

RESEARCH ARTICLE

Histopathological study of *Clarias batracus* (Bloch) infected with *Lytocestus indicus* Moghe

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ABSTRACT

The present study deals with Histopathological Study of Cestode parasites from some fresh water fishes from Amravati Division. Pathogenic effects of cestode are due to attachment of the adult parasite in the gastrointestinal tract and also to the encapsulation of larval stages in the tissues. Cestode live in a very hazardous environment as on there is continuous movement of the gut lining, food gut surface and the nature of its related glands, they have a hold fast organ (scolex) for attachment, which may be acetabulate with 4 suckers, bothriate with 4 bothria (muscles hold fast organs), or bothriate with 2 bothria (holdfast grooves), some cestode scolices may also be armed with hooks and spines or have a retractable rostellum or proboscis covered with fine hooks.

Key words: Scolex, Suckers, Bothridia etc.

INTRODUCTION

Parasitism is intimate relationship between two organisms in which one (the parasite) lives on, off or at the expense of the other (host). The parasitism is having the ecological relationship between two different organisms. The parasite is metabolically or physiologically depending upon it's host. Heavily infected host may be killed by their parasites. The reproductive potential of the parasite exceeds that of their hosts. The helminth infections are very common in man, domestic animals and wild-life. Mostly the poor tropical and sub-tropical areas with poor socioeconomic status, endemic helminth infections are very common.

Fish diseases and histopathology, with a broad range of causes, are increasingly being used as indicators of environmental stress since they provide a definite biological end-point of historical exposure, it is a mechanism which can provide an indication of fish health by determining early injury to cells and can therefore be considered an important tool to determine the effect of parasites on fish tissue.

Data on the pathological mechanism of Caryophyllid cestodes were presented by Mackiewicz and Cosgrove (1972), who made a comparative pathological study on the mode of attachment and scolex morphology of 15 Caryophyllid species. These authors found that Caryophyllid species without attachment organs could cause considerable pathology at the attachment point. They reported about some mechanical displacement and epithelial loss adjacent to the scolex proper and a narrow eosinophilic interface layer at the neck region.

The physiological conditions of a specific species depend mainly on the type of site which is available; this may be favourable or unfavourable where the parasites get sufficient nourishment. The type of diet available will have profound effect on the growth rate of the cestode parasites and also the distribution of cestode is likely to be related not only to the physiochemical conditions within the gut, but also the actual topography of the gut surface and the nature of the related glands.

In low to moderate infections, pathological effects are localized around the attachment of the adult worm. The extent damage is proportional to the depth of penetration of the scolex. It is negligible when parasites are attached to the epithelial mucosa only and becomes extreme, with extensive granuloma and subsequent fibrosis, when the scolex is anchored in the muscle layer or entirely perforates the intestinal wall (Paperna & Zwerner, 1976, McDonough & Gleason, 1981, Kabata 1958). The depth of penetration of some species may vary in different host fishes (Tarachewski, H 1989). Although reports of the presence of the tapeworm, *Proteocephales* sp., in liver of freshwater fishes have been discussed (Wardle and McLeod, 1952). Thanapon Yooyen *et al.* (2006) also found one species of cestode, *Senga Chiangmaiensis* in the liver of *Mastacembelus armatus*. Often no injury results from intestinal cestodes unless they are present in high numbers, but an inflammatory reaction may occur in association with mature worm and plerocercoid larvae that exert mechanical pressure on internal organs.

Plerocercoids migrating in the visceral cavity can produce adhesions that are very damaging to fish and can even cause death when vital organs are severely injured. The large plerocercoids of *Lingula intestinalis* can cause great damage to small fish even rupturing the body. The pathogenicity of adjacent cestodes of various orders described by Rees G, in 1967. In fishes

Mevicar (1972) described host parasites relationship of *Acanthobothrium*, *Phyllobothrium*, *Echinobothrium*. Murlidhar and Shinde (1987) observed histopathology of *Acanthobothrium*, *Uncinathum* of fish *Rhynchobatus djeddensis*. Caira (1994) observed a comparison of mode of attachment of histopathogenicity of tapeworm representing two orders infecting the spiral intestinal of the nurse shark, *Ginglymostoma cirratum*.

