

Monocystis mauritii* sp.nov. (Protista: Apicomplexa: Monocystidae) a new aseptate gregarine species of the genus *Monocystis* Stein, 1848 obtain from an Indian Earthworm, *Lampito mauritii

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Abstract:

A biodiversity survey of the endoparasitic aseptate gregarines in the Purulia district of West Bengal, India, revealed the seminal vesicles of the earthworm, Lampito mauritii were found to be infested with a new species, Monocystis mauritii sp.nov., of the genus, Monocystis Stein, 1848. The trophozoite is spindle or navicular in shape. Both the ends are pointed. The whole body size of the trophozoite measures 99.54.-140.20 μm \times 42.68-71.10 μm . The Gametocysts are ovoidal containing two unequal gametocytes. Diameter of it measures 85.32- 113.76 μm . Oocysts are navicular and measures 6.9 μm \times 3.0-4.6 μm .

Key words: Aseptate Gregarine, Endoparasite, *Monocystis mauritii* sp.nov, seminal vesicle, earthworm, Purulia, West Bengal.

Introduction :

Gregarines are a group of apicomplexan which are chiefly coelozic or lumen dwelling protozoan parasites of invertebrates especially arthropods, molluscs and annelids. Gregarine parasites are of two types, septate or cephaline and aseptate or acephaline. The acephaline or aseptate gregarines are characterised by the presence of aseptate body. Aseptate gregarine fauna has been reported from various part of the world including India. However, especially in India research on gregarine protozoan parasites infesting invertebrates has not been carried out with great importance. Only a few of over 350 species of Indian earthworms have been studied for the occurrence of gregarines, but this research has gained momentum since the 1980ies. It has already resulted in the finding of representatives of the genera *Apolocystis* Cognetti de Martiis, 1923; *Monocystis* Stein, 1848; *Nematocystis* Hesse, 1909; *Stomatophora* Drzewiecki, 1907 and *Zygocystis* Bhatia, 1930 (Hesse, 1909; Ghosh, 1923 – cited by Levine, 1988; Bhatia and Chatterjee, 1925; Bhatia and Setna, 1926; Kar, 1946; Kalavati, 1979; Subbarao et al., 1979; Pradhan and Dasgupta, 1980a, 1980b, 1982, 1983a, 1983b; Roychoudhury and Haldar, 1984; Bandyopadhyay et al., 2001, 2004, 2005, 2006a, 2006b, 2006c, 2006d, 2006e, 2007a, 2007b, 2008, 2011;2014 Bandyopadhyay and Mitra, 2004, 2005a, 2005b, 2005c, 2005d, 2006a, 2009a,2009b).

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During the course of a biodiversity survey of the endoparasitic aseptate gregarines in the Purulia district of West Bengal, India, seminal vesicle of the earthworm, *Lampito Mauritii*, were found to be infested with a new species of the genus, *Monocystis*, Stein 1848. The present paper dealt with the description of *Monocystis mauritii*.sp.nov., the morphometric comparison with closely related species and the discussion of its taxonomy and systematic.

Material and Methods:

Earthworms were collected and taken to the laboratory. The collected individuals were put in soil-filled plastic buckets and taken to the laboratory alive. Some of them were dissected while alive and their seminal vesicles were carefully removed. These were placed on clean glass with a drop of 0.6% NaCl solution. A thin film of seminal fluid was drawn out on a slide covered with a cover slip for examination of living protozoans under a phase contrast microscope (Olympus CX21i). After the initial study of living protozoans, the content of the seminal vesicles was semidried and fixed in Schaudin's fluid (20 min). The fixed smears were stored in 70% ethyl alcohol for removal of mercuric chloride. The slides were then passed through a descending series of alcohols (5 min in each) and placed in distilled water. Then they were transferred to a 3% iron alum solution (over night) and stained with Heidenhain's haematoxylin solution (20 min). Differentiation was done with 1% iron alum solution under the low power objective lens of the light microscope. The slides were then washed thoroughly, dehydrated in an ascending series of alcohols, cleared in xylene and mounted in Canada balsam. Photomicrographs were taken under an Olympus phase contrast microscope (Olympus CX21i).

Results:

Phylum: Apicomplexa Levine, 1988; Order: Eugregarinida Léger, 1900; Family: Monocystidae Bütschli, 1882; Subfamily: Monocystinae Bhatia, 1930; Genus: *Monocystis* Stein, 1848.

