

Effect of digenetic trematodes on intestine and its related organs of *Channa punctatus* (Bl.) and *Xenentodon cancila* (Ham.) of Bundelkhand region.

S.F. Siddiqui¹ and S. S. Naz^{1*}.

¹Department of Zoology, Bipin Bihari (P.G) College, Jhansi

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Abstract :

The present communication deals with the helminth parasites in fresh water fishes *Channa punctatus* and *Xenentodon cancila*, some histopathological changes have been observed in the alimentary canal and its related organs including liver, pancreas, gall bladder, kidney and body cavity, from different places of Bundelkhand region, Jhansi, during 2008 to 2010. Helminth parasites were the most frequent infectant. A total of 286 helminth parasites were recovered from the two species of fish. 210(73.42%) of these were Trematodes, 66(23.07%) were Nematodes and 10(4.76%) were Cestodes. A total of 180(62.93%) parasites were recovered from *X. cancila* out of which 136(75.55%) were Trematodes, 38(21.11%) were Nematodes and 6(3.33%) were Cestodes. 106(37.06%) parasites were recovered from *C. punctatus*, 74(69.81%) of these were Trematodes, 28(26.71%) were Nematodes and 4(3.77%) were Cestodes. Intestinal pathology associated with digeneans was minimal. The main damage caused by digeneans was destruction of the mucosal epithelium of the villi, growth of abnormal tissues as lesions and heavy necrosis. At the site of infection, numerous warts and mucous layer were seen in the epithelium. The larval stages of helminth parasites induce severe damage within the tunica propria and on the external surface of the stomach and intestine, with conspicuous granulomas.

Key word: Helminth parasites, *Channa punctatus* and *Xenentodon cancila*, fresh water.

Introduction

Due to the important of fish as one of the major source of obtaining cheap protein, studies on this aspect of biology, morphology and diseases of fish is very important. Fish culture provides a large reservoir of parasitic pathogen common in both wild and cultured fish.

Parasitic diseases, either or themselves association with other environmental stresses, influences weight or reproduction of the host, alters its population characteristics, and affect its economic importance (Rhode, 1993). Parasites occupy therefore an important position in the animal kingdom for their remarkable adaptations and damaging activities to host. The importance of parasite is related largely to the fish affecting the general public health (Hoffman, 1967). According to (Gupta, 1983) injury of fishes can carry heavy infection of parasites that cause deterioration in the fish food and may even result in

their mortality. (Chowdhury, A.K., 1992) studied on the helminth parasites infestation and histopathological changes in the snake head fishes. It is also reported that the microparasites generally are the most important parasites in aquaculture (Sommerville, 1998).

The gastrointestinal tract is a primary route of infection in fish and other vertebrates as reported by (Ringo et. al. 2007). This is due to entry of the pathogen, as well as the ready availability of the attachment sites and nutrients and a relatively non-aggressive immune response (Secomber and Chappell, 1996). Infection of the alimentary canal by helminthes especially digenetic trematodes has injurious effects on tissues and the digestive physiology of the host (Hoste, 2001). It is also observed that intestinal helminths often promote inflammation in the area of infection of the fishes.

Materials and Methods

The freshwater fishes were collected at sources from river Pahuj, Betwa, Parichha, Baruasagar, Matatila

