Sistan area. Proceedings of the 2nd convention of Iranian veterinary clinicians. Page.109. (in Persian)
- Shulman, S.S., 1990.** Myxosporidians of the USSR. Scientific program for Russian translation, pp. 36-49.
- Williams, J. S., Gibson, D. B. and Sadeghian, A., 1980.** Some helminth parasites of Iranian freshwater fishes. *Journal of Natural History*, 14, 685-699.