# On the Morphology and life history of a new cephaline gregarine, *Stenophora shyamaprasadi* n. sp., from the intestine of a chilopod *Cormocephalus dentipes* Poc.

By

**Mukundamurari Chakravarty,** M. Sc.

Assistent Lecturer in Zoology, University of Calcutta.

(With 5 figures in the text).

## Introduction.

The object of the present paper is to describe the morphology and life history of a new cephaline gregarine which I came across while examining the gut contents of the centipedes common in Calcutta. The Indian centipedes usually harbour in their intestine several species of gregarine and coccidia, two of which have already been reported viz *Nina navillae* Mitra and Chakravarty (1937), and *Adelina schellacki* Ray and Dasgupta (1937). The gregarine dealt whith in this paper, however, belongs to the genus *Stenophora* in having its epimerite simple in structure, spores ovoidal and gametocysts rupturing by simple dehiscence. So far all the species of this genus have been reported from Diplopoda only, and none from a Chilopoda. Only two species, *Stenophora khagendrae* Ray (1933) and *S. ellipsoidi* Chakravarty (1934) have been reported from India and the prcsent species is the third in order, having its host different from that of the described species.

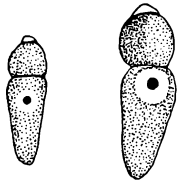
The methods employed in studying the morphology and life history of this gregarine are the same as outlined by Ray (1933)

and CHAKRAVARTY (1935) respectively. I have named the new gregarine after Mr. SHYAMEPRASAD MOOKERJEE, the present Vice-Chancellor of this University.

I am indebted to Dr. H. N. RAY, Protozoologist, Imperial Institute of Veterinary Research, Mukteswar, for helpful suggestion and criticism.

## Observations on *Stenophora shyamprasadi* n. sp.

The youngest forms obtained from the smear preparations measure 10.3 $\mu$ in length and 4 $\mu$ in breadth (Fig. 1 a). But these stages could not be seen in the serial sections of the gut of the host. The epimerite at this immature stage, is in the form of a small conical hyaline elevation situated at the anterior end of the protomerite which is more or less spherical (Fig. 1b). The nucleus contains a small spherical karyosome with a clear space around the latter, the nuclear membrane being undifferentiated.



a b

Fig. 1 (a) and (b). *Stenophora shyamaprasadi*. Camera lucida drawings from a smear × 1666.

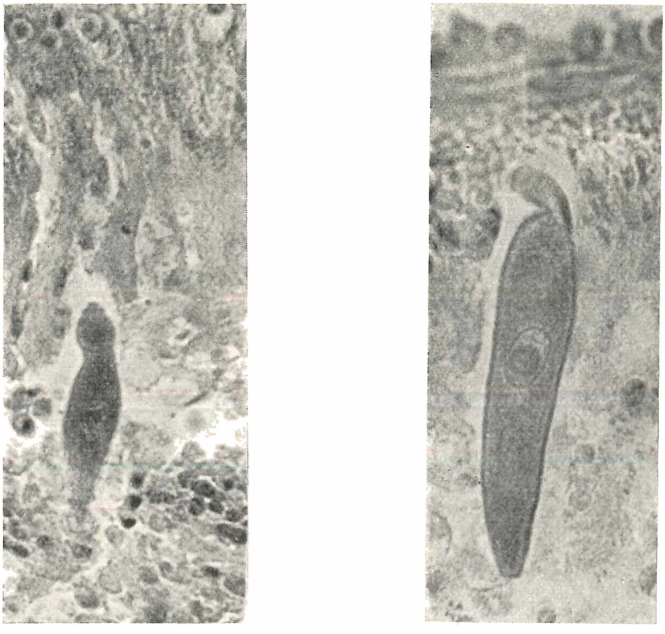
In sections of the gut of the host, forms measuring from 47 $\mu$ to 80 $\mu$ (Fig. 2 a, b) in length were found hanging with their epimerite wedged in between the epithelial cells of the intestine indicating the inter-cellular mode of development of the parasite. Some of these forms were found passing beyond the nuclei of the epithelial cells, the epimerite having reached the basement membrane (Fig. 2b) as in *Stenophora lacteria* WATSON (1915) and *S. khagendrae* RAY (1933).

The sporonts or adult gregarines measure 82—174 $\mu$ in length and 18—42 $\mu$ in breadth (Figs. 3, 4). The ectoplasm approximately 2 $\mu$ thick, is more or less transparent, and the endoplasm is packed up with greenish granules which can be readily seen in living specimens. The ectoplasm is stained faintly while the granules in the endoplasm take up energetically the stain.

The epimerite increases in size with the growth of the gregarine and finally becomes dorso-ventrally flattened leading to an oval shape. In living specimens this appears as a hyaline disc while in stained preparations it is found to be stained faintly and without any granules. It measures 2.5—5 $\mu \times 8$—15 $\mu$ being broader than long.

The protomerite which is more or less spherical in young gregarines, becomes rectangular or barrel shaped (Figs. 3, 4) in mature forms. It is granular in nature, the granulation being more dense at the centre. It measures 10—15 $\mu$ in length and 12—22.5 $\mu$ in breadth.

The deutomerite is the longest segment of the body measuring 70—157.5 $\mu$ in length and 18—42.5 $\mu$ in breadth at its broadest part,



a b

Fig. 2 (a) and (b). *Stenophora shyamaprasadi.* Photo-micrographs from sections ×520.

which is situated at a little distance posterior to the septum. It gradually becomes tapering as it passes backward exactly in the same manner as in *Stenophora khagendrae* Ray (1933), but its extremity is rounded. The deutomerite grows more rapidly than the protomerite as the accompanying table shows.

