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RESEARCH ARTICLE

PREVALENCE OF HELMINTH INFECTION IN *CYPRINUS* SP FROM DAL LAKE OF KASHMIR VALLEY

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ABSTRACT

The aim of this study which was to determine the parasites of carp *Cyprinus spp* inhabiting the Dal Lake of Kashmir valley. During the study, a total of 24 common carps were caught in different regions of Dal Lake and investigated parasitologically. On examining 11 fish were found positive to harbour cestodes *Adenoscolex* and *Bothriocephalus* from the intestines; trematode *Diplozoan* from gills and acanthocephala *Pomphorhynchus* from Intestine. Highest prevalence was shown by cestodes (93.9%) followed by trematodes (4.1%), and acanthocephalan (1.8%) in succession. Maximum mean intensity and abundance has been shown by *Adenoscolex* and *Bothriocephalus* (18.3 & 8.4) while the trematode *Diplozoan* was on the 2nd rank (0.81% & 0.37%). On the other hand, the least intensity and abundance was shown by acanthocephalan *Pomphorhynchus* (0.36 & 0.16). The parasitization showed a significant positive relationship with size of the fish, while very small fishes were nearly free of parasites, this exhibit a correlation with feeding habits of the fish.

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INTRODUCTION

Carp the most common fresh water fish of India is considered as one of the most important fish for nutrition and high market value. Diseases affect the normal health conditions and cause reduction in growth, abnormal health condition and thus result in great economic loss. Health of any population depends on the control of disease and maintenance of a healthy relationship between living organisms and their environment (Snieszko, 1983). Hence to obtain healthy and quality fish meat, it is necessary that the fish should be free from all types of pathogens. Parasites of fish constitute one of the major problems to fish health. Besides the direct losses caused by mortality, parasites have considerable impact on growth, resistance to other stressing factors, susceptibility to predation, marketability and pave way for secondary infections. The normal growth of fish is interrupted or inhibited if they are heavily infected with parasites. Fishes usually have mixed infection of parasites. The degree of damage by infection is influenced to a large extent by the type and number of parasites present. Helminth is a big group of fish parasites belonging to Trematodes (monogeneans and digeneans), cestodes, nematodes and acanthocephalans which attack the

fish both as external parasites (monogenean, few digeneans) and internal parasites. Dogiel (1964) suggested factors that directly influence parasitic fauna of fish include age, diet, abundance of fish, interdependence of members of parasitic fauna within the fish and the season. The influence of parasites in relation to the length of fish has been described by many workers (Amin 1986; Zaman et al. 1986; Jha and Sinha 1990, Shomorendra et al.2005, 2007). Besides this, Bhuiyan et al. (2007), Banu et al. (1993), Chandra et al. (1997) worked on seasonal variations in the population of a single helminth parasite associated with a particular host fish. From India, there are scattered studies on the occurrence of helminth parasites in the fish *L. rohita* (Tripathi 1959, Gussev 1976, Malhotra and Chauhan 1984). Bilqees and Khan (1990) reported *Laciotocus rohitali* (Trematoda: Monorchidae) from *L. rohita* collected from Kalri lake, Sind, Pakistan. As far as the community of helminth parasites in other fresh water fishes is concerned, there is a considerable study from neighbouring countries. The fishes which have been screened from parasitological point of view were *Heteropneustes fossilis* and *Clarias batrachus* (Ahmed and Sanaullah 1977), *Nandus nandus* (Golder et al., 1987), *Anabas testudineus* (Akhter et al. 1997), *Gudusia chapra* (Khanum et al., 2006), *Cyprinus carpio* (Tekin-Ozan et al. 2008) and *Mystus armatus* (Jalali et al., 2008) and *Rita rita* (Khanum et al., 2008). The helminth infections in fish have been studied extensively in Kashmir valley (Chisti and Peerzada 1998; Dhar and Peerzada 1989;

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Chishti and Ahmed 2004; Ahmed and Chishti, 1994 and 2000). The present study was carried to study parasitic infections, including their identification, their prevalent frequencies, mean intensity and host specificity with regard to *Cyprinus carpio* in the Dal Lake of Kashmir Valley.

MATERIALS AND METHODS

During the present study 24 specimen of carps including 14 *Cyprinus carpio* and 10 *Cyprinus spicularis* fish were collected from Dal lake in Kashmir valley.. The fish were weighed and morphometric measurements of fish were conducted to compare the differences between infected and uninfected. The fish were separated according to their sex and length. For the collection of endoparasites the fish was dissected in tray and their visceral organs like stomach, intestine and air bladder, besides muscles were examined for helminth parasites. All the collected parasites were processed using standard techniques while the identification of parasites was performed using standard keys and catalogues (Yamaguti 1958, 1961, 1963a, b and 1971). In case of acanthocephalans, collected parasites were thoroughly washed with saline and kept in distilled water to facilitate complete eversion of the proboscis. The parasites kept over glass slides were flattened under slight pressure of cover glass, fixed in carnoys fixative and after 24 hours preserved in glycerified 70% alcohol. Relative parameters were measured and identification was performed using selected identification keys (Bhattacharya, 2007; Yamaguti, 1958, 1961, 1963, 1971). For calculation of prevalence, intensity and abundance, the following formulae were applied.

