ON A NEW SPECIES OF HYMENOSTOMATOUS CILIATE (PROTOZOA: FRONTONIIDAE) FROM INDIA

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Received February 25, 1970

(Communicated by Dr. B. S. Chauhan, F.A.SC.)

ABSTRACT

A new species of free-living freshwater hymenostomatous ciliate belonging to the genus *Disemastoma* Lauterborn collected from a pond in West Bengal, India, is described in this paper. It differs from the six known species of the genus in having a comparatively big horse-shoe-shaped macronucleus with slightly swollen ends located dorsally around the peristome. This is the first record of the genus *Disemastoma* Lauterborn in the Indian sub-continent and the name *Disemastoma bengalensis* is suggested for the new species.

INTRODUCTION

In January, 1969 while examining a freshwater sample collected from a small pond at village Sarachi, Deula, District 24-Parganas, West Bengal, India, several examples of an interesting ciliate were observed. On closer examination these were found to belong to the genus *Disemastoma* Lauterborn. The detailed study of the living and the fixed and stained specimens proved that they belong to a species different from the six known species of the genus and are, therefore, described here as a new species to science.

MATERIAL AND METHODS

The water sample was kept in the laboratory in a kilner jar with some fresh *Pistia* plants and green algal filaments collected from the pond. The specimens were first encountered in the layer just above the settled sediment (ooze) in the jar a week after the date of collection. Attempts to culture the individuals free from other protozoa in hay infusion did not yield satisfactory results. However, the specimens existed in the water sample, the wild and mixed culture, in fairly large numbers for a period of six weeks. Later on their number gradually dwindled and perished totally after a fortnight. The
isolated individuals were examined in the living condition after immobilising them in "methocel" solution on slides. For making permanent preparations the specimens were either fixed in Schaudinn’s fluid or Carnoy’s solution and followed by staining in Heidenhain’s iron-haematoxylin and counterstained in eosin. All the measurements were taken with the aid of a calibrated ocular micrometer.

**DESCRIPTION**

*Disemastoma bengalensis* sp. nov.

Body more or less pyriform, grey in colour and is with a keel-shaped dorsal side and a flat ventral side. Size varies from 93–109 μ in length and 58–75 μ in breadth. The anterior portion is broadly rounded and the posterior portion is gradually narrowing with a bluntly pointed end. Body is clothed in cilia of moderate length arranged in slightly slanting ciliary lines which are transversed by diagonally placed transverse striations. The body margin is provided with a layer of closely arranged trichocysts which eject needle-like rods (38 μ long) when disturbed. The ingested food particles are seen as broken algal filaments and round food vacuoles concentrated in the posterior half of the body.

![Diagram of Disemastoma bengalensis](ventral_view.png)

*Fig. 1. Disemastoma bengalensis* sp. nov. (ventral view), Cv., Contractile vacuole; Fv., Food vacuole; Mi., Micronucleus; Mn., Macronucleus; Pc., Preoral canal; Pe., Peristome; Rc., Radial canal; Tr., Trichocyst.

The peristome is broadly elliptical and provided with two prominent undulating membranes. It is placed 15–23 μ below the anterior end, measures B3.
18.5–24 × 10–13.5 μ in size and located in the middle of the anterior third on the ventral side. The preoral canal is not well pronounced.

The contractile vacuole has eight to ten radiating channels and is located dorsally more towards one side in the middle of the body.

The macronucleus is a prominent, horse-shoe-shaped cylindrical body having slightly swollen ends in the resting stage and placed dorsal to the peristome. The bent of the macronucleus passes anterior to the peristome and its arms pass on either sides of the peristome. Examples with macronucleus having arms of slightly unequal length are also met with in the population but they are very rare. Length of the macronucleus ranges from 78 to 85 μ from end to end and the diameter ranges from 6 to 7.5 μ. The micronucleus is a small, round body measuring 2.5–3 μ in diameter and is seen close to the macronucleus.

The food of the animal mainly consists of the algal filaments and small flagellates found in the water sample. Two types of movement are observed in its locomotion. A slow gliding movement in a straight line while creeping and an irregular pattern accompanied by rotation on its main axis while swimming are displayed. During the entire period of its existence in the water sample no trace of conjugation is encountered.

*Types*: Five type slides will be deposited in the Zoological Survey of India.

*Type Locality*: India—a small freshwater pond at village Sarachi, Deula, District 24-Parganas, West Bengal. Date of collection: 3-1-1969, Coll. K. N. Nair.

**DISCUSSION**

Lauterborn (1894) established the genus *Disemastoma* and described a new species namely *D. butschlii* under it. Kahl (1931) recognised three species namely *D. butschlii* Lauterborn, *D. tetraedrica* (Fauré-Fremiet) and *D. minor* Kahl under this genus. Gelei (1954) added three new species viz., *D. frontoniiforme*, *D. invallatum*, and *D. colpidiodes* to this genus. Dingfelder (1962) gave some additional descriptions to the three new species reported by Gelei (1954) with an account of their cysts.

The species described in this paper is closely allied to *D. butschlii* Lauterborn but differs from the latter as follows:

1. Smaller in body size (93–109 by 58–75 μ).
2. Macronucleus is horse-shoe-shaped.
3. The macronucleus is comparatively big in relation to its body size.
4. The macronucleus is located around the peristome dorsally.
5. The peristome is one-fourth of its body length.

*Disemastoma* butschlii Lauterborn has a body size ranging from 140–155 by 80–90 μ according to Lauterborn (1894), according to Kahl (1931) body length is ranging from 130 to 160 μ, a band or sausage-shaped macronucleus placed dorsal to the middle of peristome and the peristome is one-third of the body length.

The present form is, therefore, described as a new species to science and the name *Disemastoma bengalensis* is suggested for it based on the geographical distribution of the species. This is the first record of the genus in the Indian sub-continent.

**Diagnosis of *Disemastoma bengalensis* sp. nov.**

Body roughly pyriform with a keel-shaped dorsal side and a flat ventral side; posterior portion gradually narrowing with a bluntly pointed end; size range 93–109 × 58–75 μ; with a broadly elliptical peristome measuring one-fourth of its body length located in the middle of the anterior third on the ventral side; macronucleus horse-shoe-shaped located around the peristome dorsally with a micronucleus close to it; with a contractile vacuole having eight to ten radiating channels in the middle more towards one side.

**ACKNOWLEDGEMENT**

My sincere thanks are due to Dr. B. S. Chauhan for kindly going through the manuscripts of the paper and to Dr. K. K. Tiwari for encouragement. My thanks are also due to the Director, Zoological Survey of India, for the facilities provided and for his kind permission to send this paper for publication.

**REFERENCES**


*Original not seen,*