The nucleus in the young stages of the gregarines, is generally spherical, while in the adults it may become sligthly oval or may retain its earlier form. It has a definite nuclear membrane and a spherical karyosome. Its position is variable but generally lies at the anterior part of the deutomerite. In full-grown sporonts the

| Length of Protomerite in microns | Total length in microns | Ratio of length of Protomerite to total length |
|---|---|---|
| 3.1 | 10.3 | 1 : 3.3 |
| 4.1 | 14.4 | 1 : 3.5 |
| 10.3 | 41.2 | 1 : 4 |
| 6.2 | 28.8 | 1 : 4.3 |
| 15 | 97 | 1 : 6.4 |
| 5.1 | 37.1 | 1 : 7.3 |
| 12.5 | 125 | 1 : 10 |
| 10 | 130 | 1 : 13 |
| 12.5 | 174.5 | 1 : 14 |
| 10 | 145 | 1 : 14.5 |
| 10 | 150 | 1 : 15 |
| 10.3 | 175 | 1 : 16.9 |

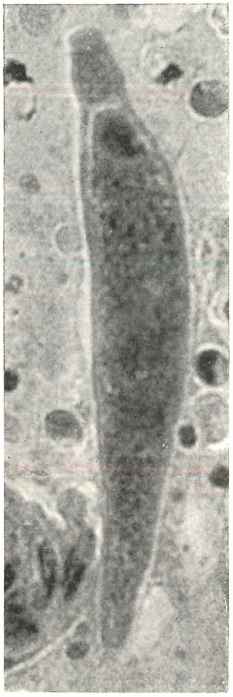


Fig. 3. *Stenophora shyamaprasadi.* Photo-micrograph from a smear ×710.

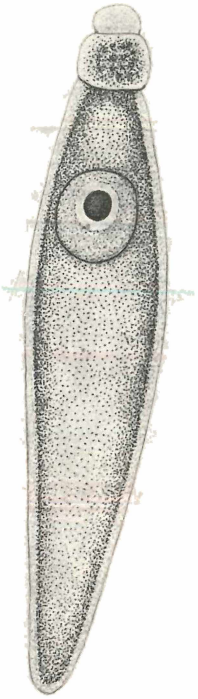


Fig. 4. *Stenophora shyamaprasadi.* Camera lucida drawing from a smear ×730.

nucleus measures 12.5—20 $\mu$ in diameter while the karyosome is 6—12.5 $\mu$ in diameter.

A few gametocysts only were noted to come out with the faeces of the centipedes, but its exact method of association could not be followed. The gametocysts are spherical measuring 253.5 $\mu$ in diameter. The cystwall is about 24 $\mu$ thick. The gametocysts when kept in moist chamber, were seen to rupture within 3 or 4 days by simple dehiscence, liberating oval and spherical bodies. The oval bodies are mature spores (Fig. 5), while the spherical ones may be regarded as zygotes in the process of development. Mature spores were also observed to come out in large numbers with the faecal matter of the centipedes. The spores are, however, without any equatorial line on them, as reported by RAY (1933) and CHAKRAVARTY (1934) respectively in *Stenophora khagendrae* and *S. ellipsoidi*. The sporozoites were irregularly arranged within the sporocysts.

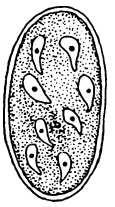


Fig. 5. *Stenophora shyamaprasadi*. Camera lucida drawing of a spore from a fresh smear × 3500.

## Diagnosis.

Sporonts solitary, elongated, measuring 82—174 $\mu$ × 18—42.5 $\mu$. Epimerite hyaline and oval. Protomerite rectangular or barrel shaped, granular and broader than long. Deutomerite granular, broadest at a little distance behind the septum, tapering, with a rounded extremity. Nucleus spherical or slightly oval. Gametocysts spherical, thick-walled, measuring 253.5 $\mu$ in diameter, dehiscing by simple rupture, liberating oval spores, 8.24 $\mu$ × 4.12 $\mu$ in dimension,

Host: *Carmocephalus dentipes* Poc.

Habitat: Intestine.

Locality: Calcutta (India).

## References.

CHAKRAVARTY, M. (1934): Studies on Sporozoa from Indian millipedes. (3) Life-history of Stenophora ellipsoidi n. sp. Arch. Protistenkde **82**.

— (1935): Studies on Sporozoa from Indian millipedes. (4) Life-history of a cephaline gregarine, Hyalosporina cambolopsisae n. gen., n. sp. Arch. Protistenkde **86**.

CHAKRAVARTY, M. (1938): Observations on the life-history of Nina navillae Mitra and Chakravarty, from the intestine of the centipede Scolopendra sp. Arch. Protistenkde **90**.

MITRA, A. N. and CHAKRAVATRY, M. (1937): Observations on Nina navillae n. sp. from Scolopendra sp. Proc. Indian Sci. Congress 24th Meeting.

RAY, H. N. (1933): Studies on Sporozoa from Indian millipede. (1) Life-history of Stenophora khagendrae n. sp. with a note on its method of progression. Arch. Protistenkde **81**.

RAY, H. and DASGUPTA, M. (1937): On Adelina schellacki n. sp., from the intestine of a centipede, Cormocephalus dentipes Poc. Proc. Indian Sci. Congress, 24th Meeting.

WATSON, M. E. (1916): Studies on gregarines. Ill. Biol. Monogr. **2**.

— (1917): The development of gregarines and their relation to the host tissues in Stenophora lacteria Watson. Journ. Paras. **3**.