



Effect of nematode parasite (*Procamallanus heteropneustus*) on the freshwater catfish Singhi (*Heteropneustes fossilis*)

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Abstract

A study was conducted to find out the monthly, seasonal, lengthwise and sexual distribution of the nematode parasite *Procamallanus heteropneustus* on freshwater catfish Singhi (*Heteropneustes fossilis*) for a period of twelve months. A total of 293 singhi were examined of which 230 fishes were infected by the parasite throughout the year. The highest prevalence was found in November (93.3%) and the lowest observed significantly. The highest infection (100%) was observed in female in the month of March and the lowest in the month of January (63.4%). The highest infection (91.5%) observed in male in the month of March; the infection was heavier in large size of fishes (18.1-21 cm) than the smaller size.

Keywords: Singhi, *Procamallanus heteropneustus*. Size of fish.

1. Introduction

Of about 5,200 species of nematode parasites of vertebrates, nearly 650 species have been recorded in the adult stage from the intestines of marine and freshwater fish (as the final hosts). Moreover larvae of adult species, which live as parasites in fish or other vertebrates, occur in the body cavity or various tissues in fish (as the intermediate hosts or as paratenic hosts). There are species, which do not change hosts also those, which have two-host or three host cycles. More than 90 species of nematodes have been reported from the freshwater fish of the USSR and about 30 from central Europe (cf. Chubb, 1980, 1982). Little is known about the species of nematodes which parasitize food and aquarium fish and their precise course of development.

Two cases differ when there is an attack by nematodes: first, the fish can be the intermediate hosts and, even the paratenic hosts and harbor the larvae of the nematodes, second; they can be the final hosts, that is the hosts of the sexually mature nematodes. For some species, the fish may not only be the intermediate host but also the final host. Almost all species of nematodes of marine fish are *dieocious*; these are mostly representatives of the suborders *Ascaridata*, *Cucullanata*, *Spirurata*, and *Camallanata*.

In the beginning the small larvae (juveniles), which are a few millimeters long, mostly live free in the skin or in the internal organs. Thereafter, the larvae are generally soon encapsulated (whitish capsules of a pinhead size or larger on the outer side of the intestine, peritoneum, cesium, liver, pancreas, and other visceral organs). Large-scale occurrence of capsule can bring about severe inflammation of the internal organs of fish. The damage to marine fish from larvae of nematodes varies from localized tissue generations or alternations to the destruction of individual organs and to the death of the (Margolis, 1970).

The disease signs due to adult threadworms are mostly slight. A low fat content has been observed among codfish parasite by large numbers in the intestine; in other respects, there appears to be an extensive adaptation between the host and the parasites. However, there are exceptions (for instance, *Proleptus p.858*). It is possible to control nematodiasis essentially by the same means as for acanthocephalosis: namely, by destroying the intermediate hosts or final hosts as far as it concerns the fish depending on which developmental stage occurs in the fish. In the case of aquarium fish, they should not be fed live animals which contain nematode larvae.

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Among the all endemic catfishes Singhi (*Heteropneustes fossilis*) is one of the popular and high priced fish in Bangladesh. As food, they are considered highly nourishing, palatable and have reputation as tasty food. They are well preferred because of less spine and fat and in great demand in many parts of India, Bangladesh and Thailand. Owing to their taste and medicinal values, they fetch a high price in the market. These fishes are well-adapted to adverse ecological conditions obtaining in swamps, marshes and derelict water bodies which are mostly shallow and characterized by heavy silt with decaying vegetation and organic load coupled with poor nutrient release.

Parasitic infestation is one of the major problems in fish culture and management. According to Fasten (1922) knowledge is essential concerning disease of lower animals because it is of prime importance in all conservation programs. Gross (1933) showed that the parasitic infestation tends to decrease the growth rate resulting in the stunting of fish. Especially *Procamallanus heteropneustus*. Ali (1967) is a common parasite of Singhi, *Heteropneustus fossilis*. It is an ovoviviparous nematode parasite and small in size (4.42-7.50mm + 90-0.19mm). It is yellowish to reddish in color and frequently found attached to the stomach of singhi. The biological aspects of this worm is still scared (Chandra 1993). However, Rahman and Ali (1968) noted the incidence of this worm from Singhi.

Little attention have been paid to the aspects of parasitology in relation to fisheries in Bangladesh. Although sometimes mortality of fishes are being noticed. Progress in fish culture is making rapid strides, creating conditions favorable for causing fish disease (Gopalakrishnan, 1968). Hence, in order to control fish disease caused by the parasites, it is essential to identify them, to know their prevalence and their effect on hosts.

