

about the pathogenic influence of leptomonad on the insect host is very scanty since most papers contain only taxonomic data about the species involved. In a normal *Odontopus nigricornis*, five types of haemocytes are present. These are Prohaemocyte, Plasmacyte, Granulocyte, Adephocyte and Oenocytoid.

In the haemolymph of an infected *O. nigricornis* are present leptomonad, crithidial and leishmanial forms, but the most prevalent are crithidial forms 22 to 24 μm long by 3 to 4 μm wide and having a flagellum about 18 to 22 μm in length (figure 1).

The pathological influence of *L. pyrrocoris* on *O. nigricornis* is indicated by the sluggish movement of the animal. The haemolymph containing millions of flagellates becomes thicker and whitish in colour instead of the normal brownish or colourless. Similar observation has been reported in *P. apterus*¹.

In an infected *O. nigricornis* it has been observed that out of five different types of haemocytes, the plasmacyte is increased from 65 to 94%. The cell size and the nuclear size of the plasmacyte is increased from 20 to 26 μm and 10 to 14 μm respectively. The nuclear size of some plasmacytes increases which later on divides forming a binucleate cell (figure 1). However, it has been reported that there is three times increase in the number of prohaemocytes of *Galleria mellonella* due to the influence of *L. pyrrocoris*².

These changes in the haemocyte picture of *O. nigricornis* indicate the possible reaction and the defence mechanism to combat the parasitic infection.

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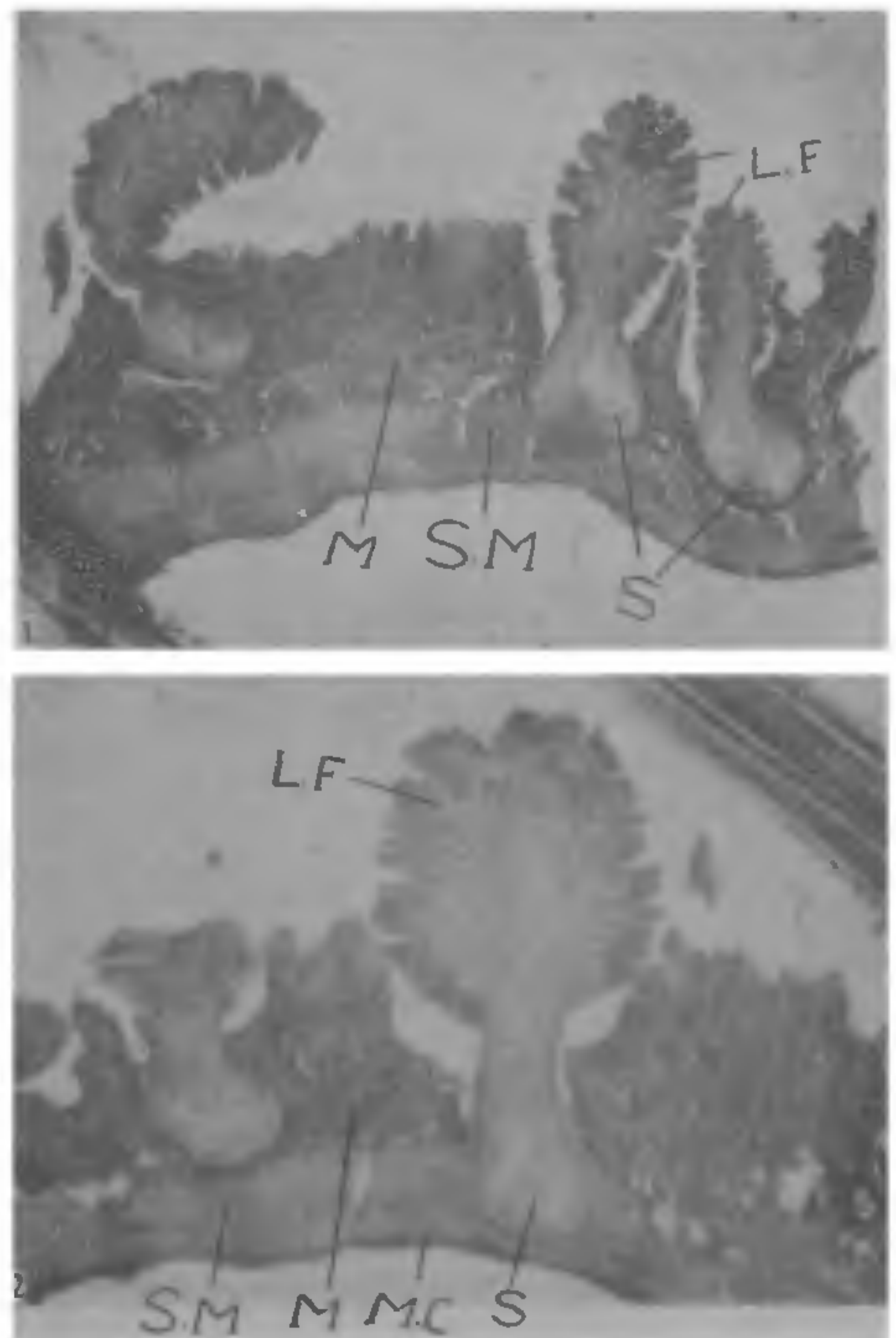
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HOST-PARASITE RELATIONS IN MONOZOIC TAPEWORM, *LYTOCESTOIDES FOSSILIS* INFECTION OF FRESHWATER FISH, *HETEROPNEUSTES FOSSILIS* (BLOCH).