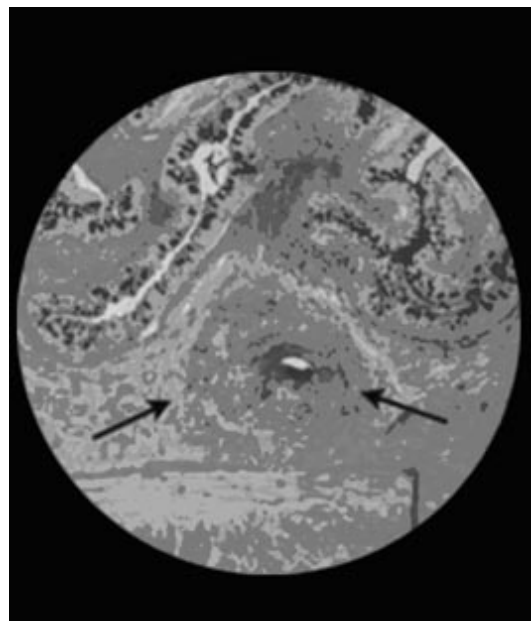
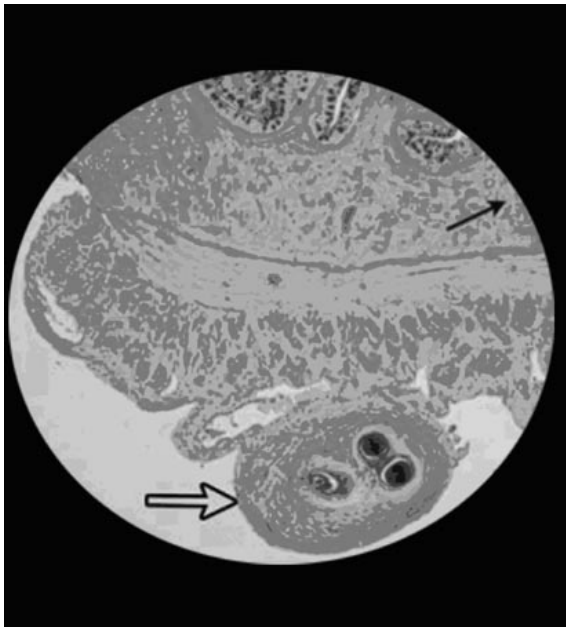
* Corresponding author's E-mail: ssnaz501@gmail.com

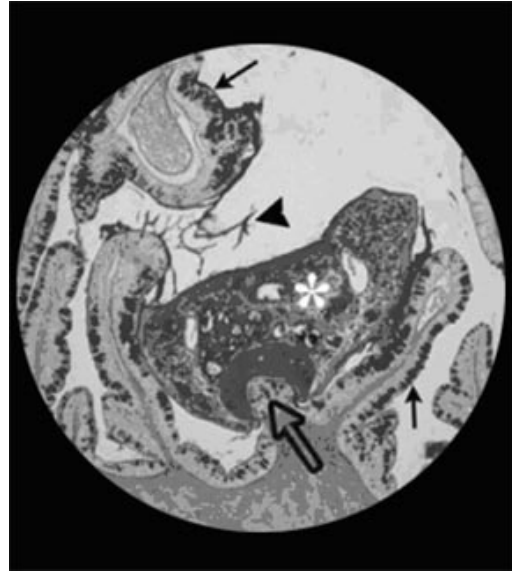
and also from local fish market, were brought and kept in well aerated laboratory aquarium at the appropriate temperature. Care should be taken to handle fish humanely and euthanize with approved anesthetic prior to examination. Fishes were subjected to full clinical examination to determine any abnormalities in their behavior or abnormal changes showing clinical abnormalities (changes in colour, size, shape, of organs and tissues). Infected fish were transferred alive to the laboratories for performance of complete postmortem, parasitological and histopathological examinations. Sample were collected from infected fish for complete parasitological, Pathological and histological examinations.

For study of histology of the tissue including pathology any living organ or tissue is fixed and a series of section are obtained. It conducts using the method described by (Robert, 1978), in which the sample were trimmed and fixed in 10% phosphate buffered formalin or boins fluid which is prepared with the help of picric acid, it is yellow in colour, then washed away in running water dehydrated in alcohol and cleaned in xylol, embedded in paraffin wax and cut in thin section of 6 or 8 microns thickness. Section will be stained either with Haemotoxyline or eosine (Lille, 1954) as routine stain.