$$\text{Prevalence (\%)} = \frac{\text{No. of Infected fish} \times 100}{\text{Total No of fish examined}}$$

$$\text{Mean Intensity (Unit)} = \frac{\text{No of collected parasites}}{\text{No, of infected fish}}$$

$$\text{Abundance (unit)} = \frac{\text{Number of parasites}}{\text{No of fish examined}}$$

RESULTS

During the present study, from 24 *Cyprinus* sp, the helminth parasites belonging to cestodes, trematodes and acanthocephala were recorded from the intestines and gills. Out of 24 specimens of *Cyprinus* sp. studied, 11 were infected showing parasitic infection with the prevalence of 45.8%. The helminth infection picture is depicted in Table 1 and 2. With a recovery of 215 parasites, as many as 206 parasites were recovered from the intestine and 09 from gills. The parasite population comprised cestodes, trematodes, and acanthocephalans. Highest prevalence was shown by cestodes (18.75%) followed by trematodes (10.41%), acanthocephalans (2.77%) in succession. As far as the mean intensity and abundance of the parasite species is concerned, the maximum was shown by cestodes, followed by trematodes and least by acanthocephalan (Table 3). The parasitization was recorded more in female fish than the male throughout the study period. In winter months (November—December and January), the occurrence of parasites was either nil or very less. The percentage of infection has been found to differ as per length groups of infected fishes, viz., up to 10 cm, within 11–15 cm and above 15 cm. In general, the percentage of infection was found more in the fish above 15 (cm) and next to it the fishes between 11 and 15 cm.

DISCUSSION

In the present investigation the parasitic infection in the fish *Cyprinus* comprised cestodes- *Bothriocephalus*, *Adenoscolex*; Trematode-*Diplozoan* and Acanthocephala- *Pomphorhynchus*. Further, the highest prevalence was shown by *Adenoscolex* followed by *Bothriocephalus*, *Diplozoan* and *Pomphorhynchus* in succession. Among acanthocephalan the highest number of *Pomphorhynchus* observed in the study can be attributed to its wide host range (Chishti and Peerzada, 1998). *Bothriocephalus* spp. commonly referred as the Asian fish tapeworm has spread from Asia throughout Europe and parts of North America (Riggs and Esch.1987).

Table 1. Prevalence of helminth infection in *Cyprinus* spp

Fish species	Total No	Infected Fish	Uninfected Fish	Prevalence
<i>Cyprinus carpio</i>	14	8	6	57.1%
<i>Cyprinus spicularis</i>	10	3	7	30%
Total	24	11	13	45.8%

Table 2. Parasitic load in *Cyprinus* spp

Class	Parasites	Site	Number
Cestode	<i>Adenoscolex</i>	Intestine	187
	<i>Bothriocephalus</i>	Intestine	15
Trematode	<i>Diplozoan</i>	Gills	09
Acanthocephala	<i>Pomphorhynchus</i>	Intestine	04
Nematode	Nil	Nil	Nil
Total No, of parasites			215

Table 3. Mean Intensity and Abundance of Parasites

No.of fish examined	No. of fish Infected	Parasites	Total no of parasites	Abundance	Mean Intensity	
24	11	Cestodes		8.4	18.36	
		<i>Adenoscolex</i>	187			
		<i>Bothriocephalus</i>	15	202		
		Trematodes		0.37	0.81	
		<i>Diplozoan</i>	09			
		Acanthocephala		0.16	0.36	
		<i>Pomphorhynchus</i>	04			

The infection of *Bothriocephalus* and *Adenoscolex* has been reported to be highest in summer and high in large size. This shows an increasing trend in the prevalence of the parasites according to length of fish. The present study of helminth parasites in *Cyprinus* sp are in line with those of Hossain *et al.* (1994a,b), Hafizuddin and Shabuddin (1996), Akhter *et al.* (1997), Parween and Rahman (2000), and Alam *et al.* (2006) who have made attempts to explore the fauna of helminth parasites of freshwater fish. Based on the observations as gathered in the present study, the occurrence of maximum infection in rainy season and minimum in winters can be explained on the basis that during summer and rainy season the food possibility was found more than in the winter season and temperature was also high. Due to this reason the movement of the fish was increased and muddy situation made more polluted environment for the fish to acquire infection. There can be no doubt that the parasite fauna is relation with the host's diet. The common carp fed mainly detritus, plankton, algae, higher plants (including seeds), aquatic vertebrates (e.g. insect larvae, worms, crustaceans and snails) (Hoole *et al.*, 2001). The choice and composition of carp's food is very important for the formation of the helminth fauna in this fish and this is considerably influenced by local conditions. The parasitization showed a significant positive relationship with size of the fish, while very small fishes were nearly free of parasites, this exhibit a correlation with feeding habits of the fish.

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