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HISTOCHEMICAL ANALYSIS OF GASTROINTESTINAL MUCOSUBSTANCES OF FRESH WATER FISH *MASTACEMBELUS ARMATUS* INDUCED BY HELMINTH PARASITE *PROCAMALLANUS SP.* FROM LATUR DISTRICT (MS) INDIA

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ABSTRACT

The present study deals infection of particular parasite and particular impact on host fish species. Different histochemical reactions showed localization of different chemicals. With the Moreover, the histochemical investigations provide an insight into the nature of various physiological and pathological processes in the gastrointestinal tract occurred due to parasites. It has been observed that the different constituents are stimulated by particular parasite and particular loss in different organs of the digestive system of the fish studied.

Histochemical study may provide a valuable with low cost-effective tool for the diagnosis of diseases in histopathology, parasitic investigation and for the researchers in histopathology. The present study includes the histochemical analysis of *Procamallanus* species infected fish intestines in *Mastacembellus armatus*.
KEYWORDS: Histochemical study, Mastacembelus armatus, *Procamallanus* species

INTRODUCTION

India is the mega biodiversity country in the world. Fish are the most important inhabitants of the aquatic ecosystem mainly marine and fresh water and provides the human population cheap and easily digestible proteins. In India it is estimated that about 10 million tons of fishes are required to meet the annual demand of fish proteins as compared to an actual annual production of only 3.5 million tons (Shukla and Upadhyay, 1998). The major component of fish is protein. Fish proteins have a high biological value. It also contains variable quantities of calcium, phosphate, fat and other nutrient important for human health and growth. Fish provides the world's prime source of high-quality protein, 14-16% of the animal protein consumed worldwide; over one billion people consume fish as their primary source of animal protein.

Recent studies indicate that of 750 species of freshwater fish species found in India, a large number of them are familiar only to the local population. Intestinal parasitic helminths have a serious impact on fish health, productivity, quality and quantity of meat. Fish parasitic populations are known to differ due to variation in the environment and host population (Dogial, 1961). Helminth parasites of fishes are commonly divided into three main groups; cestodes, nematodes and trematodes. Kennedy, (1975) stated that population investigation can provide date for the predication of integrated methods to achieve the regulation of numbers of harmful parasites, because it has been stated that a single method of control has little value, whereas coordinated activities ameliorate the infection.

MATERIAL AND METHOD

Preparation of slides for histochemical studies:

For present study the discarded intestine of *M. armatus* collected from fish market at Latur, (M.S.), India. For histochemical analysis, small fragments from the anterior, middle and posterior parts of infected intestine were used. The infected intestine and normal were cut into small pieces and were fixed in Bouin's fluid. After 48 hours, washed several times with water, dehydrated in graded series of alcohols, cleared in Cedar wood oil and xylene, blocks were made in cavity blocks by usual method. Thick sections were cut with a rotary microtome at 4- 5 micron thick. After removing the wax by xylene, hydration was carried out,

dehydrated, cleared in clove oil and xylene and mounted permanently in Canada balsam. Sections were stained with various histochemical staining methods. Best slides or sections were selected and observed under the microscope for histochemical study. Photographs were taken with digital camera Nikon Coolpix L24.

Methods used for histochemical tests were:
1. Periodic Acid- Schiff (PAS) (McManus, 1948)
2. Ferric ferricyonide (Pearse, 1968)
3. Alcian blue pH 0.4 (Martoja and Martoja-Pierson, 1970)
4. Alcian blue pH 2.5 (Martoja and Martoja-Pierson, 1970)

RESULT AND DISCUSSION

Losses due to *Procamallanus sp.*

1. **Host:** *Mastacembelus armatus*

During present investigations the infection of *Procamallanus* sp. in *Mastacembelus armatus* with different histochemical reactions showed localization of different chemicals. Infected intestine shows light staining of PAS positive substances around parasitic attachments when stained with Periodic Acid- Schiff (PAS) (Figure 1A). It indicates neutral mucopolysacchrides decreased and acidic mucopolysaccharides increased as a defense mechanism by the host. Infected intestine of *M.* armatus infected with *Procamallanus sp.* showing intense iron deposits when stained with Ferric ferricyanide (Figure 1B). Infected intestine with *Procamallanus* sp. showing light stain indicating few sulphated mucins when stained with Alcian blue pH 2.5 (Figure 1C). Heavily Infected intestine showing parasite *Procamallanus sp*. around the parasite intense stained indicating mucous cells containing acidic mucopolysaccharides when stained with Alcian blue pH 0.4 (Martoja and Martoja-Pierson, 1970)

