



**Histopathological changes due to the infection of cestode parasite,  
*Circumoncobothrium* sp. in fresh water fish, *Mastacembelus armatus*  
(Lecepede, 1800)**

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**Abstract**

*Circumoncobothrium* sp. is found in the anterior part of the intestine of fresh water fish, *Mastacembelus armatus* (Lecepede, 1800). This parasite brought about several histopathological changes in the infected intestine of *Mastacembelus armatus*. Histopathological changes includes damage of internal epithelium, damage of villi, inflammation, vacuolation in the layer of the intestine. The present paper deals with the histopathological changes in the infected intestine of *Mastacembelus armatus*.

**Key word:** *Circumoncobothrium* sp., Histopathology, *Mastacembelus armatus*

**I. INTRODUCTION**

Helminth parasites are important agents among etiology of many fish diseases and may harm their hosts in different ways. These parasites may cause irritation, injury or atrophy of tissues and occlusions of alimentary canal, blood vessels or other ducts. Their presence may lead to certain changes in the activity of enzymes, vitamins or hormones of their hosts. Also, they may introduce toxic metabolic by products that may lead to deprive fish from normal feeding (Williams, 1967).

Fishes are said to be gold in water, they play an important role in nation's economy. As a nutritional point of view, fishes give high content of proteins to the daily growing population. Now a day they are facing the problems of malnutrition. The tapeworms present in them cause considerable damage. The parasitic infections are very common to the man (Sushil Jawale, 2011). 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.( Jaywant Dhole, 2011)

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).

Fish in intensive culture are continuously affected by environmental fluctuations and management practices such as handling, crowding, transporting, drug treatments, undernourishments, fluctuating temperatures and poor water quality. All of these factors can impose considerable stress on the homeostatic mechanism of fish, rendering them susceptible to a wide variety of pathogens. Helminths infect almost all the regions of the alimentary tract of fish. Any damage to the alimentary canal will alter the physiological activities of fish. For cestode parasites the most favourable and selected site is the alimentary canal, and the reason is to meet their primary need of food from the host. Cestodes have also been found to infect many fish and cause pathological effects on the host. In some cases the parasites have caused severe changes in the host.(Laxma reddy and Banarjee, 2014).

Fish health management is the concept of proactively regulating the host, pathogen and environment to maximize the optimal condition for sustained growth and health. In order to get better nutrition from fishes, they must be free from diseases and mishandling. Fish diseases may be due to parasitic or non-parasitic causes. Among the parasites that infect freshwater fishes, helminthes form the most diversified group. Parasitic diseases of fishes are very common all over the world. Globally the parasites (defined broadly as infectious agents of diseases) are responsible for 19 % of human mortality (World Health Organization, 2004). The helminthes exhibit highly diverse ecological inter-relationship and the most complicated host relationship. Endoparasitic helminths, with indirect life cycles, involve one or more hosts. Fishes are one of such hosts that act as either definitive, paratenic (transport) or intermediate host in the life cycle of many helminth parasites.

Noteworthy work was carried out on histo-pathological changes caused by cestode parasites by (Mackiewicz *et al.*, 1972), (Molnár *et al.*, 2003), (Ruhela *et al.*, 2006), (Williams, 2007), (Jadhav *et al.*, 2012), (Gjurčević *et al.*, 2012) and (Laxma Reddy and Benarjee, 2014).

The present study deals with investigation on the *Circumoncobothrium* sp. collected from freshwater fish, *Mastacembelus armatus*.

## II. MATERIAL AND METHODS

For the histopathological study, the freshwater fish, *Mastacembelus armatus* (Lecepede, 1800) were collected from the different region of Aurangabad District and brought to the laboratory and killed by pithing brain, later cut opened the fish and observed internally taken out the intestine in the normal saline water in petridish and cut opened; examination carefully for parasites. The cestodes were collected from the intestine, identified worm were kept separately and wash in saline water solution, flattened by using coverglass and slide, then preserved in 4 % formalin for taxonomical studies. The slides were prepared by Harri's Haematoxyline stain, dehydrated in alcoholic grades (30%, 50%, 70%, 90%, and 100%), cleared in Xylene and mounted in DPX and identification was carries out by the using Systema Helminthum cestode Vol-I (Yamaguti, 1956).

The infected intestines with the cestode parasite were kept intact and small pieces of such intestines were fixed in Bouins fluid for histopathological studied. The fixed tissues were washed in distilled water, dehydrated in alcoholic grades, cleared in xylene, embedded in paraffin wax with melting point (58-60 °C).

Block were cut at 8µ and slides were stained with Haematoxyline counter stained with eosin stain. Best slides were selected, observed under the microscope and photographs are taken.

