

Trichodina canningensis sp. n. (Ciliophora: Trichodinidae) from an Indian Estuarine Fish, *Mystus gulio* (Hamilton) (Bagridae)

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Summary. During the study on the biodiversity of trichodinid ciliates from the state of West Bengal, India, the gills of the Indian estuarine fish, *Mystus gulio* (Hamilton) (Bagridae) was found to be the host to a new species *Trichodina canningensis* sp. n. This ciliate is characterized by reduced blade; stout and robust central part; elongated ray having parallel borders and a large clear circle at the centre containing argentophilic particles. The body diameter ranged from 47.0-56.1 μm , whilst denticle number ranged from 22-29. Approximately 3.6% of the host fishes (6 out of 165) were infested with this ciliate, sometimes in concurrent infestation with *Trichodina mystusi* Asmat and Haldar, 1998 and other species of *Trichodina* from November to January 1996. This trichodinid closely resembles *Hemitrichodina robusta* Basson and Van As, 1989 but differs with slightly developed blade having sharp tangent point and without any protrusion on the distal margin.

Key words: ciliophoran, estuarine fish, India, *Trichodina canningensis* sp. n., trichodinid.

INTRODUCTION

More than 200 species of trichodinid ciliophorans have been reported from the skin, fins, gills, urinary bladder as well as reproductive system of fishes. Despite the abundance of trichodinids they have been little studied in India since the early work of Annandale (1912). As a result, 12 species of trichodinid ciliates representing the genera *Trichodina* Ehrenberg, 1838; *Paratrachodina* Lom, 1963; *Tripartiella* Lom, 1959

were identified from different freshwater and estuarine Indian fishes (Hagargi and Amoji 1979; Mukherjee and Haldar 1982; Das and Haldar 1987; Das *et al.* 1987; Mishra and Das 1993; Saha *et al.* 1995a, b; Saha and Haldar 1996, 1997; Asmat and Haldar 1998; Basu and Haldar 1998). During the course of the present investigation on the biodiversity of trichodinid ciliates in various freshwater and estuarine fishes in the state of West Bengal, an estuarine fish, *Mystus gulio* (Hamilton) has been found to be a host to a new species of *Trichodina*.

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MATERIALS AND METHODS

The host fishes were collected from the river Matla (Latitude 21.5°N Longitude 88.5°E) at Canning, South 24-Parganas District, about 30 km south of Calcutta, which regularly receives saline water from the Bay of Bengal during high tide.

A total of 165 host fishes were examined during September 1995 to December 1997. The fishes (12-16 cm x 20-120 gm) were collected by fishing nets. Gill scrapings were made at the riverside. Air-dried scrapings were transported to the laboratory. The slides with trichodinid ciliates were impregnated with Klein's dry silver impregnation technique (Klein 1958). Examinations of preparations were made under the Olympus phase-contrast microscope at x100 magnification. Measurements were made according to the recommendations of Lom (1958), Wellborn (1967), Arthur and Lom (1984) and Van As and Basson (1992). Photomicrographs were made in order to have comprehensive morphological analyses of the ciliates.

DESCRIPTION OF THE SPECIES

Trichodina canningensis sp. n. (Figs. 1-12, Table 1)

The trichodinid is medium-sized and disc-shaped, 47.0-56.1 (51.1 ± 2.8). There are 7-10 (8.5 ± 0.8) radial pins per denticle. The centre of the adhesive disc is a clear circle, which is surrounded by an undulating or notched heavily impregnated perimeter and somewhat elevated from the rest of adhesive disc (Fig. 6). There are few to many dark argentophilic particles scattered in the circle (Figs. 1, 2, 6, 7).

The denticulate ring consists of 22-29 (25.4 ± 2.1) denticles. The blades are reduced and angular with truncated distal margins, which are parallel to the border membrane, sometimes slightly sloped anteriorly. In some malformed specimens the blades appear as warts or are absent altogether (Fig. 7). The tangent point is sharp and situated slightly lower than the distal margin. The anterior surface of the blade is slightly curved and extends more than half of the space to the y axis (Figs. 9-11). The apex is not always prominent because of the impregnation of the apical depression, giving a notch-like appearance at the base of blade. The anterior blade apophysis is not clearly visible. The posterior margin of blade forms a narrow semilunar curve with the deepest point at same level as anterior notch. The blade connection is short and well developed. The posterior blade apophysis is prominent.

The central part is robust, flat and rectangularly triangular in shape with a bluntly pointed end and wider than the length of blade (Table 1). The point of the central part is fitted tightly into the following denticle, almost touching the y-1 axis (Figs. 9-11) and sometimes extends beyond this line. The section of the central part above the x-axis is more convex. Indentation in the lower central part is not prominent.

The ray apophysis is present, sometimes prominent and directed obliquely in an upward direction (Figs. 6, 7). The ray connection is short and wide. The ray is broad and straight with a distinct central groove (Fig. 1), but appears as whip-like filaments in younger specimens (Fig. 8). The ray gradually tapers to a rounded point (Figs. 1, 3, 4, 6) and remains parallel to y axes (Figs. 7, 9). The tip of the ray sometimes touches the boundary of the clear circle.

The exact turn of the adoral ciliary spiral could not be detected.

Type host: *Mystus gulio* (Hamilton) (Bagridae).

Type locality: river Matla (Latitude 21.5° N Longitude 88.5° E) at Canning, South 24-Parganas District, West Bengal, India.