The trophozoite is spindle or navicular shaped. Both the ends are pointed and middle part is quite swollen. Nucleus is ovoidal and resides in the middle or slightly anterior part of the body. Mucron is not so prominent. Cytoplasm is granular. Endocytal striations are not found. Endosarc is granular and deeply stained with Haematoxyline. Episarc is 2-3 μm in wide. The whole body size of the trophozoite measures 99.54.-140.20 μm \times 42.68-71.10 μm . The Gametocysts are ovoidal containing two unequal gametocytes. Diameter of it measures 85.32- 113.76 μm . Oocysts are navicular and measures 6.9 μm \times 3.0-4.6 μm . Some deeply stained granules are seen inside the oocysts.

Taxonomic Summary

Type material: *Monocystis mauritii* sp.nov.

Type host: *Lampito mauritii*

Type of locality: Purulia district of West Bengal, India.

Symbiotype: LMW/14 deposited in the Museum of the Department of Zoology, Panchakot Mahavidyalaya

Site of infection: seminal vesicles

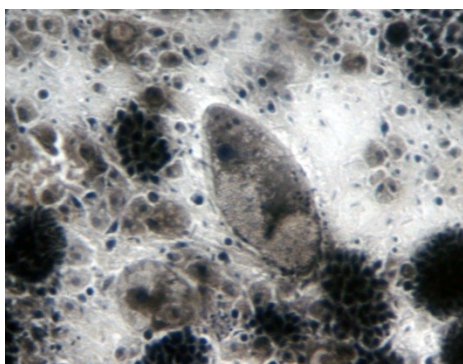
Prevalence: 12/32 (37.5 %)

Holotype: MSII/07 is deposited in the Museum of the Department of Zoology, , Panchakot Mahavidyalaya

Paratype: MSII/03 , MSII/08 and other slides are in the collection of the Parasitology Laboratory, Department of Zoology, Panchakot Mahavidyalaya , 723121 West Bengal, India

Discussion:

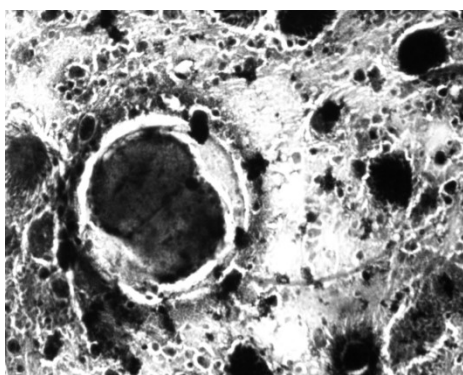
Cylindroid, solitary, with mucron, and coelomic habitat of the parasite in an earthworm justify the inclusion of the present form under the family Monocystidae, subfamily Monocystinae and genus *Monocystis* Stein, 1848. Of more than eighty species belonging to genus *Monocystis* Stein, 1848 only 20 have been described from India. Of these species, *M. odontotermi* Kalavati, 1979 has been reported from the haemocoel of the termite *Odontotermes obesus* (a non oligochaete host) and *M. pontodrilus* Subbarao *et. al.*, 1979 from the littoral oligochaete, *Pontodrilus bermudensis*. All other eleven species of *Monocystis* have been reported from terrestrial earthworms. The present species of monocystid gregarine obtained from the seminal vesicles of the oligochaete host, *Lampito mauritii*. The species which is considered to be a new, shows a little degree of affinity with *Monocystis lalbagensis* Bandyopadhyay *et. al.* 2001 and *Monocystis senchalensis*, Pradhan and Dasgupta, 1982. The present species and *Monocystis lalbagensis* were obtained from seminal vesicles and the trophozoite is spindle shaped with granular cytoplasm. Nucleus with karyosome and ovoidal in shape but in *Monocystis lalbagensis* and *Monocystis senchalensis* spherical. Cytoplasm of the present form is granular and endosarc with deeply stained granules. Oocyst of *Monocystis lalbagensis* is biconical shaped and in present form it is not navicular with pointed tips. Gametocyst of the present species is ovoidal whereas it is not mentioned in *Monocystis lalbagensis*. So comparing all the morphological features, we consider this species of the genus *Monocystis*, obtained from *Lampito mauritii* is new to science and therefore, we propose the species as *Monocystis mauritii* sp.nov.



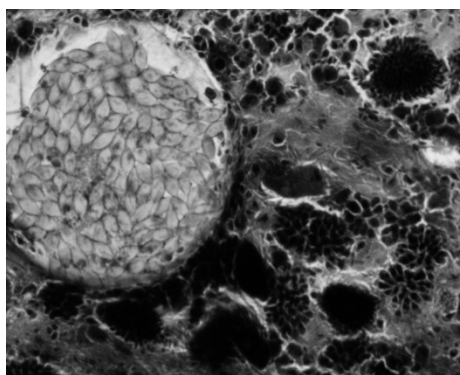
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Figures 1-4. Photomicrographs of different stages of the life cycle of *Monocystis mauritii* sp.nov fig.1-2. Mature trophozoites, fig.3. Gametocyst. Fig.4. Oocysts.

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