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Parasitic Infection with *Cirrhina mrigala* (Hamilton) Collected from Rajshahi, Bangladesh

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Abstract

The parasitic infection was studied on *Cirrhina mrigala,* an indigenous major carp in different water bodies of Rajshahi district during April 2006 to January 2007. A total of 83 specimens of *C. mrigala* were examined during the study period of which 74 fishes were observed to be infected by numerous protozoan and metazoan parasites. A total number of 3063 parasites were recorded from the infected fishes. Ten different parasitic genera, *Trichodina, Myxobolus*, *Chilodonella, Ichthyophthirius, Dactylogyrus, Gyrodactylus, Fellodistomum, Eucreadium, Camallanus* and *Argulus* were identified from the hosts sampled. Among them seven were cetoparasites and three were endoparasites. Parasites were collected from different body parts of the fishes. Most of the parasites were collected from external body surfaces and gills. Prevalence, intensity and abundance of the infection with parasites were varied to different length groups of the hosts and months of the year. In case of length, the medium sized fishes were more infected than the maximum sized and their prevalence, intensity and abundance were highest. Infection rate was lowest in larger size fish group. In seasonal variation, the maximum infection was observed in pre-winter and the lowest number was recorded in rainy season.

Key words: Parasitic infection, *Cirrhina mrigala*, Prevalence, Intensity, Abundance.

Introduction

Bangladesh abounds in plenty of aquatic resources, Fishery resources are the second export item which contributes about 4.86% of the gross domestic products (GDP) and 4.36% of foreign exchange of Bangladesh. In spite of rich aquatic resources of Bangladesh, fish production cannot achieve the target level due to some problems. Among the problems, the most important is the diseases and parasitic infection of the fishes that cause deterioration of the fish production to some extent.

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With the development of agriculture, greater attention has also been given to fish culture in freshwater and brackish water. Fishes are subjected to various parasitic diseases (Tripathi, 1975). The parasites generally attack fishes largely and destroy them by making wounds or diseases on their flesh and thus making them inedible. Recent physiological studies on nutritional requirements of parasites have indicated that the depletion of the host's nutrients by parasites may have some serious consequences (Cheng, 1964).

Protozoan and metazoan infections frequently occur in adult and juvenile carps and some cultural fish species in many nurseries Heavy parasitic infestation of fishes cause hyperirritability, heavy nucous secretion, discoloration and many other disease syndromes. The parasitism may become so severe that causes high mortalities and great economic losses.

Cirrhina mrigala is one of the most important indigenous carp fishes. It is nutritious, delicious, attains high market value and its fry and fingerlings are easily available. This fish may be infected by different parasities diseases that reduce its production. The fish parasites may cause fish mortality in culture fisheries where the entire population of pond may be destroyed, resulting in gross loss of potential food and economic loss to the culturists (Sood, 1970). The success of the implementation of various fishery development programmes depends on the intensification of the fish parasitological research, because increase in fish yield can mainly be achieved from healthy fish stock (Srivastava, 1975). Hence, the study of the fish parasitology is important both from the turning point of fishery management and checking the spread of human and animal diseases for which fish may act as carriers.

Materials and Methods

Period and methods of sample collection

The present investigation was conducted in the period of April 2006 to January 2007. During the collection period, a total of 83 live specimens or freshly dead *Cirrhina mrigala* were collected as hosts from different places of Rajshahi City. These fishes were mainly caught from the adjacent beels, rivers and ponds. The collected specimens were kept in the shopping bags and transported to the Fisheries Research Laboratory, Department of Zoology, University of Rajshahi for detailed investigation.

Length grouping of host fishes

The collected host fishes were divided into three groups according to their length, smaller (<20 cm), medium (20-30 cm) and larger (>30 cm). This grouping was done to depict a clear picture of relationship between the length of fishes and parasitic infestation.

Examination on host fishes for detecting parasites

Detailed examination was made on the collected fishes. Firstly, the external surface of the host body including scales, fins, skin, fin base etc. were examined by magnifying glass for ectoparasites or any kind of lesions. Then scrapping was done in the skin by an blunt scalpel to collect the mucous slime in a petri dish for microscopic examination. Then the gills were gently removed from the branchial cavity and placed in a slide for microscopic examintation.

For the parasitic investigation into the body cavity and general viscera, the body of each host fish was cut open and examined. The inner surface lining the body cavity, outer surface of the visceral organs and serous membranes were examined for encysted larvae. The entire viscera were then removed from the body cavity and kept in saline solution (0.75% NaCl solution). Considerable attention was given to the internal organs, viz., heart. air bladder, liver, gall bladder, spleen, urinary bladder, gonads and kidneys. After examination of the external surface, the organs were carefully dissected to find out the internal parasites. Peritoneum and mesenteries were also observed for occurrence of parasites.

