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Histochemical studies on changes in the lipid composition of digestive gland of Lymnea luteola infected with distome cercariae

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Abstract:

Histological and Histopathological observations were made on infected and non-infected digestive gland of snails, *Lymnea luteola*. Infected digestive gland either with Rediae of *cercaria microcaeca* (Distome) revealed basically histopathological abnormalities showing the presence of reduced amount of lipids. Alteration either histological or histochemical in infected digestive gland are associated with the type of size of trematode larvae and degree and parasitism and these were greater in digestive glands of infected with sporocysts than in rediae. The amount of lipid increases in the digestive cells of the snails lymnea luteola. The cercariae are directly responsible for the change in the lipid content of the digestive glands of the host shell. The parasites may not take lipids as their food, but accumulation of fatty substances is a direct consequence of carbohydrate metabolism.

Keywords: Histopathology, digestive gland, *Lymnea luteola, cercaria microcaeca,cercaria dimorpha*.

I- Introduction:-

Larval trematodes in general, great harm to their hosts. They multiply in snail hosts resulting in tissue damages, and the pathological changes range from deilitation to gigantism of the hosts. (Rothschild 1936,1941:Wilson and Dension 1980). Histopathological changes in molluscs associated with larval trematode infections have been described or reviewed by several workers (cheng and snyder1962;Porter 1967). Further histochemical changes in parasitized digestive glands have also been investigated (James and Bowers 1967; southgate 1970;Reder, 1971;Dennis et. el 1974; Anteson and William, 1975;Bedse, 1986;Hyalij 1988;Basch, 1991;Huxham et.al1995.Gorbushin and Levakin ,1999,Snyder, 2004; Khalil, 2002; Johnson and clayton, 2003; Criscione and Bloun, 2004; and Pough et.al., 2005).

In the present study, besides histopathology of the snail tissues. The histochemical result for lipids are more in non – infected snails. Lipids are present in large quantities. The amount is fairly less in lightly infected hepatopancreas. The increase in the size of the shell, thinning and ballooning is the direct consequences of the excessive consumption of food by the snail to meet the demands of the larval parasites.

II-Materials and methods:-

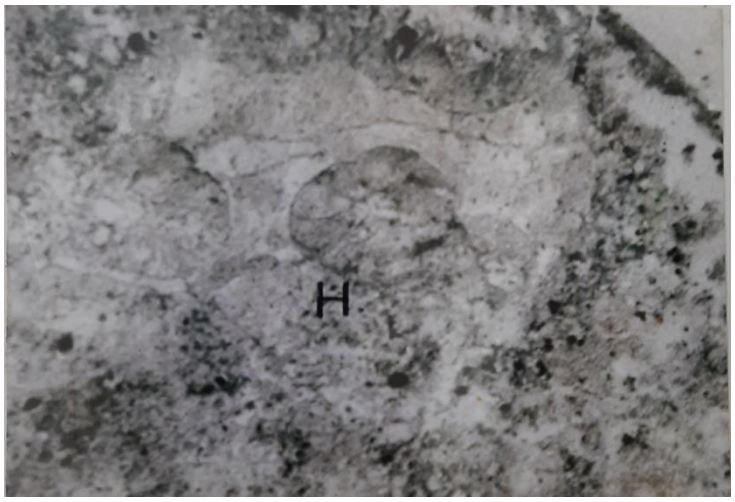
The snails, *Lymnea luteola* were collected from freshwater habitats of chankapur dam in Nashik district, Maharashtra. The methods for rearing of snails and collection of larval trematodes were described (Choubisa and Sharma 1983,1986). For histopathological localization of lipids the Sudan Black B Methods for lipid followed by (Mac Manus, 1946) Paraffin sections were cut at 5 to 7µm and were spread on slides.

III-Result and Discussions.

Of 300 *Lymnea luteola,* 46 species were infected with cercaria microcaeca and 18 with Cercaria dimorpha. The Sudan Black B test was slightly positive in non-infected digestive glands fig. 1 and fig. 2. Moderately and strongly positive in lightly and heavily infected digestive glands of the snail infected with cercaria microcaeca and cercaria dimorpha fig. 3 and fig. 4. It was clear by the staining intensities that the lipids were present in slight quantities in non-infected digestive glands, moderate quantity in lightly infected and large quantiy in heavily infected digestive gland of lymnea luteola infected with cercaria microcaeca and cercaria dimorpha. It is concluded that the amount of lipid increased with the increase in intensity of infection.