At the same, it is known that tapeworm ingest nutrition by digesting the intestinal content and partially by damaging the intestinal wall with the help of their proteolytic enzymes while they protect themselves from the effect of host-produced proteolytic enzymes with their protease inhibitors. Mackiewicz *et al.* (1972) supposed that proteolytic enzymes or other lytic secretion played a role in pronounced tissue reaction. Adult cestodes are not uncommon parasites in the digestive tract of fishes. However compared to larval stages, adult helminth in general and cestode in particular are looked upon as of not having much adverse effect on their fish hosts. Never the less quit a few reports on the pathogenicity of cestodes on fishes are available (Vik .R, 1957). But often the pathology of infection is reported only in very general terms and the exact nature of damage to fish hosts by adult cestodes is not fully examined. This work is an attempt to bring out the different aspect of pathology of infection of fresh water fish *Clarias batrachus* (Linnaeus).

Fish is a cheap and important source of protein. It contains lipids, minerals, oils and vitamins. *Mastacembelus armatus*, *Mrigal*, *Labeo rohita*, *Clarius batracus*, *Channa orientalis*, *Catla*, *Rohu* and etc. are widely distributed in India and it occurs mainly in quiet waters, lakes, pools but may also occur in fast flowing rivers. The fish is generally classified as omnivores or predators feeding mainly on aquatic insects, fish and higher plants debris. In most part of the world, fish production is mainly from the wild. As the world population grows, fish resources are being depleted at an increasing rate as a result of environmental degradation, over harvesting, pollution thus fish production could no longer meet the demand of the growing population. This had led to increase in the involvement of stakeholders in aquaculture. This method has also been plagued by the problems of overcrowding, poor environmental conditions and pollution which often result in reduced immunity of fish and higher susceptibility to parasites and diseases.

MATERIALS AND METHODS

Freshwater fish *Clarias batrachus* (Linnaeus) were brought to the laboratory for examination. During the parasitological examination the intestines were cut open and examined under stereomicroscope to see the degree of infection. The tapeworms were collected, placed in saline solution, freed from the adhering mucus by gentle shaking, they were flattened, processed and stained for morphological studies and were identified as *Lytocestus indicus* with in short time 2 to 3 cm long pieces of proximal intestinal and liver segments containing tapeworms were fix in Bouin's solution for 24 hrs, as the tissue undergoes autolysis rapidly after death and rapid fixation is essential. The fixed material were transferred and processed through ascending grades of alcohol, dried in a wax miscible agent and impregnated in wax (M.P 58° to 60°C). Sectioning were carried out on a rotary microtome at 6Em. Sections were floated on warm water at 48°C and mounted on chemically cleaned slides coated with egg albumin. The mounted, unstained sections were dewaxed in three stages of xylene at 1 minute each and stained with most widely used standard haematoxylin and eosin stain, staining

was carried out using haematoxylin and eosin staining technique (Bullock, 1963). This stained is often sufficient for identification of larger parasites such as helminthes, in this method the nuclei of cells are stained by the haematoxylin, the cytoplasm is coloured by the eosin. Stained mounted sections were examined under light microscope for good ones that were selected for photomicrography.

RESULTS AND DISCUSSION

Histopathological sections from intestine of *Clarias batrachus* (Linnaeus, 1758) infected with *Lytocestus indicus* cestode parasite. After their first detection in March 2015, specimen of the cestode *Lytocestus indicus* were found on several occasions, during the dissection of *Clarias batrachus* (Linnaeus) submitted for routine diagnostic examination from Khadak Purna Dist. Buldhana (M.S) India. In histological section made from the foregut the non segmented strobila of the worm, section in more or less longitudinal direction could be seen in the gut lumen. At the site of worm penetration into the mucous membrane the damage of the epithelium was well visible. In areas more distant