Result and Discussion

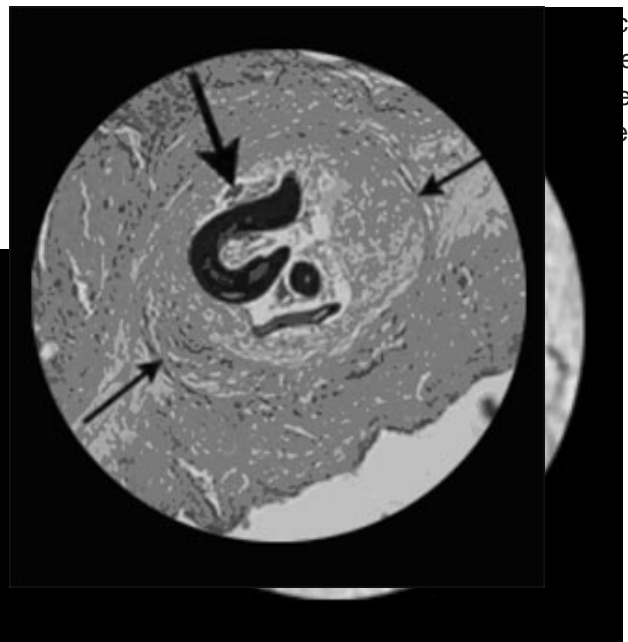
The most heavily parasitized segments of *Channa punctatus* and *Xenentodon cancila* digested tract were the intestine and duodenum. The digeneans were the predominant species and occurred throughout the length of the alimentary canal. The major damage influenced by digeneans and their larval stages consisted of necrosis and sloughing of stomach and intestine epithelium. At the site of infection, numerous warts and mucous layer were seen in the epithelium. Histological sections showed the anterior portion of the digeneans attached to the intestinal wall by the oral sucker which detached particles of epithelium. Epithelial cells in various stages of degeneration were observed inside the sucker. Detached and damaged epithelial fragments were also seen in proximity to the parasite's body and within the gut lumen. Data from several recent surveys of wild and farmed fish support the suggestion that leucocytes are an immune cell type closely related to other piscine inflammatory cells such as mast cells (Reite, 2005; Reite and Evensen, 2006; Jordanova et, al., 2007; Dezfuli, et, al., 2008; Vigliano, et, al., 2009) These result show the variety of parasites caused remarkable histological changes in different parts of body in fresh water fishes, have been reported by numerous workers.



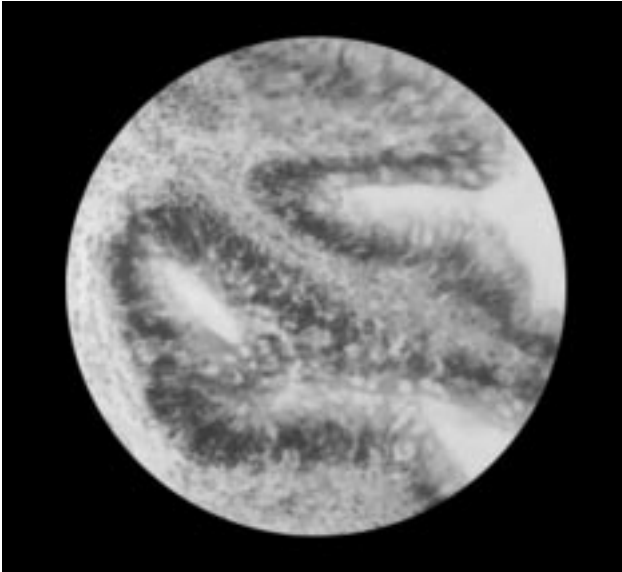


Intestine of *C. punctatus* showing increase number of mucous cells due to attachment of the digeneans to the intestinal wall (Plate-A) Intestine of *C. punctatus* showing metacercariae within the intestinal wall, thin arrows show granulomas. (Plate-B) Conspicuous granulomas on external surface of the intestine of *X. cancella*, surrounding digeneans larvae(Plate-C) Intestine of *X. cancella* showing granulomas within the wall of the intestine(Plate-D).

The larval stages of helminth parasites induce severe damage within the tunica propria and on the external surface of the stomach and intestine, with conspicuous granulomas (Plate-B,C&D). Data on fish granulomas provoked by helminthes have been reported by (Taraschewski, 1988,1989., and Karanis



