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RESEARCH ARTICLE

HELMINTH PARASITES INFECTION OF THE FISHES OF NAMBOL LOCALITY, BISHNUPUR DISTRICT, MANIPUR

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ABSTRACT

Biodiversity may be defined as species richness (plants, animals and micro-organisms) in a given habitat be it on land, in fresh water or sea or as parasites or symbionts. Biodiversity represents sum total of various types of microbes, plants and animals present in that system. It is the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystem and the ecological complexes of which they are a part and includes diversity within species, between species, and ecosystem. Wetlands are the transitional zones between the terrestrial and aquatic environment. These habitats perform major ecological role in biosphere. They are immense use of mankind both economically and ecologically. Present paper depicted that the diversity on helminth fauna of freshwater fishes from Nambol Locality of Bishnupur District of Manipur. The study was conducted between April to August 2013 and found four groups of parasites in 600 fishes. The fishes belong to five different orders and thirteen families. Among the fishes, 279 are found infected with helminth parasites belonging to four different groups i.e., class Acanthocephala, class Cestoda, class Trematoda and 13 belongs to class Nematoda.

INTRODUCTION

The ever increasing demand for natural resources such as water due to ever increasing population as well as government constructed dams which supply water to the local communities for farming, industry, and general house hold etc. Human civilizations depend partly or fully on freshwater biodiversity for a variety of resources. Among organism, most attention has focused on fish as food of protein rich diet because of their overwhelming economic importance. The importance of fish parasites is related directly or indirectly to the importance of fish they may affect. There is bewildering array of fish parasites and probably all the fish species harbor one or more species. Parasitic diseases of fish are very common throughout the world and are of particular importance in the tropics. Fresh water fish serve as definitive and or intermediate hosts in the life cycle of many helminth parasites (Schimidt, 2003). Fish parasites are an integral part of aquatic ecosystems and they are commonly found in wild and aqua cultural systems. Large population of parasites usually cause health effects including oxidative stress (Marcogliese *et al*., 2005), tissue damage, immune suppression, and endocrine disruption (Jobling and Tyler, 2003), among others; and, may sometimes lead to the mass mortality of infected hosts. These parasitic events are often associated with biotic or abiotic changes in the environment. Nevertheless, factors, such as, fish population size could also determine parasite infection rates (Bagge *et al*., 2004). Fish illness due to helminth parasites is one of the important problems in fish farming. A wide range of parasitic infections of freshwater fishes have been studied from various parts of the world. Many workers studied different aspects of fishes, including their morphology, ecology, behavior, lifecycle, histopathology of different organs infested by helminth parasites. Probably all the fish species harbour one or more parasite species. Chubb (1977, 1979, 1980, 1982) illustrated the studies of seasonal occurrence of helminthes in freshwater fishes in different climatic zones of the world. Work of Yamaguti (1958, 1961) related the occurrence of helminth parasite in vertebrate host is of immense importance, Gupta (1961) described new cestode from freshwater fishes. Jha (1989) studied the characterization of parasite fauna of fishes of Muzaffarpur, Bihar. Shomorendra and Jha (2009) studied the acanthocephalan parasites of certain fishes from Manipur. Kar and Sen (2007) studied the systematic list and distribution of fish biodiversity in Mizoram, Tripura and Barak drainage in

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North East (NE) India. Kar *et al.* (2008) studied the panorama of fish biodiversity in certain rivers and wetlands protected areas in Assam. Sangeeta *et al.* (2010) studied the diversity of fish Nematodes of Oinam Lake in Bishnupur District of Manipur. Shomorendra *et al.* (2011) studies on Cestode parasites of Manipur: An observation on some caryophyllid infection in some freshwater fishes of Manipur. Binky *et al.* (2011) studied the diversity of helminth parasites in fishes of Karbhala wetland in Cachar District of Assam. Singha *et al.* (2011) studied the influence of host species, sex, length and different seasons on the helminth parasite infection in the fishes of Dolu Lake, Silchar, Assam. Puinyabati *et al.* (2013) studied the helminth parasites of fishes of Awangsoi Fishery, Manipur. Ranibala Th *et al.* (2013) discussed briefly about the seasonal variation of the nematode *Camallanus anabantis* in the fish *Anabas testudineus* in Loktak Lake, Manipur, India not tend to severely injure their hosts. Singh *et al.* (2013) made a detail study on Helminth Parasite Fauna of the fishes of Pumlen Lake, Thoubal District, Manipur. Sometimes, these parasites can affect the biology of fishes as well. Among other organs, these parasites may infect the brain of the fish to affect the behaviour. The fish may also become susceptible and prey to the predatory birds sometimes.