The detected parasites were collected from the infected area for gross observation and identification. For this purpose, lice, large nematodes and cestode parasites were picked up by forceps, needles etc. and small nematodes and helminthes were collected by a hair brush. Protozoan parasites were collected with mucous or body fluid by the help of pipette, dropper and nedle kept in a slide.

Indentification of parasites

The collected parasites were identified by using a compound microscope following the description and figures of Gupta (1959), Yamaguti (1963), Bykhovskaya *et al.* (1962), Agarwal and Sharma (1988), Islam (1972), Kennedy (1975) and Hafizuddin and Shahabuddin. (1996).

Statistical analysis

The following statistical analyses were carried out-

1. Prevalence: Prevalence

$$= \frac{\text{Number of infected hosts}}{\text{Total number of hosts examined}} \times 100$$

2. Abundance: Abundance

$$= \frac{\text{Number of parasites}}{\text{Total number of hosts examined}}$$

3. Mean intensity: Mean intensity

$$= \frac{\text{Number of parasites}}{\text{Total number of infected hosts}}$$

(Margolis, *et al.* 1982).

Results and Discussion

In the present investigation 83 samples of *C. mrigala* were examined, Among which 74 fishes were infected. A total 2348 parasites were recorded from the infected fishes which belonged to 10 different parasitic genera. Among 10 genera, 7 were ectoparasites and 3 were endoparasites.

Among the collected parasites, four protozoan parasites *Trichodina, Ichthyophthirius, Chilodonella* and *Myxobolus,* two monogenic parasites *Dactylogyrus* and *Gyrodactylus,* two digenic parasites *Fellodistomum* and *Eucreadium*, one nematode *Camallanus*. and one crustacean parasite *Argulus* were recorded. Protozoans and monogeneans were very common on the gill, skin and fin. They were found active and active in gill filaments. They remained strongly attached to the gill, skin or fin bases. Crustaceans were mostly found abundantly attached to the fin and skin. On the other hand, digenean flukes and nematodes were recorded from the stomachs and intestines. The host-parasite list is presented in Table I.

Monthly fluctuations in prevalence, mean intensity and abundance of parasites in *C. mrigala*

The prevalence value of infection ranged from 60.42% to 100% during the study period. The maximum prevalence (100%) was recorded in October, November and December. The minimum prevalence (60.42%) was recorded in June. The next higher prevalence (87.80) was accomplished in January and April (Fig 1).

In *C. mrigala*, The mean intensity value ranged from 21.8 to 49. 13 during study peri

Table I. List of hosts, parasites and their site of infection.

Host	Parasite		Site of infecton
Cirrhina mrigala	Protozoa	: *Trichodina*	Gill, skin
		Chilodonella	Gill
		Ichthyophthirius	Skin
		Myxobolus	Gill, Skin
	Monogenea	: *Dactylogyrus*	Gill
		Gyrodactylus	Gill, Skin
	Digenea	: *Fellodistomum*	Stomach
		Eucreadium	Intestine
	Nematoda	: *Camallanus*	Intestine
	Crustacea	: *Argulus*	Fin, skin

od. The maximum mean intensity (49.13) was recorded in December and the value in November (48.89) was close to the maximum value. The lowest value of mean intensity (21.8) was recorded in July.

The recorded value ranged from 15.57 to 49.13 The highest abundance (49.13) was recorded in December and the abundance value in November (48.89) was very close to the highest value. The minimum value of abundance (15.57) was recorded in July and the values in June and August (21.43 and 24.28) were near the lowest value. So it can be concluded that the abundance rate was maximum in early winter and minimum in rainy season (Fig. 1).

So it is apparent that during the period of investigation, the infection exhibited monthly or seasonal fluctuation. The abundance of parasites recorded from host fishes was maximum in the months of November-December and minimum in June-July. Generally, the infestation was maximum in winter or pre winter and minimum in rainy season. The similar findings were also reported by Akhter *et al.* (1997), Banu *et al.* (1993), Chandra *et al.* (1997) and Hossain *et al.* (1994).

