



COMPARATIVE LIVER HISTOPATHOLOGY OF FRESH WATER MURRELS DUE TO TREMATODE, EUCLINOSTOMUM HETEROSTOMUM

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ABSTRACT

The trematode parasite, *Euclinostomum heterostomum* infects the fresh water murrels, *Channa punctatus* and *Channa striatus*. The parasite damages liver and brings histopathological changes in the infected fish. Histopathological changes include loss of polygonal appearance and rupture of cell membranes, enlargement of hepatocytes. The hepatocytes lost their distinct shape and vacuolation of cytoplasm. Hypertrophy of hepatocytes and perilobular space of the liver shows vacuolation, loosening of hepatic tissue, necrotic effects on hepatocytes. The cytoplasm was not uniform turned into granulated.

Key words : *Channa punctatus*, *Channa striatus*, *Euclinostomum heterostomum*, Histopathology

INTRODUCTION

Murrels are one among the best known air breathing fresh water fishes of Southeast Asia. They are commonly called as snake-headed because of the elongated cylindrical body and particularly due to the presence of large scales on the head. Murrels are obligatory air breathers capable of living in oxygen depleted water bodies and hence are suitable for proliferate culture in tropical shallow systems. They constitute the main of the natural fresh water fisheries of India, fetching high price as food fish due to taste, flavour, fewer intramuscular spines and medicinal value, therapeutic value (for wound healing, arthritis and convalescence (Murrel fish food expo,2012, Haniffa,2011). Fresh water murrels of the family ophicephalidae harbour a good number of helminth parasites. Fresh water murrels act as intermediate host for digenetic trematodes.

In the present investigation, the metacercariae of *Euclinostomum heterostomum* (Rudolphi,1809) showed maximum prevalence from the liver of *Channa striatus* (Striped murrel) and *Channa punctatus* (Spotted murrel). The occurrence of trematode parasites found in murrels was reported by Bose and Sinha, 1979; Gupta and Agarwal, 1984; Lester, 1980; Maqbool and Nijami,1984; Pardeshi and Hiware, 2010; Laxma Reddy et al., 2006, Laxma Reddy and Benarjee, 2011. Therefore an attempt has been made to assess the histopathological changes induced by the parasite in the liver of *Channa striatus* and *Channa punctatus*.

MATERIAL AND METHODS

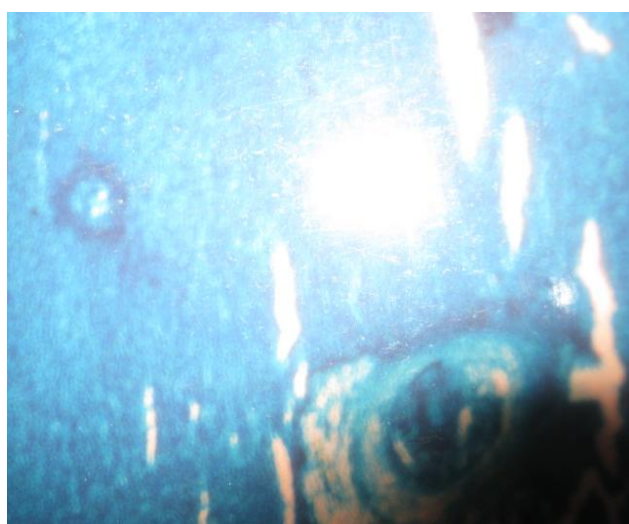
Pieces of the infected and uninfected liver of fresh water murrels, *C. punctatus* and *C. striatus* were

fixed in Bouin's, Susa, Carnoy and Zenker's fluid for the histopathological and histochemical studies (Pearse, 1968; Bancroft, 1975). They were dehydrated by graded alcohol, cleared and embedded in paraffin wax. A battery of histochemical tests were applied on the microtome cut sections of liver gives exact localization of the parasite, the damage caused at a particular site of the tissue and the change in the chemical nature of the tissue of the organ affected.

RESULTS AND DISCUSSION

Liver is the chief organ performs the process of detoxification. It plays prominent role in the metabolism of carbohydrates, proteins and lipids. The functions performed by the liver are storage of glycogen, catabolism of fatty acid and amino acid synthesis. The liver is susceptible to number of toxic and metabolic disturbances either through the pollutants or parasitic invasions. In the present study various histochemical tests have been conducted on liver to understand the pathological effects on host physiology.