## III. RESULT

On closer observation of the transverse section of healthy intestine of host *Mastacembelus armatus* (Lecepede, 1800) all layers are clearly observed (**Fig. 1**), whereas in the infected intestine with cestode parasite, *Circumoncobothrium* sp. causing damaged the epithelium (**Fig. 2**).

*Circumoncobothrium* sp. is found in the anterior part of the intestine. In the transverse section of infected intestine with the *Circumoncobothrium* sp. are clearly observed. The cestode parasite *Circumoncobothrium* sp. was damage the epithelial layer, intestinal villi and embedded in the fibroblast, lymphocytes, plasma cells of the intestine. Therefore, causing inflammation and vacuolation (**Fig. 2**).

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.

## IV. DISCUSSION

The present study showing that, the worm *Circumoncobothrium* sp. from *Mastacembelus armatus* (Lecepede, 1800). This pathological result is resemblance and discussed with (Karanis and

Taraschewski 1993), described the histopathological changes in cyprinids infected by *Caryophyllaeus laticeps*, the scolex of *Caryophyllaeus laticeps* cause only local compression of the hosts gut epithelium and at the site of attachment of these cestodes vacuolation of epithelial cells and ruptures the brush border.

(K. Molnar, 2005) shown that, the cestode parasite, *Neogryporhynchus cheilancristrotus* infected to *Gibel* carp fish. Cestode parasite is a truly pathogenic species causing degeneration and inflammation in the intestinal wall, their scolices of *Neogryporhynchus cheilancristrotus* intrudes into deeper layer of the gut and breaking through the epithelium is located in the lamina propria of the mucosa layer.

The Atlantic salmon (*Salmosalar*) had ananisakid 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 (Hiware C. J., 2008).

(Jaywant *et. al.*, 2011) has studied, the worm *Circumoncobothrium sp.* infected to the *M. armatus*. In L.S. of intestine it has been observed that the *Circumoncobothrium sp.* attached to the mucosal 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*.

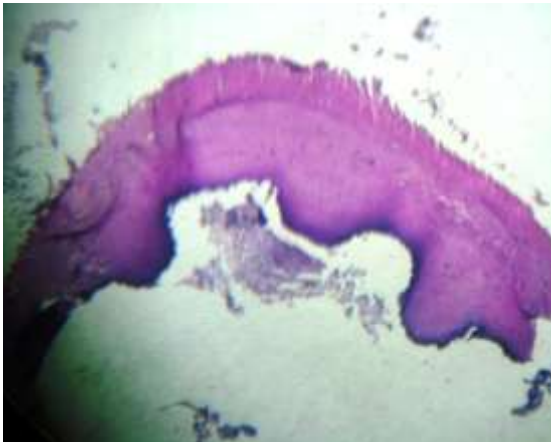
Histology of intestine of *C. punctatus* and *C. striatus* infected by *Senga sp.* exhibited excessive mucus secretion, the worms were found in the lumen of intestine. Pathological effect exhibited ruptured serosa layer, strong inflammatory edema and vacuolization in tunica muscularis and lamina propria, shortened and irregular shaped villous processes with blunt tips, breakage and separation of villous processes with large space. In case of chronic infection in *C. striatus* exhibited damaged submucosal layer and thinning and fusion of villous processes (Pinky kaur, 2014)



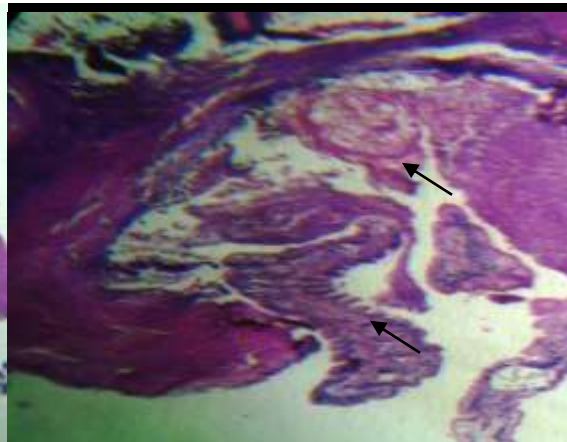
**Host: Mastacembelus armatus**



**Dissected: Infected intestine**



**Figure.1: T.S. of healthy intestine**



**Figure.2: T.S. of infected intestine**

## V. CONCLUSION

It is concluded that, the parasites are very harmful for human being as well as other animals. Fishes gives content of protein, provides vitamin A, vitamin D and as a commercial economic point of view and useful for preparation of soup, liver oil. The study of the parasites are necessary because the parasite affects on productivity of the fish population which may cause deterioration in their food value, by decreasing growth rate, reducing the flesh quality, loss of protein, behavioral changes as well as reduces the absorption and metabolic process result may in heavy mortality. Besides, infected fishes act as a very potent source of parasite infections of man and they transmitted (to man) only through eating of fish.

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