It flesh is nutritionally equivalent to meat in protein contents, low in saturated fats and high in essential minerals and vitamins. To have healthy and quality fish meat, the fishes should be free from all the types of infection like viral, bacterial and parasitic. Helminthes are found in all animals including fishes throughout the world (Bychowsky, 1962). Parasites in fish are natural occurrence and common. Parasite can provide i.e. parasite communities can be used to distinguish distinct populations of the same fish species co-coordinating a region. Parasites are a group of organisms that may or may not cause illness in depending on a harmful if present in large numbers but they are not harmful if they present in few numbers. Helminth parasite damages health of the fish but also due to quality condition of water (Read, 1992).

Our study site Nambol is a city and a municipal council in Bishnupur district in the Indian state of Manipur. Nambol is one of the educational hubs of Bishnupur district as well as of Manipur. Its market, known as Nambol Bazaar is the second busiest market, after Khwairamband Bazaar (also known as 'IMA Keithel') in Manipur. Nambol is located at 24.71°N 93.84°E. Fish is an excellent source of food. (Figure 1 Map of Nambol)

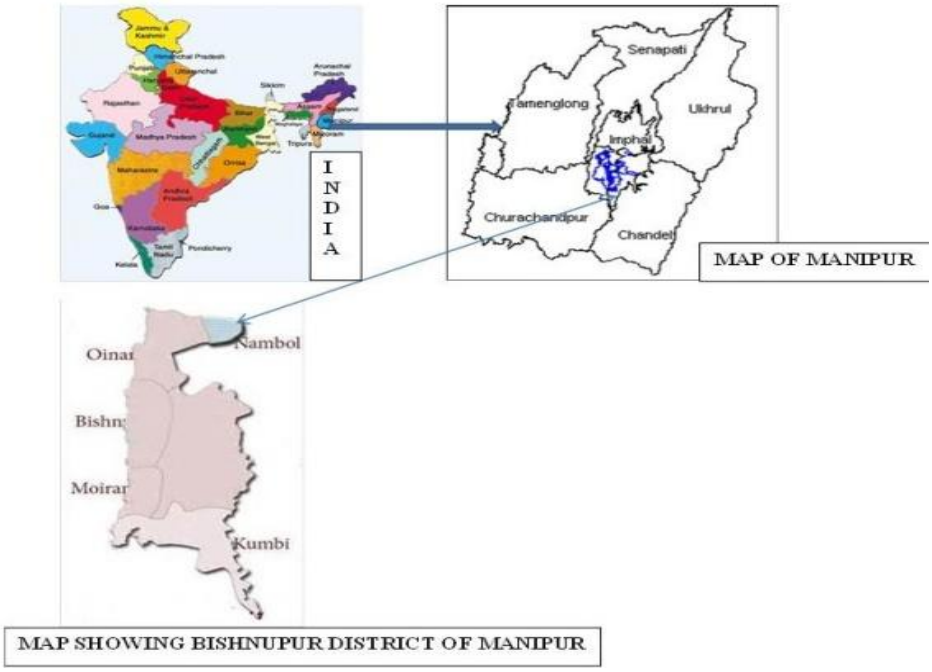
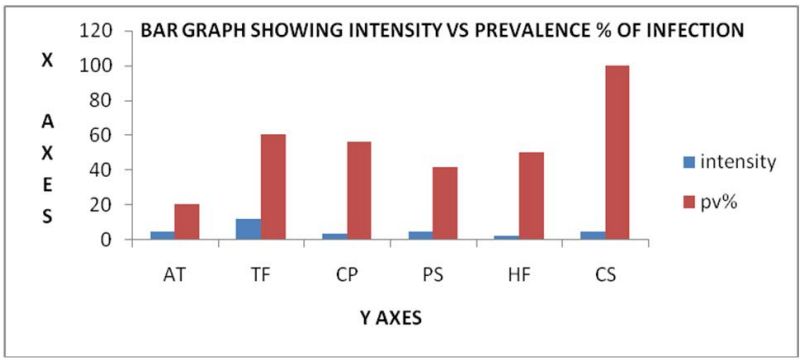


Figure 1. Showing the map of study site i.e. Nambol locality



AT=*Anabas testudineus*, TR= *Trichogaster fasciatus*, CP= *Channa punctatus*, PS= *Puntius sophore*, HF= *Heteropneustes fossilis*, CS= *Channa striata*

Figure 2. Showing intensity Vs Prevalence % of infection

MATERIALS AND METHODS

The fishes were collected live and carried in containers to the laboratory in polythene bags containing water of the same locality. The external and internal body organs were thoroughly examined for the parasites. The parasites collected were fixed in the fixatives prescribed for different helminth groups. The acanthocephalan were fixed and preserved in the AFA (alcohol-formalin-acetic acid), Cestode in 5% formalin, nematode stretched in glacial acetic acid and fixed in 70% alcohol and Trematode is fixed in A.F.A and preserved in 70% alcohol. To facilitate identification of worms Cestodes were stained in alum carmine and mounted in Canada balsam while the acanthocephalans were cleared in lactophenol and observed under stereo binocular microscope.