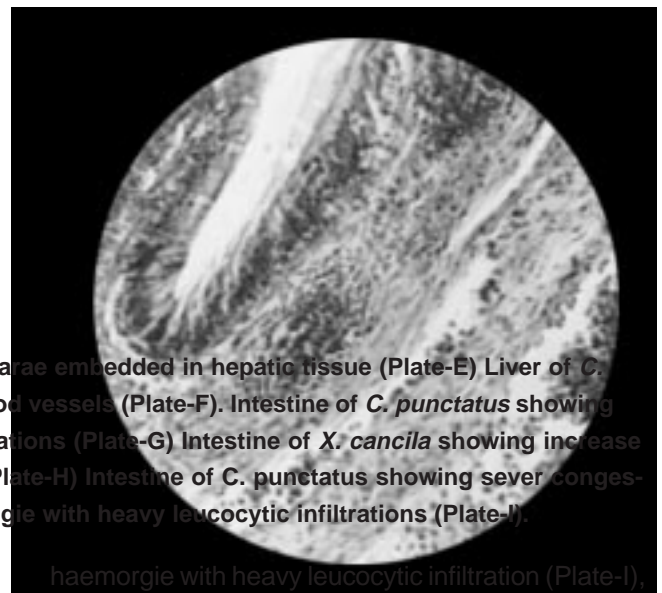
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Liver of *C. punctatus* showing encysted metacercariae embedded in hepatic tissue (Plate-E) Liver of *C. punctatus* showing sever congestion of hepatic blood vessels (Plate-F). Intestine of *C. punctatus* showing increase number of goblet cells with leucocytic infiltrations (Plate-G) Intestine of *X. cancila* showing increase numbers of goblet cells with leucocytic infiltrations (Plate-H) Intestine of *C. punctatus* showing sever congestion of submucosal blood vessel & haemorrhage with heavy leucocytic infiltrations (Plate-I).

Histopathological changes in the liver of the fresh water fishes involving sever congestion of liver cells (Plate-E and F), also reported in the liver of *Clarias batrachus* (Parasad, Y., and Qureshi, T.A., 1995), in the liver of cyprinid fish (Hoole, D., Bucke, D., Burgess, P and Wellby, I., 2001).

In Present histological study, the effect of different types of parasites caused varying degree of intestinal lesions including degeneration of cellular boundaries, severe congestion of submucosal blood vessels and



haemorrhage with heavy leucocytic infiltration (Plate-I), destructions of mucosal epithelium, desquamation, oedema. They caused well marked degenerative changes in the epithelial cells. The severity of effects varied with the intensity of parasites. In case of high intensity of parasites, the lesions were more and pronounced. In the severe infection, there was disruption of all layers of the intestine including the increase number of mucous cells with leucocytic infiltration in both fish species *C. punctatus* and *X. cancila*

Name of The fish	Type of the fish	Length (inch)	Width (cm)	Weight (gm)
<i>C. punctatus</i>	Healthy group	12.5	11.3	5.0
	Infected group	4.2	210-215	180-200
<i>X. cancila</i>	Healthy group	10.5	9.4	2.5
	Infected group	2.1	190-220	170-200

Table 1 : Morphological changes in the fishes due to Trematode infection

(Plate-G,H and A). This agrees with the findings of (Wedemeyer, J., Tsai, M., Galli, S.J., 2000).

Morphological changes were found in *C. puntatus* and *X. cancila* due to heavy trematode infection (Table-I). This was in accordance with (Bullard, S.A.S., Frasca, S. Jr., and G.W. Beng 2000., Aken'ova, T. 2000b). The intensity of the parasites increased, it leads to biochemical disturbance in the fish body. In helminthes some of such changes are the presence of thick cuticle few protecting them from the digestive enzymes of host, possession of strong adhesive organs, spines and hooks are meant to attack some of the organs systems like respiratory, circulatory and reproductive systems etc. The attachment organs of endoparasitic helminthes often provokes inflammation of the host gastrointestinal tract. Inflammation is a protective reaction of the host in respons to injury, resulting in specific chemical and morphological alteration in cells and tissues (Suzuki and Iida, 1992). The presence of these parasites are rarely noted only when they become obvious apparently and fishes are rejected by fishermen and consumers. The pathogenicity of parasites varies greatly depending on their number, habitats, degree of adaptation that has developed with host and considerably with the species and size of the host and its health status. Thus the parasites cause a number of diseases and damage to human beings and other domestic animals and affect the normal health values. Therefore, to improve the health values and biological productivity, there is a need to develop suitable methods which prevent the expansion of these parasites thereby helping to a greater extent in preventing them and immunizing their effects. In recent years a number of workers have done work in this field. Few of drugs like bayer 205 (also called antrypol) and pentamidine, certain sulpha drugs like salphanilamide and sulphamerazines are known to act on certain specific physiological systems or inhabit a metabolic pathway

by inactivating one or more enzymes. In the body of any organism a number of metabolic pathways are presents and these after many points which cause injury where parasites can act. A few herbs like Tulsi and Neem leaves, bark and fruits were used in the Lab. aquarium, shows positive result to control the parasites and their effect on fish or aqua culture.

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