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THE nature of helminthic infections in vertebrates has been studied extensively but information on the pathogenic effects of Caryophyllid tapeworm remains comparatively meagre, although valuable contributions in this field have been made¹⁻⁴. The present work deals



Figures 1 and 2. Sections of small intestine of *Heteropneustes fossilis* showing *Lytocestoides fossilis* buried upto 1. submucosa and tissue reaction 2. muscular coat, crypt and vacuolation of submucosal cell. ($\times 100$). L.F: *Lytocestoides fossilis*, M. mucosa, M.C: muscular coat, S: scolex, S.M: submucosa.

with the nature of host parasite relationship of a monozoic Caryophyllid tapeworm, *Lytocestoides fossilis* infesting the intestine of Indian freshwater fish, *Heteropneustes fossilis*. An attempt has also been made to assess the nature and extent of the pathological changes in host's tissue.

Small pieces of host's intestine, normal as well as infected were fixed in Bouin's solution. Sections (8 μ m thick) of paraffin embedded material were stained with Weigert's iron haemotoxylene and eosin.

L. fossilis has undifferentiated, bluntly rounded scolex, devoid of any penetrative or attachment organ. But the study of the serial section shows (figure 1) the presence of a number of fine channels opening on the surface of the scolex. While the worms commonly live with their heads deeply embedded in the host's inner mucosa upto the muscular coat, they maintain a loose association with the host's tissue. Further studies reveal that the penetration by the parasite in the host's organ invoked severe tissue reaction characterised by hyperplasia and hypertrophy of intestinal villi, degenerative changes in mucosal epithelium and vacuolation of submucosal cells. The proliferative changes lead ultimately to degenerative changes (figure 2). These have also been confirmed by Sircar and Sinha⁴. Rees² observed that cestode infection may produce inflammation, eosinophilia and fibrosis in association with hyperplasia or metaplasia. Ahmad and Muhammad⁵ with reference to *L. indicus* reported shallow ulcer and mechanical obstruction which, how-

ever, was not seen during the present study.

Mackiewicz et al³ reported an inverse relationship between scolex adaptation and pathology which has been confirmed by Sircar and Sinha⁴ and has also been noticed during observation with *L. fossilis*. Stirewalt⁶ suggested that lytic secretions enabling helminths to penetrate into the submucosa may cause pronounced tissue reaction. Sircar and Sinha⁴ supported Stirewalt's view and added that lytic secretion may be proteolytic enzyme secreted by these channels enabling cestodes to penetrate submucosa. Smyth¹ further suggested that the channels in the scolex may be for the transport of nutrients absorbed from the host's tissue.

The findings presented here support the contention that Caryophyllid cestodes have attained a remarkable compatibility with their hosts as a result of long evolutionary association between them.

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