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Parasitic prevalences in fresh water prawn *Macrobrachium rosenbergii* in north and south 24 Parganas districts of West Bengal

Abstract

The occurrence of different freshwater prawn (*Macrobrachium rosenbergii*) parasites, found during the period from April to August 2007, was investigated in different freshwater wetlands of north and south 24 Parganas districts of West Bengal state in India. Eleven parasites – *Zoothamnium*, *Epistylis*, *Gregarina*, *Amphileptus*, *Dileptus*, *Myxobolus*, *Chilodonella*, *Balladyna*, *Gozia*, *Rhabdochona*, *Indocucullanus*, *Procamallanus* and *Cucullanus* – were found after examining 1,000 specimens of *Macrobrachium rosenbergii* of different-sized groups. The highest prevalence of the parasites was recorded in the size group of 81–85 mm and 136–140 mm. The intensity of ectoparasitic infection was observed to be high with an increase in size. The gills and the surface of the body were mostly infected. Endoparasites were found in the intestinal part, and mostly due to poor raw foods given to the prawns as their diets. The parasites get more shelter and space for them. The highest intensity of those parasites was found in the month of August due to favourable autumnal conditions, with little rain and favourable breeding time of the parasites. Stressed and weak prawns are more vulnerable to infestation under adverse environmental conditions.

Key words:

Ectoparasites, endoparasites, lengthwise prevalence of parasites, Macrobrachium rosenbergii, monthly prevalence of parasites

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Introduction

Among the observed parasites during the study period, there are some important pathogenic parasites reported in this study from two districts (north and south 24 Parganas) of West Bengal state in India. At the high densities, these parasites have been found as causing the mortality in cultured prawns, leading to severe losses in various parts of the world. *Macrobrachium rosenbergii* cultured in India, in West Bengal, is a most important farmed species for agrobusiness due to property as food supply as well as a valuable export product, and about 6% of the total global aquaculture production of shrimps and prawns. There is a tremendous scope for the development of freshwater prawn culture in India, but the problems coming from pathogens and diseases lead to the huge losses throughout India as well as the world.

The aim of the present study was to investigate some parasitic pathogens of *Macrobrachium rosenbergii* in two districts of West Bengal (north and south 24 Parganas) and their probable reasons for prevalence during different months of the study period.

Materials and Methods

Specimens of prawns (different-sized groups) were collected during the study from different wetlands of north and south 24 Parganas districts of West Bengal. The wetlands of the two districts are sometimes

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fed with domestic sewage water as well.

Sampling was carried out on a monthly basis from April to August 2007. For this investigation, the prawns were transported alive to the laboratory of Asutosh College, Department of Industrial Fish and Fisheries, in the same water as in the wetland. A total of 1,000 specimens were examined. The total length of each specimen was measured. The exoskeleton, gills, surface of the body underneath the exoskeleton, legs and the intestinal part of the prawns and scrapping from these parts were examined under a light microscope. The total number of the parasites was determined by screening and counting the entire material of each slide. Air-dried smears were stained by hematoxylin & eosin and studied under the microscope with $\times 100$, $\times 150$, $\times 400$ and $\times 450$ magnifications.

For the identifications of the parasites, various literatures, taxonomy books, parasitic pictorial guide and expert comments were taken. The monthly and lengthwise prevalence of the parasites was studied.

Result and Discussions

Fouling disease is the main problem in the rice–shrimp farming system. In the study, the fouling protozoans, *Zoothamnium* and *Epistylis*, were detected and found to be dominant in the gills of the adult prawns. A similar examination was carried out by Xianle Y Xiaozhong HU and Tran TT *et al.*^[1-3] *Chilodonella*, *Amphileptus*, *Dileptus*, *Myxobolus* and *Balladyna* were found in the skin, gill and carapace regions of the prawns, causing blackening or dirty appearance of the regions.