The role of lipids in cercaria depends on the type of swimming (Ginetsinskaya,1961, Gautam,1982; Bedse 1986). In the present investigation cercaria microcaeca and cercaria dimorpha are very fast swimminers showing continuous vibrating movements and thus they have more amount of lipids in digestive gland of host.

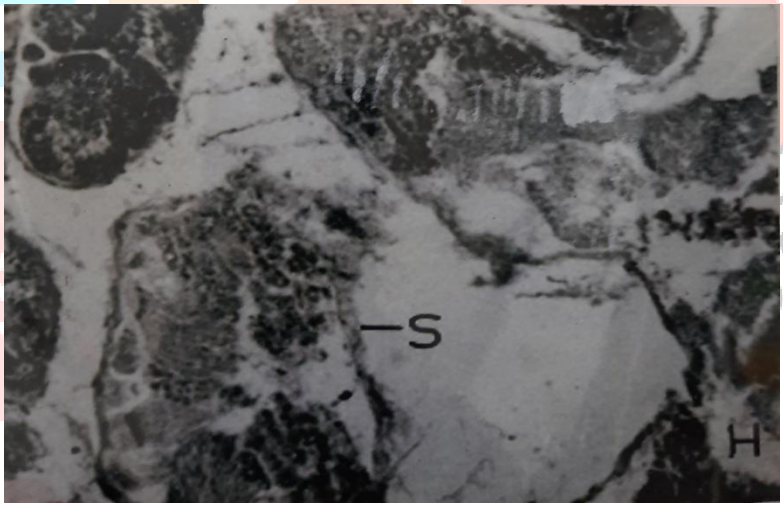
Figure 1.1



1.1 Section of non-infected digestive gland of Lymnea luteola showing the presence of lipid

(Sudan Black - B) x 400

Figure 1.2

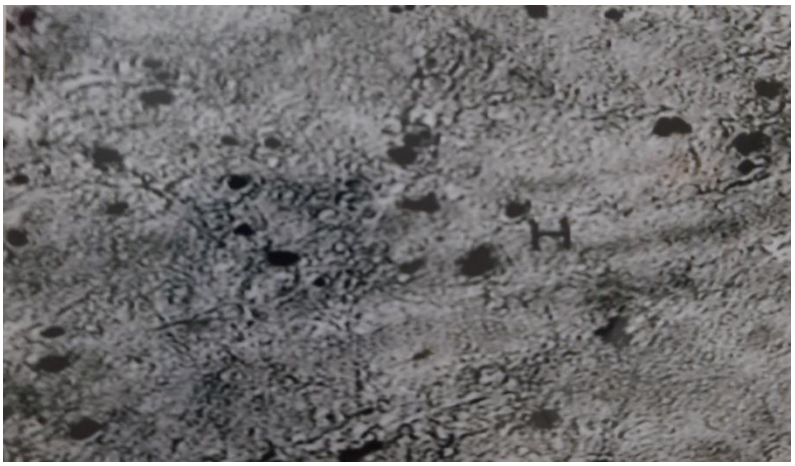


1.2. Section of digestive gland of Lymnea luteola infected with Cercaria microcaeca n.sp. showing the presence of increased amount of lipid (Sudan Black - B) X 400

H: Digestive gland

S: Sporocyst

Figure 1.3



1.3 Section of non-infected digestive gland of

Lymnea luteola showing the presence of lipid (Sudan Black - B) x 400

Figure 1.4

1.4. Section of digestive gland of *Lymnea luteola* infected with *Cercaria dimorpha* n.sp. showing the presence of increased amount of lipid (Sudan Black - B) X 400

H: Digestive gland

IV-Conclusion:-

The present study has shown histochemical observation in Lymnea luteola infected with *cercaria microcaeca and cercaria dimorpha.* That the presence of lipids, the Sudan Black B test was positively gland of non infected snails slightly and strongly positive in lightly and heavily infected digestive gland of infected snail. The fatty acids have been reported to be concentrated at the body surface of many cercariae and therefore, they may be used either in the synthesis of neutral lipids or as a source of energy for growth and development. However ,fat does not appear on the surface of cercaria microcaeca until a late stage of development and this observation agrees with Ginetsinskaya (1960) and reader (1971). During the aerobic and free swimming phase of cercariae it appears that the fat may be used as a source of energy increasing the buoyancy of the cercariae.

Parasitised digestive glands, either with sporocysts of cercaria microcaeca or radiae of cercaria dimorpha clearly revealed the decrease of glycogen, protein and lipid food components was comparatively greater in digestive gland cells infected with rediae. The debris in redial gut was highly positive and this corresponds with the tissue feeding of the redial larvae. Such observations have also been reported by others.

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