Table 1. List of helminth parasites infecting in the fishes of Nambol Locality

S.No	Name fish host	Acanthocephala	Cestode	Nematode	Trematode
1.	*Anabas testudineus*	–	–	+	–
2.	*Trichogaster fasciatus*	-		+	+
3.	*Channa punctatus*	+		+	+
4.	*Puntius sophore*	-	+	-	-
5.	*Heteropneutes fossilis*	-	+	-	-
6.	*Channa striata*	+		-	-

Negative (-) means absent and Positive (+) means Present

Table 2. Showing prevalence and intensity of helminth parasites groups of Nambol Locality

S.No.	Fish Host	Total no. of fish examined	Total no. of fish infected	Total no. of parasites	Parasites Group	Intensity	Prevalence (%)
1	*Anabas testudineus*	120	24	98	*NT	4.08	20
2	*Trichogaster fasciatus*	90	54	612	*NT ,*TR	11.33	60
3	*Channa punctatus*	174	98	325	*NT ,*TR	3.32	56.32
4	*Puntius sophore*	116	48	192	*CT	4	41.38
5	*Heteropneutes fossilis*	90	45	90	*CT	2	50
6	*Channa striata*	10	10	40	*AC	4	100

*NT equal to Nematoda, *CT equal to Cestoda, *TR equal to Trematoda and *AC equals to Acanthocephala

Table 3. Showing group of Parasites and their site of infections

S.No.	Fish Host	Parasites groups	Site of infections
1	*Anabas testudineus*	Nematoda	Intestine
2	*Trichogaster fasciatus*	Nematoda and Trematoda	Intestine, Body cavity, Intestine
3	*Channa punctatus*	Nematoda and Trematoda	Liver, Stomach, Intestine
4	*Puntius sophore*	Cestoda	Intestine
5	*Heteropneutes fossilis*	Cestoda	Intestine
6	*Channa striata*	Acanthocephalan	Intestine

DISCUSSION

During the investigation for helminth parasites infection, 600 fishes were examined, belong to 5 order and 13 families having 15 genera (46.5%) were rate of infection in whole. (Table 2) highlights a sum total of 1357 parasites individuals were found to infect in the fishes belonging to four different types of helminthes. Acanthocephala shows highest infection rate during our examination which was followed by Trematoda and Nematoda. The intensity of infection rate is quite in *Channa striata* and lowest in case of *Anabas testudineus*. Puinyabati *et al.* (2010) discussed that some of the parasites are host specific. Many of fish die due to various infections may be due to fungus, bacteria, viruses, Protozoa, crustacean and molluscans. In addition to these, infection also due to helminth parasites is also a major problem. They can cause diseases even mortality in fishes. (Table 3) shows the relationship between fish host and their site of infection. The infection in intestine is very common in all fish host. The heavy infection is intestine, liver, and stomach sometimes leads to blogging which automically leads to die of fish host. Geetarani *et al.* (2011) also discussed that the infection due to trematodes may be major problem in reducing the fish yield by causing mortality in fish and advised not to take improperly cooked fishes. Diseases affect the normal health condition and caused and reduction of growth, abnormal metabolic activities and even death, thus result great economic loss. Healthy of population depends on the control of diseases and maintenance of a healthy relationship between living creatures and their environment (Snieszko, 1983). Five factors directly influence the parasite fauna of fish like age, diet, abundance of fish and season (Kabata, 1985).

Srivastava, (1975) also discussed that the characteristic of any water body can influence and determined its parasitic fauna and when environment condition such as water, food temperature become favorable for mass reproduction of parasites, the disease may spread very quickly. Puinyabati *et al.* (2013) clearly discussed that the species and feeding activity of the host fish and also the choice and composition of the food play very important role in the diversity of the helminth fauna in fishes. Further investigation is very much necessary to explore more information in fish parasites as well as fish diseases in entire district of Manipur.

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