Endoparasites like *Gozia*, *Rhabdochona*, *Indocucullanus*, *Procamallanus* and *Cucullanus* are found in the intestinal parts of the prawn. The parasites actually weaken the prawns, reducing the normal growth. These parasites are common in Bengal and are reported by Arthur and Abu Tweb.^[4]

The parasites were mostly detected from the surfaces of the body (39%), swimming legs (26%) and gills (20%) and under the exoskeleton (15%). The mobility and feeding were also checked. The prawns showed abnormal swimming behavior and surfacing. In severe cases, mortality could occur. The swimming legs, body surface and the gills are mostly preferred because the parasites get better shelter benefits of different nutrients and foods from here.

However, the occurrences of such parasites vary in different months during the study period due to the changes of a seasonal pattern in different months. Ciliophora: *Amphileptus* were found mostly (43%) in May, and prevalence was shown to be higher in April, May and June. Myxosporea: *Myxobolus* were found almost throughout the year, and

intensity was high in August (26%). Ciliophora: *Chilodonella* were high in June (42%) and were the lowest in August in (7%). Nematoda: *Procamallanus* intensity were high in July (31%) and August (35%). Nematoda: *Rhabdochona* were high in August (31%), with a dominance in June and July. The present study is related to the report of Srivastava^[5] from the intestine of prawns, where the intensity was high due to the breeding season. The intensity of the ectoparasites was high in August due to favourable climatic conditions like autumnal season with little rain. These favourable conditions are helpful for the breeding of those parasites. Because of the same reasons, the endoparasites were dominant in the month of August [Table 1].

In lengthwise prevalence, it was concluded that the

Table 1: Month-wise ecto- and endo-parasitic prevalence statistics, April–August 2007

Parasites	% parasites (month-wise)				
	April	May	June	July	August
Ciliophora: <i>Amphileptus</i>	21	43	24	4	9
Myxosporea: <i>Myxobolus</i>	21	23	18	21	26
Ciliophora: <i>Chilodonella</i>	18	18	42	10	7
Gregarians	7	4	16	9	12
Nematoda: <i>Procamallanus</i>	22	6	9	31	35
Nematoda: <i>Cucullanus</i>	18	29	33	27	38
Nematoda: <i>Rhabdochona</i>	11	40	22	25	31
Ectoparasites	23.5	26	41.5	47.5	65
Endoparasites	44.5	40.5	47.5	46	58

Table 2: Length-wise statistics: Ecto- and endo-parasitic prevalence, 2007

Total length (mm)	Average weight (g)	% of parasites (length-wise)	
		Ectoparasites	Endoparasites
61–65	59.6	20	28
66–70	70.2	24	32
71–75	76.3	29	35
76–80	80.5	27	34
81–85	86.3	36	40
86–90	93.2	30	10
91–95	97.8	20	25
96–100	103.4	10	20
101–105	108.6	5	19
106–110	126	10	19
111–115	139.9	12	29
116–120	149	25	24
121–125	163.5	1	10
126–130	190.2	5	2
131–135	198.6	10	21
136–140	208.4	40	12
141–145	211.7	20	27
146–150	226.4	23	27
151–155	226.7	20	33
156–160	247	5	9
161–170	289.2	19	17

ectoparasitic intensity was high in the 81–85-mm size group and the 136–140 mm size group [Table 2]. Lower-sized prawns are less affected because they live in newly prepared ponds, but with an increase in size of the prawn, the pond becoming older, organic matter (fecal matter, waste foods, dead prawns) are accumulated in the pond. These increase the stress and the chances of infestation. The intensity becomes higher in larger prawns because the parasites get larger space for their feeding and breeding. The findings of the higher intensity levels of the parasites with higher body length agree with the reports of Özer and Erdem^[6] and Özer.^[7,8]

Endoparasites were observed to be high in prawns due to the poor water quality. The wetland farms use various raw and unhygienic foods, raw nail meat and slaughter house offal as food, directly to the pond. This deteriorates the quality of the pond water and helps in increasing the intensity of the endoparasites in the prawns.

Conclusion

Parasites have been found in prawns, and the present study with monthly and lengthwise prevalence with proper diagnosis is important for effective treatment. Aquaculture is a high-risk industry and, where local economies become dependent on it, the financial

vulnerability is high. Disease is perhaps a major threat to intensive rearing operations.

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