Very little work has been done on the parasite *Procamallans* of Singhi (*Heteropneustes fossilis*),

although they are quite important fishes due to their good taste, normal fat content, easy availability and cheaper price. The present study has been aimed:

1. To find the prevalence (Percentage %) and intensity
2. To determine the organelle distribution of the parasites
3. To find out the monthly, seasonal and sex-wise and length-wise distribution of parasites on the host.

## 2. Materials and methods

Living and freshly dead fish samples of Singhi, *Heteropneustes fossilis* were collected from the fish market of Mymensingh during the period of (January 1999 to December 1999). A total of 293 fish specimen were examined. The total length (classified three length group: < 16 cm, 16-18 cm and > 18cm), weight and the sexes of the host specimens were recorded. The fish body was opened by an incision along the mid ventral line in front of the anal opening. Then the alimentary canal like esophagus, stomach and intestine were examined in petri dishes containing physiological saline to determine the original distribution of the parasites. The alimentary canal of the host specimens were divided into two parts (stomach and intestine).

The parasites collected from the alimentary canal of the fishes and fixed Berlin's fluid and examined under the microscope. The infestation of the prevalence, (Percentage %) and mean intensity were studied.

## 3. Results and discussion

A total of 230 fishes were found infected among the 293. The prevalence (% of fish infection) was 77.41% and the intensity (per infected fish) was 3.92 (Table-1). The highest prevalence was found in November (93.3%) and the lowest note in February (33.2%). Similarly the highest intensity was noted in November (7.24) and the lowest in February (2.09).

The parasitic infection was observed (Table-2) in female (81.26%) higher than the male (76.64%). The highest infection noted in female (100%) in

March and lowest in January (63.4%) followed by February (63.5%). The highest intensity found in female (5.4) in August and the lowest in October (1.3).

Table -1 Monthly figures of water temp., number of Singhi (*H. fossilis*) examined and infected by *Procammalanus heteropneustus*

Month (1999)	No. of Singhi		No. of Worms found	Prevalence (Percentage%)	Ave. no. of worms per infected fish	Mean temp.
	Examined	Infected				
January	23	15	42	65.2	2.62	19
February	30	19	46	33.2	2.09	20
March	30	27	48	90.0	2.66	24
April	29	18	73	75.0	4.05	25.5
May	30	27	93	90.0	3.32	26.5
June	28	20	127	82.0	6.35	29.5
August	10	08	47	80.0	5.88	31.5
September	30	27	93	90.0	3.57	28.5
October	23	16	32	69.5	2.11	25.5
November	30	28	204	93.3	7.28	27.5
December	30	25	79	83.3	3.16	21
Total	293	230	884	77.41	3.92	25.57

Table-2 Monthly pattern of infection in male (M), and female (F) Singhi by *Procammalanus heteropneustus*.

Month (1999)	No. examined fish		No. of infected fish		Prevalence (%)		No. of worms recovered		Mean intensity	
	M	F	M	F	M	F	M	F	M	F
January	12	11	08	07	66.6	63.4	13	29	1.2	2.6
February	14	16	09	10	65.2	63.5	22	24	1.5	1.5
March	26	14	13	19	81.5	100	20	28	1.2	1.5
April	13	16	18	11	81.5	68.7	35	39	1.8	2.4
May	27	13	15	12	88.2	92.3	36	57	1.7	1.3
June	14	14	10	10	71.4	71.4	58	69	2.8	2.8
August	04	06	03	05	75.0	83.3	20	27	5.0	5.4
September	07	23	05	22	71.4	95.6	25	68	5.0	3.1
October	12	12	09	10	76.3	83.3	15	17	1.3	1.4
November	10	19	09	16	81.8	84.2	69	135	1.7	1.8
December	12	17	11	13	84.6	88.2	39	50	3.0	2.9
Total	131	161	110	135	76.68	81.26	352	543	2.38	2.43

The parasitic infection also varied in different size of fishes. The highest prevalence (100%) was found in large size of fishes (>18cm) in March, April, May, August and October. It was also observed that the larger fishes have higher intensities than the smaller.

Higher prevalence and intensity were observed in the month of November. However, it is difficult to explain the reason and may have

infection *Procammalanus heteropneustus* common and occurring throughout the year in Singhi (*H. fossilis*). Prevalence and intensity of infection did not quite follow any distinct seasonal cycle.

Several reasons, but may also be accidental (Chandra, 1993). The difference in the infection between young and adult fish was related to the infection efficiency of hosts (Chandra, 1994). Gupta, (1959) described a new species *Procammalanus*

*daccai* from the small intestine of an unidentified catfish from Dhakka (Bangladesh). The highest infection occurred (100%) by the female during the month of March. The female infection was much higher than male throughout the year but not significant. The highest infection of *Procamallanus heteropneustus* was found in stomach probably due to feed.

#### 4. References

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