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HELMINTH PARASITES OF SOME FRESHWATER FISHES

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Abstract: Forty-three freshwater fishes *(Heteropneustus fossilis* 11, *Mystus vittatus* 16 and *Channa striatus* 16) were collected from various freshwater ponds in the vicinity of Lahore and brought to the lab. All fishes were examined for the presence of internal helminth parasites in the digestive tract. The study revealed that all (100%) *H. fossilis* were infected with nematodes, *Procamallanus heteropneustus,* only 6 (37.5%) *M. vittatus* were found infected with nematodes, *Rhabdochona magna* and among *C. striatus,* 9 fish (56.25%) were infected with acanthocephalans, *Pallisentis ophiocephali,* 4 (25%) were infected with cestodes, *Senga taunsaensis* and 5 (31.25%) were infected with nematodes, *R. magna.* The mean intensity of infection was 14.36 in *H. fossilis,* 6.5 in *M. vittatus* and in *C. striatus,* 3.33 for acanthocephalans, 2.4 for nematodes and only 1.0 for cestodes per infected fish. The results indicate that the parasite intensity is quite high. It may be due to the presence of physical factors that favour the completion of life cycles of these parasites.

Keywords: Freshwater fishes, fish helminth, parasite intensity, prevalence, gut parasites.

INTRODUCTION

There are many freshwater ponds which are used to culture fishes in the area of Kasur near Lahore. *Heteropneustus fossilis, Mystus vittatus* and *Channa striatus* are carnivorous fishes commonly found in these small ponds receiving mainly rainwater. These ponds are managed by local people for fish raising. Fishes being very important source of protein for human are consumed as white meat. Since humans utilize these fishes, it is important that they should be healthy and free of infection. Infections which are caused by viruses, bacteria and parasites among fishes

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in natural and man made culture systems are harmful for fish health and growth. The parasitic infections are sometimes very fatal and can cause high mortalities (Ahmed, 1994) when intermediate hosts support their life cycles. Among freshwater fishes, there are 1211 species of different parasites representing 5 phyla and 11 classes of invertebrates (Bykovskaya *et al.*, 1964). The major parasitic groups found in freshwater fishes are trematodes, cestodes, acanthocephalans and nematodes that complete their life cycles through intermediate hosts like piscivorous birds (Schmidt, 1990). The need to assess the parasitic infection arises because the fish suffering from parasitic infection or disease result into severe damage to fisheries industry. For successful prevention and elimination of such infections, it is extremely important to achieve early and correct diagnosis of the larval stages of the parasites for which fish constitute the final host.

MATERIALS AND METHODS

A sample of 43 fishes comprising 11 specimens of *Heteropneustes fossilis,* 16 specimens of *Mystus vittatus* and 16 specimens of *Channa striatus,* was obtained from different freshwater ponds found in the area of Kasur near Lahore. Fishes were brought in the laboratory alive in a small container and each species was maintained in glass aquaria separately. Length and weight of each fish were recorded. Fish were dissected one by one exposing their visceral organs. The stomach and the intestine were cut open lengthwise as to expose the lumen. The lumen was washed gently with distilled water in Petri plates and was observed under dissecting microscope.

All the parasites recovered from the gut were preserved in 70% alcohol. They were cleaned and kept in small vials for the study of their morphology for identification. The parasite number and place of their attachment were also recorded. Drawings of these parasites were made with the help of camera Lucida. External and internal morphological characters of each worm were recorded for further species identification according to Bykovskaya *et al.* (1964). This identification was confirmed by the description of the same or similar parasites (Zaidi and Khan,1976; Akram,

1988a, b; Khan and Bilqeese, 1990; Khan, 1991; Habib, 1996; Nazir, 1996).

RESULTS

From the sample, all (100%) specimens of *H. fossilis* were found infected with nematode, *Procamallanus heteropneustus*. The total number of nematodes obtained from 11 fish was 158 and the mean parasite intensity was 14.36. The worms were attached in the intestine. They were dull red in colour when fresh and the colour disappeared after isolation. The female nematodes were larger in size than the male.