Fluctuations relating to prevalence, mean intensity and abundance of parasites in different length groups of *C. mrigala*

All the specimens of *C. mrigala* (examined) were divided into three length groups, <20

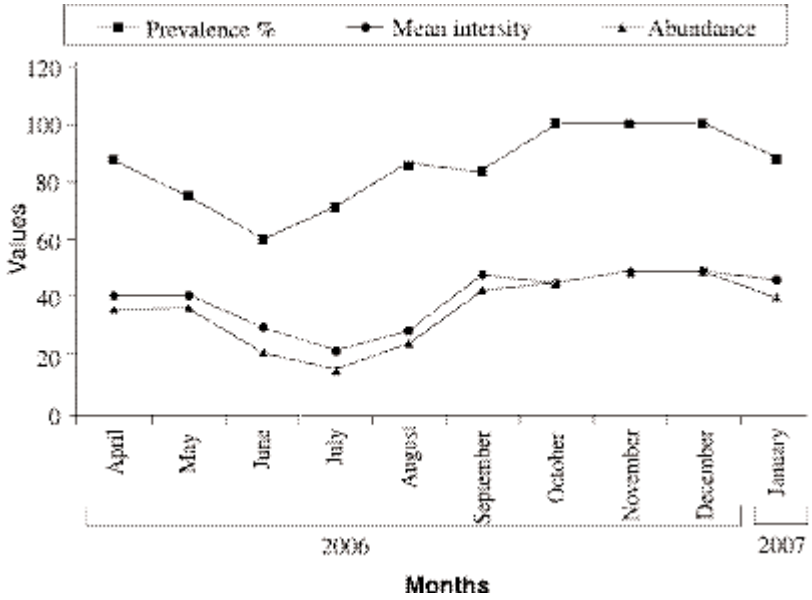

Fig 1. Monthly fluctuations in prevalence, mean intensity and abundance of parasites in *C. mrigala*

cm (smaller), 18-28 cm (intermediate) and >28 cm (larger). During present study, 50 smaller, 25 intermediate and 8 larger fishes were examined. Among them 45 smaller, 22 intermediate and 7 large fishes was infected.

The highest prevalence of total parasite was found as 90.00% in the smaller length group and the lowest as 87.5% in the larger length group. The prevalence of intermediate length group is 88.00%.

The highest mean intensity of parasites was observed as 50.90 in intermediate length group and the lowest as 35.71 in the large length group. The mean intensity of smaller length group is 37.62, which is close to middle of the two values.

Table II. Prevalence, mean intensity and abundace of parasitic infection of *C. mrigala* in different length groups.

Length groups (cm)	No of hosts		Total no of parasites recorded	Prevalence (%)	Mean intensity	Abundace
	Examined	Infected				
10-20	50	45	1693	90.00	37.62	33.86
20-30	25	22	1120	88.00	50.90	44.80
>30	8	7	250	87.50	35.71	31.25
Total	83	74	3063	89.16	41.39	36.90

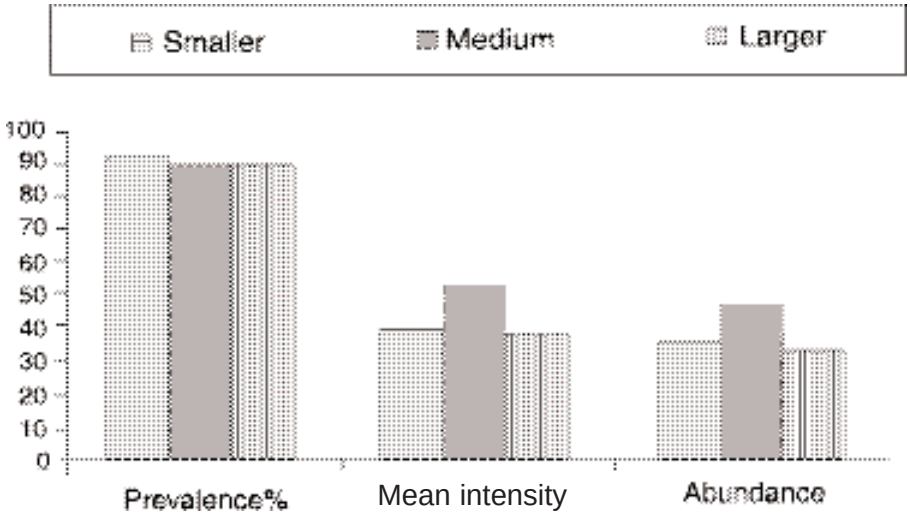

Fig 2. Comparative prevalence, abundance and mean intensity of parasites in different length groups of *C. mrigala.*

The abundace value ranged from 31.25 to 44.80 The lowest abundance value (31.25) was recorded from larger length group and the highest value (44.80) was in intermediate length group. The abundance in smaller type was 33.86 (Table II and Fig 2).

It was obseved that among the different size groups of fishes. maximum infection were recorded in medium size group fishes and minimum were recoeded from larger fish groups. The infection rate in smaller group fishes was more than larger, but less than medium group. Golder *et al.* (1987) also observed the similar results.

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