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SEASONAL PREVALENCE, INTENSITY AND ORGANAL DISTRIBUTION OF HELMINTH PARASITES IN *MACROGNATHUS ACULEATUS*

HAMIDA KHANUM, SALMA BEGUM AND ALEYA BEGUM*

Department of Zoology, University of Dhaka, Dhaka-1000, Bangladesh

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Abstract

Examination of 122 individuals of *Macrognathus aculeatus* (popularly known as Tara Baim), collected monthly, from the river Buriganga during March, 2007 to February, 2008 revealed 77 fishes were infected with various helminth parasites with an infection rate of 63.11% and intensity of infection of 3.18. A total of 245 parasites were recovered from different organs of the fishes, with the highest number from the intestine. Six species of helminths were detected, of which two were trematodes (*Clinostomum piscidum* and *Rhynchooharynx paradoxa*), one species of cestode (*Marsipometra parva*) and three species of nematodes (*Pseudoproleptus vestibules*, *Cucullanus cirratus* and *Porrocaecum trichiuri* L3 larva). The prevalence and intensity of parasitic infection were a bit higher in female fish than in male. The parasites were much more abundant in rainy season (75%) followed by summer (62.5%) and winter (31.81%). The larger fishes were heavily infected (71.01%) than medium (53.33%) and smaller (52.17%) fishes.

Introduction

The lesser spiny eel, *Macrognathus aculeatus*, is a tropical fish belonging to the Mastacembelidae family found mostly in Southeast Asian countries, India, Nepal, Pakistan, Sri Lanka, Myanmar and Bangladesh.[1] In Bangladesh it is popularly known as Tara baim and found in rivers, canals, beels and in inundated fields throughout the country.[2,3] The fish is very nutritious and liked by the common people. However, the production of this fish is not in a satisfactory level. The production and growth of this fish are hampered by various ecological and biological factors and also diseases, parasites etc. and of the factors; helminth parasites play a major role.[4] So far, information on the helminth parasites of *Macrognathus aculeatus* is scanty in Bangladesh, except that of Khanum and Parveen.[5] The present study was aimed at investigating the helminths of *Macrognathus aculeatus* with emphasis on the organ distribution and seasonal abundance.

Materials and Methods

A total of 122 host fishes were collected on monthly basis at a regular interval during March, 2007 to February, 2008 from Buriganga river situated near the Dhaka city. After

*Corresponding author. <aleya2000@hotmail.com>.

collection, the live fishes were kept in polythene bags and brought to the Parasitological Laboratory of Zoology Department, University of Dhaka for detailed investigation. The fishes were examined to determine their parasite community and to study the prevalence of infestation in different length groups. On the basis of the total length of *Macrognathus aculeatus* (from the tip of the head to the end of the tail fin) the hosts were divided into three length-groups at regular intervals *viz.,* 11 - 17, 17.1 - 23 and 23.1 - 29 cm. The fishes were dissected and removed the digestive tract and urinogenital organs from the body and each organ was put into separate Petri dishes. The stomach, intestine, rectum and pyloric part, gall bladder, liver, kidney, muscles and egg sacs were examined. Trematodes, cestode, nematodes and acanthocephalans were collected from the host and kept in 70% ethyl alcohol. Then the parasites were removed from alcohol and mounted temporarily in lactophenol to clear the cuticle of the parasites. To make whole mount the trematodes, cestode and nematodes worms were passed through graded of alcohol and stained in borax carmine. They were dehydrated in xylene and mounted in Canada balsam for microscopic study.

Results and Discussion

Out of 122 fishes (74 males and 48 females), only 77 (45 males and 32 females) were found to be infected with various helminth parasites. A total of 245 parasites were collected from different infested organs. The prevalence of infestation was 63.11% (both sexes combined). The intensity of infestation was 3.18. Female hosts were more infected than males. The prevalence of infestation of male and female hosts was 60.81 and 66.66% respectively, (Table 1). In the present study, it was revealed that female hosts were observed to be more infected than males. Similar reports were also observed by Khanum and Parveen[5], Thomas[6], Chandra[7] and Khanum *et al*.[8] They concluded that this might be due to lower physiological resistance of female fishes rather than the ecological conditions. Female fishes were generally found to be more susceptible to the parasites than the males as also found by Kennedy and Lie[9] and Wickins and Macfarlane. [10]

