PART IV

A NOTE ON THE HARMFUL EFFECTS OF THE GREGARINES

ON THE HOST EARTHWORM

The invasion of the parasites into the annelid body can at times lead to detectable injuries. In some cases serious effects resulting in the death of the host has been noticed. Instances of responses of the host to parasitic invasion is also on record and many annelids have developed means to defend themselves. The coelom in most Polychaetes and Oligochaetes have coelomocytes, which phagocytose foreign materials. Leeches have botryoidal tissue which accumulates alien material by phagocytosis. The earthworms defend themselves by autotomising their posterior segments. In this way they void any unwanted material and alsc coelomic parasites, which accumulate at the posterior segments of the body.

Keilin(1925) has suggested autotomy of the host as a mode of liberation of the coelomic parasites from the body of the earthworm.

Cameron (1932) and Bang (1973) have observed the reaction of the amoebocytes to large foreign bodies in the coelom of earthworms. Bang pointed out that though

encapsulation of the experimentally introduced foreign objects took place, phagocytosis could not occur as the objects were too large. However, parasites like nematodes were found to be encapsulated. Fibrous capsules were found to form around Monocystid gregarines.

Stephenson (1930) reported that adult gregarines of Oligochaetes were not attacked, but cysts were encapsulated though the sporozoites were not affected.

In the course of the present study, three instances have been encountered, where the parasites concerned affected the host in some way.

In one instance, Amynthas alexandri had white globular cystic bodies - Apolocystis n.sp.(c) growing on the dorsal aspect of the anterior region of the intestine. (see page 60). Close scrutiny revealed the presence of a fine transparent membrane covering them.

Examination of sectioned material of the infected intestine revealed that these cysts which contained adult

trophozoites were composed of an outer wall formed from the peritoneal layer of the host intestine. This layer seperated the parasites from the underlying muscle layers and the intestinal mucosa. This could be a case of response mechanism on the part of the earthworm, caused by the presence of the parasites. The growth of the cystic bodies exerts a pressure on the alimentary canal flattening it to a certain extent.

A similar case has been noticed in the course of the present investigation in Pheretima robusta which had Apelocystis n.sp.(a) and Apelocystis n.sp.(b), growing as white bodies on its dorsal blood vessel. They were so intimately attached to the dorsal vessel that any attempt to dislodge them led to the rupture and breaking up of the latter.

In cases of heavy infection the entire dorsal blood vessels were found to be parasitised. Very often earthworms infected thus were seen to autotomise their posterior segments, the other half of the body leading a normal life. The autotomised parts, when dissected were seen to be replete with the parasites and cysts.

Prior to autotomisation, the blood vessels constricts,

PLATE XXIX

Examination of the sectioned material appears to indicate that the continuity of the epithelial layer is interrupted at the point where the parasitic mass presses against the intestine. Such interruption in the continuity of the epithelial layer later on extends towards the sides.

10 X 10X

PLATE XXIX

due to the weight of the parasitic bodies. The blood vessel kept constricting until cessation of blood flow resulted. This is the beginning of autotomy.

In contrast to the above two parasites, another case has been encountered, in which the presence of coelomic parasites proved fatal to the host.

Apporectodea trapezoides, has been found to be infected with a very heavy population of B(a), B(b), and Nematocystis n.sp.(a) . Earthworms infected with these three species of gregarines, invariably always died.

The infection led to the body of the earthworm accumulating excess coelomic fluid, which assumed a dirty yellow colour. The body bloated to such an extent that it lost its usual body contour. In some places the swollen part of the body had excess fluid, and the rest of the body had none. The latter region appeared wrinkled. The body became very soft to the touch. Constrictions occurred at several points of the body, followed by the ligation of the body at these points. Earthworms died soon afterwards. Putrefaction set in rapidly after death.

When dissections were made at the stage when the body was extremely bloated, it was found that parts of the internal organs viz.,stomach, and the intestine were in a state of evagination.

Smears prepared of the coelomic fluid of the autotomized portions showed a very heavy concentration of Nematocystis n.sp.(a). The other two gregarines viz. B(a), and B(b) though present in the earlier stage (before autotomy) were strangely absent. In one or two instances , one or two of these could be found.

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Copy of Dr.R.V.Melville's letter Ref.No.Z.N.(G) dated 11th March 1980.

Dear Miss Pradhan,

Thank you for your letter of 2 March asking a question about publication. I can assure you that your earlier letter of 28 January has not been received.

Certainly, if Dr.Chatterjee's thesis of 1971 has never been published, his names cannot enter into zoological nomenclature. His new names are not so much nomina nuda - a nomen nudum is normally a name that is published but without satisfying the provisions of Articles 10 to 20 - as simply non-existent names.

A thesis does not become a published work merely by being deposited in a library from which copies can be supplied on demand. On the other hand, some theses are genuinely published: for example, some German universities require 100 printed copies of a thesis to be submitted, and in both Germany and France I have seen theses published and on sale as separate works, or published as papers in standard scientific periodicals. So it is not the simple fact that

a work is a thesis that prevents it being published; it may well be published if - and when - it satisfies Articles 8 and 9 of the Code. The availability of the names in a published work is then a separate matter, to be examined in the light of Articles 10 to 20.

I hope this is a helpful answer. Certainly, on the basis of what you tell me, you are right to ignore Dr. Chatterjee's new names.

Yours sincerely,

Sd/- R.V.Melville

Secretary, International Commission
on Zoological Nomenclature