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Studies on cestode parasites of freshwater fishes in the Madhepura region of the River Kosi

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Abstract- Fishes are relished by the people of Madhepura district as they are easily available in river Kosi. Though abundant, infestations by parasite greatly hamper the growth as well as yield of fishes. Parasites of fishes are categorized into 3 categories, Nematodes, Trematodes and Cestodes. Major nematodes include *Capillaria pterophylli* which infects Cichlids (e.g. tilapia). Trematodes are blood and tissue flukes infect fishes like *Wallgo attu, Channa punctatus* etc. Cestodes are segmented tapeworms that infect Silurians. Fishes used were preserved in 10% and 40% formalin and after cutting them open the parasites were identified and classified.

Key words: Cichlids, Nematodes, Trematodes, Cestods, Parasite,Silurian,etc.

INTRODUCTION

Fishes are considered delicacy in the regions of Bihar. Bihar is nourished majorly by the river Ganga and river Kosi. It is also bestowed with the abundance of freshwater fishes which are a great source of proteins, carbohydrates and oil. Madhepura is in the north eastern part of Bihar and located in the plains of Kosi River. The range of temperature of madhepura lies between 35 – 45 degrees C in summers and between 7-9 degrees C in winters.

Bihar receives an annual rainfall of 1000 mm per year. The district generally has almost humid type of climate. The winter season begins from the month of November and lasts till the month of February and January is the coldest month. The summer season starts from the month of March and lasts till the month of June. May is the hottest month when and rainfall is usually 1300mm. In general the district exhibits a low land with few gentle undulations due to several ups and down in the form of flood, famine and drought.

River Kosi and its tributaries controls the drainage. The economic efficiency of the district is usually dependent upon the agriculture. Though fishes are abundant, there is constant shortage of fishes for human consumption. There are many reasons owing to this condition; one of the major reasons is being infestation by fish parasites. Parasite not only hinders the growth of fish, it decreases the fish viability, as well as its reproductive capability by impairing its bodily functions. The river Kosi is about 720 km long and divides into many tributaries like Kamala, Baghmati (Kareh) and Budhi Gandak, Bhutahi Balân. Major Fishes like, *Clarias batrachus, Labeo rohita, Mystus vittatus, Mystus tengra, Wallago attu, Xenentodon cancila, Mastacembelus*

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armatus, Channa punctatus and *Channa marulius* are found in the river Kosi and are consumed by humans. *Clarias batrachus* is the state fish of Bihar.

Madhepura is one of the worst affected regions of floods that occur annually due to the unstable nature and path changing behaviour of Kosi, popularly called as the "Sorrow of Bihar". Though it is fresh water, the water is not potable, which means it is unfit for drinking. This was concluded due to high amounts of feacal matter found in the water body. The water quality index was found to be 45.

There are plenty of parasites which harm the fish production. Some major fish parasites that affect humans or the fishing industry are roundworms (nematodes), flatworms or flukes (trematodes) and tapeworms (cestodes).

Nematodes also called as round worms infect fishes and cause damage. Examples include *Capillaria pterophylli* which infects Cichlids, Eustrongylid nematodes infect yellow perch, *Camallanus* species infect gut of cichlids, *Contracaecum* species infect carps, etc.

Trematodes or flukeworms are endoparasites whose intermediate host are snail followed by the definitive host vertebrate. Examples include the lung fluke, *Paragonimus westermani*, and the liver flukes, *Clonorchis sinensis* and *Fasciola hepatica* which are under the category of tissue flukes. The second category which is the blood flukes includes species of the genus *Schistosoma*.

Cestodes or tapeworms are classified under the phylum Platyhelminthes. They are flat and segmented. Cestodes rely on 2 classes of host first being the definitive host which in this case are vertebrates like humans and a wide range of intermediate host like insects, crustaceans, arthropods, etc. Their life cycle includes 3 hosts, copepods being the initial host, fishes being the intermediary host, and humans forming the final host.

MATERIALS & METHODS

With the help of local fishermen fresh fishes were captured using gears and nets of different varieties like cast nets, scoop net, hooks etc. These fishes were collected for observation, identification and classification. Photography before and after collection in glass jar was done on the spot. Photography was done to avoid any miscalculation resulting by colour change after addition of formalin. The glass jars used were cleaned thoroughly. Fishes were preserved in 10% formalin and 40% formalin was injected into their body via their mouths.

The labelling procedure included giving serial number to each glass jar, writing the locality of collection, the day and date along with the time of collection. Local name of the fish was also noted. The temperature, humidity and ph of water were noted carefully. The turbidity of water was measured. A sample of water for any further analysis was taken.

The samples were then brought to the Department laboratory for investigation and identification.

RESULTS & DISCUSSION

11 species of Siluriforms are found in Bihar which includes *Mystus tengara, Sperata aor, Sperata singhala, Mystus vittacus, Mystus cavacus, Wallago attu, Ompok bimaculatus, Clarias batrachus, Ailia coilia, Heteropneustes fossilis, and Eutropichthys vacha.* Most of these are edible. These fishes are infected with almost all the 3 types of helminthes i.e. round worms, flat worms and tape worms.

In the taxa Cestoda, which is again subdivided into cyclophyllidea and pseudophyllidean various species are found. In Cyclophyllidea, *Echinococcus granulosus and E.multilocularis* cause *Echinococcosis*, a disease which results in formation of cysts or nodules in the intestine of the host. *Taenia saginata*, *T. Asiata,* and *T scolium* causes Taeniasis / Cysticercosis is also the infection of intestine, and may cause abdominal pain and weight loss in infected individual.

Hymenolepis nana and *Hymenolepis diminuta* cause *Hymenolepiasisa* disease caused by infection with the above 2 species simultaneously. In Pseudophyllidea**,** *Diphyllobothrium latum* causes Diphyllobothriasis which has symptoms like gastrointestinal complaints, weight loss, and fatigue, *Spirometra erinaceieuropaei* and *Diphyllobothrium mansonoides* causes Sparganosis. In sparoganosis seizures, hemiparesis and headaches are seen.

Table 1. List of Cestode Taxa sampled from freshwater fishes in the Madhepura region of the River Kosi

Sl. No.	Cestode taxa	Disease caused	Fishes infected	Area of infection	Observations
1.	**Cyclophyllidea**				
	Echinococcus granulosus	Echinococcosis	Siluriforms	Gastro intestinal tract	Nodule formation in gall bladder and intestine
	E.multilocularis	Echinococcosis			
	Taenia saginata	Taeniasis / Cysticercosis			
	Taenia asiatica	Taeniasis / Cysticercosis			
	Taenia solium (pork)	Taeniasis / Cysticercosis			
	Hymenolepis nana	Hymenolepiasis			
	Hymenolepis diminuta	Hymenolepiasis			
2.	**Pseudophyllidea**				
	Diphyllobothrium latum	Diphyllobothriasis	Siluriforms and tilapia	Ceolomic cavity	Atrophy in tissue and inflammation
	Spirometra erinaceieuropaei	Sparganosis			
	Diphyllobothrium mansonoides	Sparganosis			

We can see that most parasites not only harm the fishes but are also transferred to humans and other vertebrates via them. It is advisable that raw consumption of fishes must not be done without proper treatment, or must be avoided at all costs. In humans, these parasites can cause seizures, headaches, abdominal pain, cyst formation, inflammation, skin irritations, vitamin deficiency and if by chance the parasite migrates upto the brain, it can cause memory loss.

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