The parasites were particularly collected from different parts of the alimentary canal and body cavity. Six species of helminth parasites were recovered, of them two species of trematodes, one species of cestode and three species of nematodes. Among the helminth parasitic groups nematode parasites showed the highest prevalence (36.05%) and intensity (3.70) and cestode parasite showed lowest prevalence (4.09%) and intensity (1.4) (Table 2). The incidence of nematode parasites was higher than the other groups of helminth may be due to the fact that, among the different groups of helminths only nematodes undergo both direct and indirect life cycles. They utilized both soil and aquatic environment. Therefore, it may be possible that fishes get the infection of nematodes directly through ingestion of contaminated soil, algae and other aquatic animals and plants that constitute the major portion of their food.

The prevalence and intensity of infestation of different species of helminth parasites varied greatly from one another. Six species of helminth parasites were recovered, of them two species of trematodes were *Clinostomum piscidum*, Southwell *et* Prashad, 1918;

Table 1. Prevalence and intensity of helminth parasites in male, female and total hosts.

Host sex	No. of host examined	No. of host infected	Total no. of worm collected	Prevalence (%)	Intensity
Male	74	45	148	60.81	3.28
Female	48	32	97	66.66	3.03
Total	122	77	245	63.11	3.18

Table 2. Prevalence and intensity of different groups of helminth parasites in *M. aculeatus*.

Helminth groups	No. of host examined	No. of host infected	Total no. of worm collected	Prevalence (%)	Intensity
Trematoda	122	28	75	22.95	2.67
Cestoda	122	5	7	4.09	1.4
Nematoda	122	44	163	36.06	3.70

and *Rhynchooharynx paradoxa*, Odhner, 1928; one species of cestode was *Marsipometra parva*, Cooper, 1917; and three species of nematodes were *Pseudoproleptus vestibules*, Khera, 1953; *Cucullanus cirratus*, Moorthy, 1937; and *Porrocaecum trichiuri* (L3), Ralliet *et* Henry, 1952. In the present investigation, it was observed that the prevalence and intensity of *Cucullanus cirratus* were highest (18.85% and 4.21) and lowest (4.09% and 1.4) in *Marsipometra parva* (Table 3). It was also shown that there are some variations in the parasitic fauna compared to Khanum and Parveen[5]. They collected five species of helminth parasites from *Macrognathus aculeatus*, except *Rhynchooharynx paradoxa*, all the parasites were changed. This variation may be due to the difference in feeding habits and environmental factors of the hosts.

Organal distribution of helminth parasites were found to maximum in intestine (72.25%), while in the stomach it was 25.71% and minimum 2.04% in body cavity (Table 4). According to Marcov[11], fish parasites like other vertebrates, feed either on the digested contents of the host in the alimentary canal or the hosts own tissues. The small intestine seems to be a favourite site for helminth parasites. The abundance of trematode *Rhynchooharynx paradoxa* and nematodes *Cucullanus cirratus* and *Porrocaecum trichiuri* (L3) in the stomach may be explained by the fact that primarily the thick cuticular body covering of the parasites are well adapted to their hosts and secondly they possess a complete or partially complete alimentary canal, so they can take in and digest the undigested food materials from the stomach of the host. The abundance of cestode

parasite *Marsipometra parva* in the intestine may be related to their feeding behaviour as they are completely devoid of digestive system. Hence, they absorb the simplest form of nutrients through the cuticle.

Table 3. Prevalence and infestation of helminth parasites in *M. aculeatus*.

Name of parasisites	No. of host examined	No. of host infected	Total no. of worm collected	Prevalence (%)	Intensity
Trematoda	122	10	25	8.19	2.5
Clinostomum piscidum					
Rhynchooharynx paradoxa	122	18	50	14.75	2.77
Cestoda	122	05	07	4.09	1.4
Marsipometra parva					
Nematoda	122	12	43	9.83	3.58
Pseudoproleptus vestibules					
Cucullanus cirratus	122	23	97	18.85	4.21
Porrocaecum trichiuri (L3)	122	09	23	7.37	02

Table 4. Organal distribution of helminth parasites.