Table I: Various helminth parasites found in the gut of some freshwater fishes.

Fish species	Length (cm)	Weight (g)	Parasite location	Helminth parasites			
				Trema-todes	Cestodes	Acanthoce-phalans	Nema-todes
Heteropneustus fossilis (n=11)	13.23[a] ± 1.15	81.01 ± 10.91	Intestine	-	-	-	14.36 ± 9.91
Mystus vittatus (n=16)	14.00 ± 0.81	114.37 ± 9.66	Foregut	-	-	-	2.44 ± 3.28
Channa striatus (n=16)	17.25 ± 2.51	117.50 ± 7.50	Intestine	-	0.25 ± 0.43	1.88 ± 2.08	0.75 ± 1.19

Out of 16 specimens of *M. vittatus*, only 6 (37.5%) were found infected. The total numbers of nematodes obtained from 6 fishes were 39 and the mean parasite intensity was 6.5. From 16 specimens of *C. striatus*, only 9 (56.25%) were found infected by various parasites. Among 9 fish, all (100%) were positive for acanthocephalans *(Pallisentis ophiocephali)*, only 5 (55.56%) were infected with nematodes *(Rhabdochona magna)* and 4 (44.45%) were infected with cestodes *(Senga taunsaensis)*.

All parasites were found attached at various areas of the intestine (Table I). The parasite intensity of acanthocephalans was 3.33, nematode 2.4 and cestodes was 1.0 (Table II).

Table II: The prevalence and intensity of various parasites found in some freshwater fishes.

Fish species	Parasite species	Total No. of parasites	Prevalence (%)	Mean parasite intensity
Heteropneustus fossils	*Procamallanus heteroneustus*	158	100	14.36
Mystus vittatus	*Rhabdochona magna*	39	37.5	6.5
	Pallisentis ophiocephali	30	56.25	3.33
Channa striatus	*Senga taunsaensis*	4	2.5	1.0
	Rhabdochona magna	12	31.25	2.4

DISCUSSION

Fish helminth parasites are generally found in all freshwater fishes. The parasite prevalence and intensity depend on many factors like parasite and its life cycle, host and its feeding habits and the physical factors of water body where the fish inhabit. It also depends upon the presence of intermediate host such as piscivorous birds for the spread of cestodes infection (Zaidi and Khan, 1976). The hygienic conditions are also very important for the healthy environment where fish are raised. The study areas are small ponds, which are generally receiving rainwater. The amount of water is always variable depending on the rainfall. It also changes the water quality significantly particularly when water level is low and animal from the neighboring villages used to visit these ponds. Most of the time buffalos sit in these ponds and continuously contaminate water with their excrements. Due to decaying of the organic matter in the bottom of the ponds dissolved oxygen contents deplete and water quality parameters are altered. The poor hygienic conditions favour the existence and propagation of many parasites. The water when very shallow allows many birds to visit there for fish as food. These birds usually start living in the vicinity of these ponds. These birds act as intermediate host for internal parasites particularly cestodes. When life cycle of any parasite is completed its prevalence and intensity increase significantly. The present study revealed that nematode infection was highest in all fish sample. It reflects that the piscivorous birds after ingesting the infected fish remain hovering on these