Figure-1. T.S. of infected Liver shows cysts (*C. striatus*)

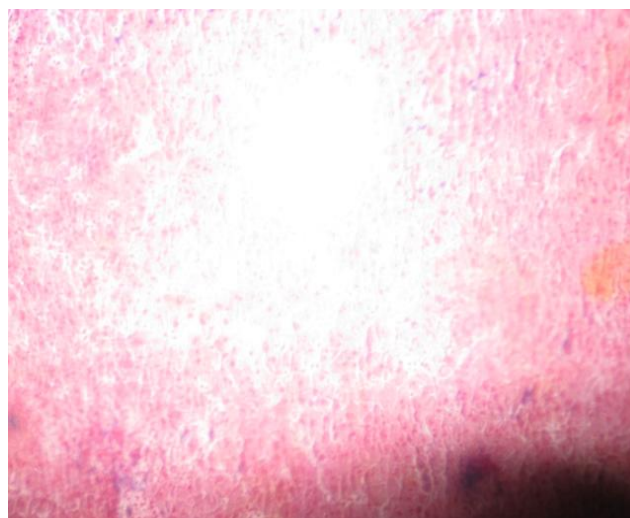


In the present study digenetic trematode, *E. heterostomum* infects the liver of fresh water murels. Histopathological investigations have been carried out on infected liver of murels reveals that loss of polygonal appearance and

rupture of cell membranes, enlargement of hepatocytes. The hepatocytes lost their distinct shape and vacuolation of cytoplasm. Hypertrophy of hepatocytes and perilobular space of the liver shows vacuolation, loosening of hepatic tissue, necrotic effects on hepatocytes. The cytoplasm was not uniform turned into granulated. The sinusoids were ruptured and filled with blood vessels. The blood vessels were shrunk and degenerated. The parasitic penetration into the liver causes blockage of bile passages. Some hepatocytes were completely vacuolated, they are found with the extruded nucleus.

The external appearance of liver indicated by change of its colour due to parasitic infestation. Cysts and abscess were also noticed in the liver. The pathological changes noticed in the liver might effect the physiological activity of fish such as reduction in enzyme synthesis this reduces the functional ability of liver which indirectly effects all metabolic activities of the organism (Quazisaleem and Seema Hashmi, 2013). Encysted metacercariae of *E. heterostomum* were reported from the liver of channa spp. from India, Gupta and Agarwal (1983). Sinha and Nikhil (1988) studied the histopathological changes in fresh water murrel, *Channa punctatus* infected with *E. heterostomum*

Figure-.2. T.S. of Infected Liver shows Disarray of hepatocytes (*C. punctatus*)



Rai et al. (1984) have observed the changes occurred in the Alkaline and Acid phosphatase levels in the liver of *Channa punctatus* and *Clarias batrachus* due to *Euclinostomum heterostomum*. Sinha et al., (1988) indicated that the metacercariae of *Euclinostomum heterostomum* were localized in the liver. They also opined that liver had highest infection. The infected liver was atrophied and it was pale in colour in contrast to its characteristic red colour as in normal fish. They (1988) have also noticed the histopathological changes that occurred in the liver include the compressed and distorted hepatocytes. The epithelium of the bile duct was inflated resulting in congestion of bile passage. Vasodilation and congestion of blood vessels in infected liver were evident. Gupta and Agarwal (1983) studied the encysted metacercariae of *Euclinostomum heterostomum* occurring in liver of *Channa punctatus*. The pathological consequences of parasitic effects on fishes are well documented and serve as an evidence to support the view that parasites are one of the main causes of mortality in population of fish. Different species of helminth parasites, therefore pose serious threat to the fishes. With the invasion of a fish by a parasite an infection develops in the host.

However, the extent of damage or pathogenic condition depends on the number of invasive parasites and the site where they localize in the host. Laxma Reddy et al (2006) have studied the histopathology of liver in *C. punctatus* infected with *E. heterostomum*. Benarjee and Laxma Reddy (2008) studied the histopathological changes in the liver of *C. striatus* caused by a trematode *E. heterostomum*. They observed that hepatic cells showed shrinkage and shifting of nuclei at the periphery cells. These reports suggest that the both murrels are often get infected with *E. heterostomum*.

Therefore, infection has been observed in both trematode helminth infected murrels where incidence of infection is high during summer, low rainy season. In the present study infected liver of both murrels reveals the same interesting feature with this parasite in the area of Wgl. The present findings therefore in agreement with the

earlier report of Laxma Reddy et al., (2006), Pinky kaur et al., (2012). They studied the pathological effects and infection levels of this parasite in the liver of *Channa punctatus* and *Channa striatus*. The authors opined that infection of *C. punctatus* was slightly more than *C. striatus*.

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