Organs (%)	*Clinostomum piscidum* (%)	*Rhynchooharynx paradoxa* (%)	*Marsipometra parva* (%)	*Pseudoproleptus vestibules* (%)	*Cucullanus cirratus* (%)	*Porrocaecum trichiuri* (L3) (%)
Body cavity	5 (2.04)	-	-	-	-	-
Stomach	-	38 (15.51)	-	-	20 (8.16)	5 (2.04)
Intestine	20 (8.16)	12 (4.90)	7 (2.86)	43 (17.55)	77 (31.43)	18 (7.35)

In the present investigation, maximum infestation was observed in rainy season (75%) and minimum in winter season (31.81%). Seasonal fluctuation of six species of helminth parasites showed a remarkable variation. In summer *Cucullanus cirratus* showed highest (32.5%) prevalence but *Clinostomum piscidum* showed highest (9.0) intensity (Table 5). In rainy seasons the highest (21.66%) prevalence was observed in *Rhynchooharynx paradoxa* and lowest (5.0) in *Marsipometra parva*. In winter the infestation rate is very low. Highest (13.63) prevalence occurred in *Clinostomum piscidum* and lowest (0.0) in *Marsipometra parva* (Table 6). LaRue[12] reported that there are numerous complex factors that influence the parasitic infestation reached peak during the rainy season. This may be over rainfall, flood, domestic sewage, various kinds of pollutants, less immunity of hosts and presence of huge number of sprouting insects. Lower rate of infestation in winter season may be due to the lack of feeding tendency of the host. Niyogi *et al.*[13] suggested that this was due to a temperature dependant rejection response.

Table 5. Overall seasonal variations of helminth parasites in *M. aculeatus*.

Seasons	No. of host examined	No. of host infected	Total no. of worm collected	Prevalence (%)	Intensity
Summer (March - June)	40	25	91	62.5	3.64
Rainy (July - October)	60	45	132	75	2.93
Winter (November - February)	22	07	22	31.81	3.14

Table 6. Seasonal variations of different parasites in *M. aculeatus*.

Name of parasites	Summer (March - June)				
	No. of host examined	No. of host infected	No. of worm collected	Prevalence (%)	Intensity
Clinostomum piscidum	40	01	09	2.5	9.0
Rhynchooharynx aradoxa	40	04	11	10.0	2.75
Marsipometra parva	40	02	03	5.0	1.5
Pseudoproleptus estibules	40	03	23	10.0	5.75
Cucullanus cirratus	40	13	39	32.5	3.0
Porrocaecum trichiuri (L3)	40	01	07	2.5	7.0
	Rainy (July - October)				
Clinostomum piscidum	60	06	15	10.0	2.5
Rhynchooharynx paradoxa	60	13	36	21.66	2.76
Marsipometra parva	60	03	04	5.0	1.33
Pseudoproleptus vestibules	60	07	17	11.66	2.42
Cucullanus cirratus	60	09	50	15.0	5.55
Porrocaecum trichiuri (L3)	60	07	10	11.66	1.42
	Winter (November - February)				
Clinostomum piscidum	22	03	01	13.63	0.33
Rhynchooharynx paradoxa	22	01	03	4.54	3.0
Marsipometra parva	22	00	00	00	00
Pseudoproleptus vestibules	22	01	03	4.54	3.0
Cucullanus cirratus	22	01	08	4.54	8.0
Porrocaecum trichiuri (L3)	22	01	06	4.54	6.0

Prevalence and intensity varied in relation to the host's body length. The individuals of the small length group (11 - 17 cm) had less prevalence (52.17%) than the large length group (23.1 - 29 cm). The intensity was also highest (3.33) in the large length group and lower in small length group (Table 7). Bashirullah[14] reported that the degree of parasitism was obviously related to the food habit and age of the fishes.

Table 7. Prevalence and intensity of helminth infestation in different length groups.

Length groups (cm)	No. of host examined	No. of host infected	Total no. of worm collected	Prevalence (%)	Intensity
11 - 17	23	12	37	52.17	3.08
17.1 - 23	30	16	50	53.33	3.12
23.1 - 29	69	49	158	71.01	3.33

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