ponds and adding their feces with nematode larvae in the water that then ingested by crustacean and small fishes. These crustaceans and small fishes then become food for large fishes living in the bottom of the pond. *Heteropneustus fossilis* is a bottom dweller carnivorous fish mainly feeding on crustacean (copepods), worms, larvae and small fishes, which are mostly infected with nematode larvae. These copepods play major role in the spread of nematode, *Procamallanus heteropneustus* infection in *H. fossilis* (Akram, 1988 a, b; Khan, 1991). *Mystus vittatus* is feeding relatively on small fish from the water column (Habib, 1996; Nazir, 1996). Since this fish is strict carnivore and feeding only on small fish, the chances of ingesting infected fish are relatively low, resulting in low prevalence of nematode. *Channa punctatus* is feeding on crustaceans, copepods, worms, larvae and small fishes not only on the bottom but also from the water column. This feeding habit has increased the possibility of ingesting food infected with many parasite species. The prevalence of acanthocephalan *(Pallisentis ophiocephali)* infection was quite high and is in accordance with the findings of Mithal (1981), Muzzall, (1984), Khan and Bilqees (1990), and Khan (1991). The nematode infection in C. *punctatus* was low because of it feeding habits similar to that *of M. vittalus* as it was ingesting infected food very occasionally while the low prevalence of cestodes infection may be due to discontinuity of the pond itself. Since these ponds are not permanent one that is; they get dry very often when rain water is not available, the life cycle for cestodes get disturbed or blocked (Zaidi and Khan, 1976). That is why the onwards transmission of parasites stopped resulting into low prevalence and parasite intensity.

REFERENCES

AHMED, M.S., 1994. *Trypanosomiasis in common carp, Cyprinus carpio* L. Ph.D. thesis, Zoological Institute, Catholic University Leuven, Belgium, pp.12.

AKRAM, M., 1988a. On the subfamily procamallaninae (Yeh, 1960). Part-I. Systematic studies on the genus *Procamallanus* (Baylis, 1923) with note on the genus *Platocamallaniis* Bilqees and Akram, 1982 (Nematoda: Camallanidae). *Rec. Zoot. Sur.*, **11**:70-85.

AKRAM, M., 1988b. On the subfamily procamallaninae (Yeh, 1960). Part-II. Erection of two new and rediscription of two known species of the genus *Spirocamallanuss* (Calsen, 1952) Petter, 1979 along with *Malayo carnal/anus* Jolly and Fernando, 1971 (Nematoda: Camallanidae). *Karachi Univ. J. Sci*. **17**: 125-150.

BYKOVSKAYA, I.E., PAVLOVSKAYA, A.V., GUSEV, M. N., DUBININA, N.A., DUBININA, N.A., IZYUMOVA., T.S., SMIRNOVA, I.L., SOKOLOV-SKAYA, G.A., SHTEIN, S.S. AND SHUL'MAN, V.M., 1964. Key to parasites of freshwater fish of the U.S.S.R. Israel Program for Scientific Translations, Jerusalem.

HABIB, S., 1996. *Studies on the helminth parasites of a freshwater fish, Wallago attu.* M.Sc. thesis, Department of Zoology, Govt. College, Lahore, P. 35.

KHAN, A. AND BILQEES, P.M., 1990. *Allocreadium kalriai*, new species (Trematoda: Allocreadiidae) from the fish *Channa striatus* (BI) of Kalri lake, Sind. *Pakistan J. Zool.*, **22**: 345-351.

KNAN, A., 1991. *Studies on some helminth parasites of freshwater fishes of Sind.* Ph.D. thesis, Department of Zoology, University of Karachi, pp.376.

MITHAL, R.P., 1981. Two new acanthocephalan worms *Pallisentis croftoni* n.sp. and *P. indica* n.sp. from freshwater fishes of genus *Ophiocephalus*. *Indian J. Zool.*, **17**: 165-175.

MUZZALL, P.M., 1984. Observation of acanthocephalan species infecting the central mud minnow *Umbra limi,* in a Michigan River. *Proc. Helminthol. Soc. Wash.*, **51:** 92-97.

NAZIR, T., 1996. *Studies on the helminth parasites of a freshwater fish, Channa punctatus.* M.Sc. Thesis, Department of Zoology, Govt. College, Lahore.

SCHMIDT, G. D., 1990. *Essentials of Parasitology* (4th ed.). W.M.C. Brown Publishers.

ZAIDI D, A. AND KHAN, D., 1976. Cestodes of fishes from Pakistan. *Biologia (Lahore)*, **22**: 157-179.

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