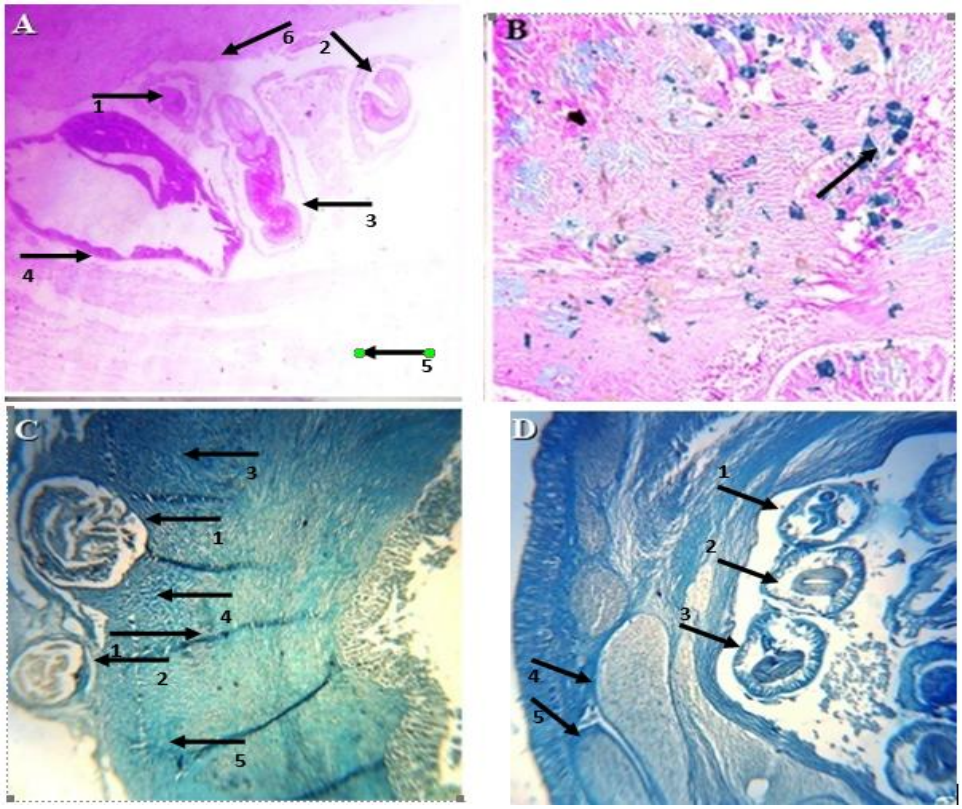

Figure1.: Photomicrographs of transverse sections of different regions of the infected intestine with *Procamallanus sp.* of *Mastacembelus armatus* showing the histochemical localization (PAS 100 X) **A.** Mucous cells containing neutral (stain purple) or a mix of both acid and neutral glycoconjugates (Arrow 4,5,6) and parasites (Arrow 1,2,3) **B.** Infected intestine of *M.* armatus infected with *Procamallanus sp.* showing intense iron deposits (Arrow) **C.** Infected intestine with *Procamallanus* sp. showing light stain indicating few sulphated mucins **D.** Heavily Infected intestine showing parasite *Procamallanus sp*. around the parasite intense stained indicating mucous cells containing acidic mucopolysacchrides

DISCUSSION

A heavy mucus production has also been described from several other fish-helminth systems including those detailed by Chambers et al. (2001). The attachment organ of helminth parasites often provokes an inflammatory response within the host"s gastrointestinal tract (Dezfuli et al., 2011). Inflammation is a protective reaction in response to parasitic invasion which results stimulation of specific chemical alterations to the cellular community and tissues at the site of infection. Hur et al. (2013), although the factors that govern mucus discharge are partially defined for mammals, they are not well studied in fish. The present findings are more or less similar to the observations made by Kaur (2014).

CONCLUSION

The helminth fauna of fish may depend on various environmental factors such as geographical location of the habitat, season of the year, physico-chemical characters of the water. The infection of helminth parasites may also be related to the availability of their intermediate host, life cycles of the parasites and feeding habits of the fish host. Individual parasite species may have widely differing effects on different host species.

It is indeed important to acquire knowledge on different fish pathogens, their biology and life cycle in order to recognize fish diseases and for their control. The results obtained from current research will give preliminary knowledge of population dynamics of parasitic fauna of fishes from Latur District, Maharashtra, India which was till date less explored. At the same time, it will help the scientific community and also pisciculturists to know about the parasite species found to be infected in different fish hosts.

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