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HISTOPATHOLOGICAL STUDY OF *MASTACEMBELUS ARMATUS* (LECEPEDE, 1800) INFECTED WITH TAPEWORM FROM OSMANABAD DISTRICT (M.S.) INDIA

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Abstract

The freshwater fish *Mastacembalus armatus* (Lecepede, 1800) collected from Osmanabad district during the period of June 2008 and after dissection their intestinal passage was examined for tapeworm parasites. The tapeworm, *Circumoncobothrium* sp. Shinde (1968) was recovered from intestine *Ophalocephalus leucopunctatus*. The histopathological studies were carried out and observations clearly shows that the parasites, *Circumoncobothrium* sp. was approaching to the intestinal villi, embedded in the fibroblast cell, plasma cell and are attached to the intestinal villi. The histopathological studies of tapeworm *Circumoncobothrium* sp. *have* been studied to find the pathological changes and extent of damage of the intestinal layers of *M. armatus*.

Keywords: Histopathology, *Circumoncobothrium* sp., *Mastacembalus armatus*, Intestinal villi, Osmanabad

Introduction

In aquaculture the health of fish is of at most important. The health of fish can be affected by environmental factors, nutrition as well as by pathogens. The presence of large population of a particular species of fish provides ample habitats for parasites and the stress conditions associated with such crowding will also affect the health and subsequent susceptibility of the fish to parasites. Parasites are affected by both the macro and micro environments. The environmental factors are important in the recruitment, transmission, colonization, fecundity and survival of both the adult and larval parasites (Esch *et al.,* 1977). The tapeworm *Circumoncobothrium sp.* is one of the tapeworm which cause the severe damage to *M. armatus* which results into the anemia, weight loss and decreased production.

The extensive study on the host parasite relationship has been carried out by *Amoebotaenia indiana* (Mitra and Shinde). *Hymenolepis nana* (Bailey, 1951). Host response to implanted adult *H. nana* as studied by Coleman and Sa L. M, 1962 and experimental immunization of dog against *E. granulosus* was first observed (Foresk and Rukavina, 1959). Histopathology of *Acanthobothrium uncinathum* was observed from a fish *Rhynchobatus ajeddensis* (Murlidhar and Shinde, 1987). They have studied the histopathology of intestine of fish caused due to cestodes (Hayunga, 1977) and the caryophyllaeidiasis in fish hosts (Ahmed and Sanaullah, 1975). In rural area rearing of the *M. armatus* (Lecepede, 1800) is the common business for the fisherman, for this purpose the commonly used *M. armatus* and other fishes where helminthes infection is the common threat to the *M. armatus* population. In this first investigation we studied the histopathology of fish by tapeworm *M. armatus* (Lecepede, 1800).

Material and Methods

For the histopathological study, *M. armatus* of freshwater fishes were collected from local fisherman of Osmanabad district during the period of June 2008. These fishes were brought to the laboratory, dissected out the intestine, examined for the cestode infections. Some fishes were found to be infected whereas few were not. Both infected and non infected hosts intestine were fixed in Bouin's fluid to study histopathological changes. The fixative inhibits the post mortem changes of the tissues. Then tissues were washed, dehydrated through alcoholic grades, cleared in xylene and embedded in paraffin wax (58-62°C). The blocks were cut at 7μ by rotary microtome and slides were stained in Eosin Haematoxylin double staining method and the sections were mounted in the DPX. Best slides or sections were selected and observed under the microscope for histopathological study. The photomicrographs were taken with the help of camera. These slides were identified by using keys "Systema Helminthum" (Yamaguti, 1956).

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Results and Discussion

From the present communication the results indicate that some of the intestines were found to be infected with cestode parasite. The (Plate No. A) Shows the healthy intestine, in which villi and all layers are clearly observed, where as in (Plate No. B) infected intestine shows that the worm attached to the mucosal layer of intestine and slowly invades to the deeper layers of the host tissue.

The worm *Circumoncobothrium sp.* is having scolex with hooks, which are used for attachment with the intestine of host *M. armatus.* In L.S. of intestine it has been observed that the *Circumoncobothrium sp.* attached to the mucosal, sub-mucosal and muscularis mucosa of intestine and slowly damaged the host's intestinal tissue and it destroys the intestinal epithelium of villi showing they are highly destructive to intestine of *M. armatus*.

On closer observations the parasites turned out to be *Circumoncobothrium sp.*; these cestodes are found in the anterior part of the intestine. The transverse section of healthy intestine of host *M. armatus (*Lecepede*, 1800)* shows intact histological architecture and all layers are clearly observed, whereas in the infected intestine with cestodes parasite, *Circumoncobothrium sp.* causing damaged the epithelium. In the longitudinal section of the cestode, *Circumoncobothrium sp.* infected with the intestine of *M. armatus* are clearly observed that the anterior end of the cestode parasite *Circumoncobothrium sp.* was approaching the intestinal villi and damage the epithelial layer, embedded in the fibroblast, lymphocytes, plasma cells and attached to the intestinal villi, therefore, causing inflammation, vacuolation and damage the intestinal villi.

The worm is not only successful to enter into the intestine forming the ulceration in the intestinal wall causing damage to the host tissue but the parasite may affect host physiology in many ways that induce stress in the host. The parasitic infection in turn disturbs the metabolic pathways. (Esch GW et al., 1977). The present study showing that, the *Circumoncobothrium sp.* damage the epithelial layer, these results are matching in accordance with the studies carried out by (Gopal Krishnan, 1968) patterns of scolex invasion in serosa showed as previous reports. Haque and Siddiqi, (1978) have reported the infection of *F. buski* causes surface desquamation of mucosal epithelium, infiltration of eosinophils and plasma cells. They have also observed the destruction of mucosal epithelium and villi of intestine. These finding are similar to those of Haque and Siddiqui who observed surface desquamation and damage lamina propria. It is also observed that inflammatory nodulation in the intestinal wall and increased number of goblet cell.

The Atlantic salmon (Salmo salar) had an anisakid larva partly embedded in the wall of an intestinal caecum (Hammerschmidt, K., 2007). However, the helminths crosses majority of the intestinal layers (internal epithelium, submucosa, muscularis layer) and come to lie near serosa suggesting that, it is very dangerous and destructive parasites to the definitive host (C. J. Hiware,2008).

Observations

Plate A : L. S. of non Infected intestine of *M. armatus*

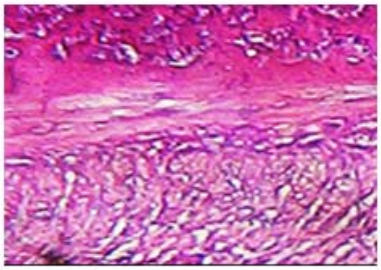
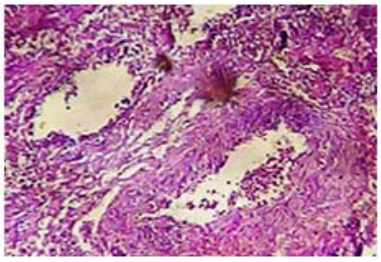


Plate B : L. S. of Infected intestine of *M. armatus*



Conclusion

Parasites affect the productivity of the fish in the systems through mortalities, by decreasing growth rate, reducing the quality of the flesh and making the hosts more susceptible to more pathogens. From above histopathological discussion it can be concluded that tapeworm parasites like *Circumoncobothrium sp.* are finds the nutritive material from the intestine of hosts *M. armatus*, which is essential for their nourishment and growth.

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