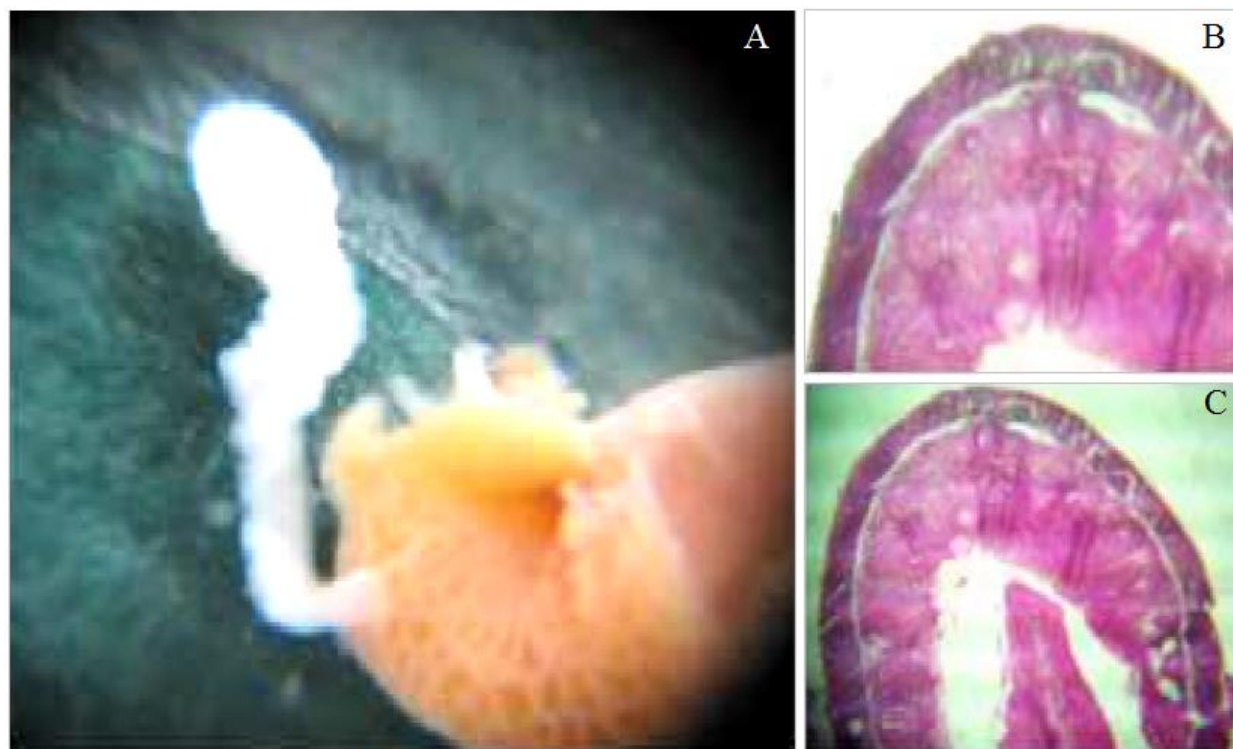


Fig. 1: Histopathological sections from intestine of *Clarias batrachus* (Linnaeus, 1758) infected with *Lytocestus indicus* (Moghe, 1925) cestode parasite

A: Attached cestode parasite **B:** Non infected Intestinal tissue **C:** Infested Intestinal tissue

from the point of entry the gut wall was still covered by an intact epithelium. Which gradually became narrower, and at the site of the penetration only epithelial debris and damage connective tissue cell could be found. Moreover in one case the complete absence of epithelium was noticed where the worm scolex was in direct contact with the connective tissue cell and damaged capillaries of the lamina propria.

In the present study case the damage of *Lytocestus indicus* is similar to the damage reported by Satpute and Agrawal (1974) also noticed shortening of villous processes and inflammatory response in the submucosa and serosa of *C. batrachus* infected with *Lytocestus indicus*. According to Karanis and Taraschewski (1993), in *Caryophyllaeus laticeps* infection of cyprinids the scolices of the worms caused local compression of the host's gut epithelium at their site of attachment, where vacuolation of the epithelial cell and rupture of the brush border could be observed.

Conflicts of interest: The authors stated that no conflicts of interest.

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