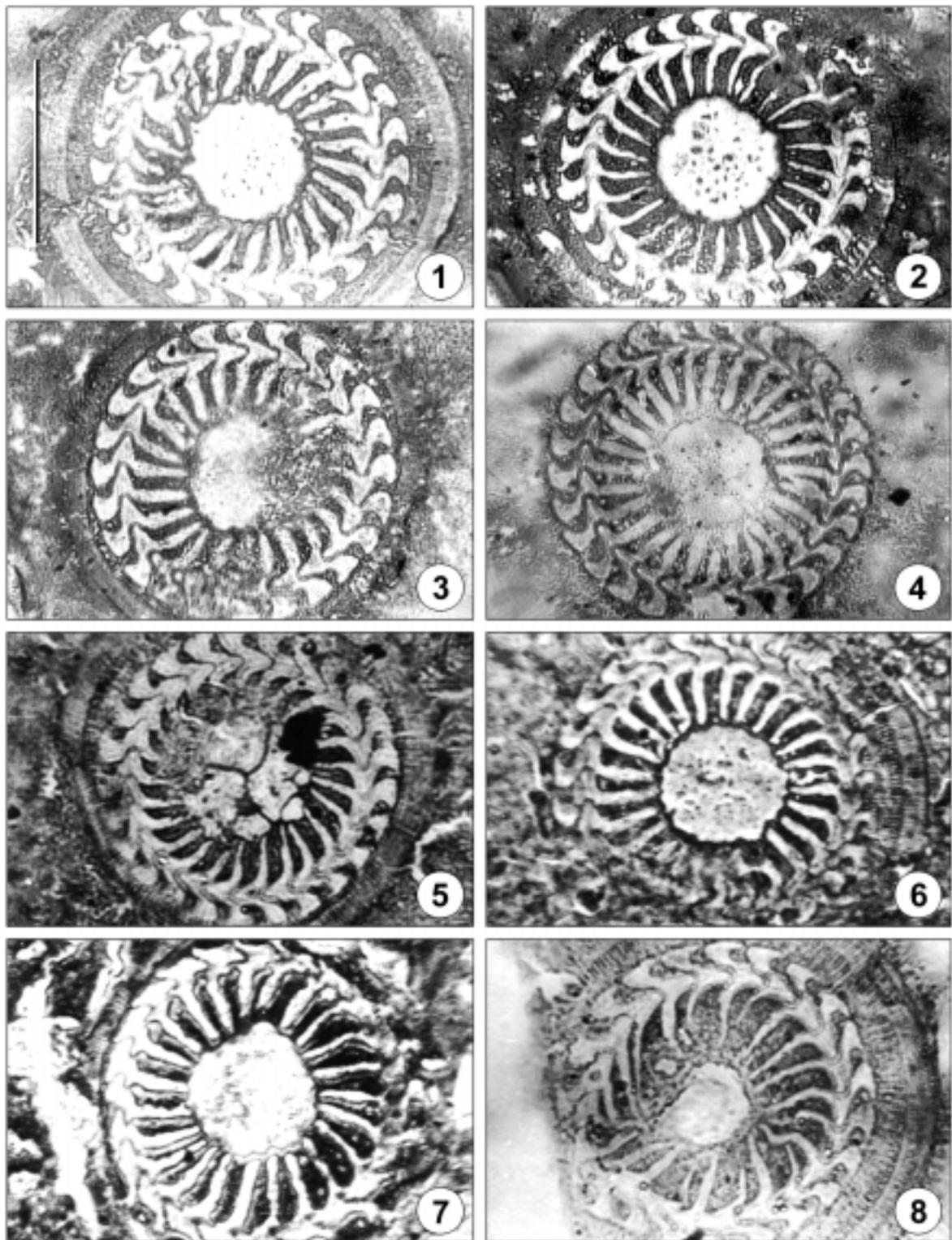
Location: gills.

Etymology: named after the place of collection of the type host fish, *Mystus gulio* (Hamilton).

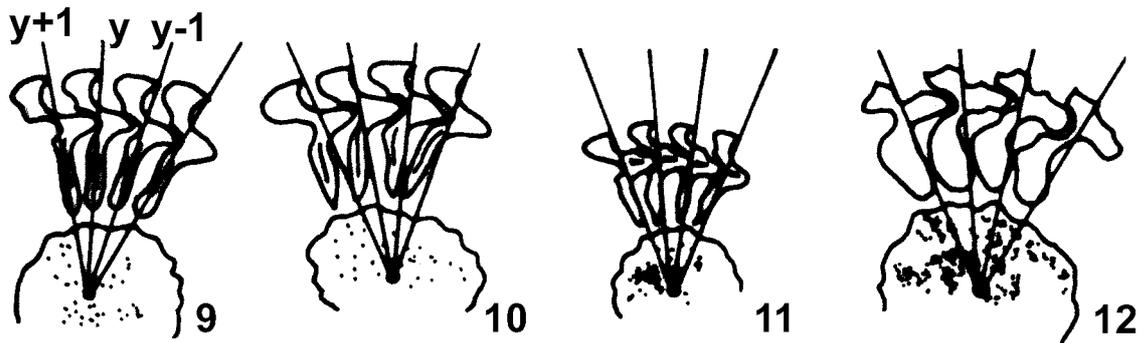
Type specimens: holotype, slide MG-1 prepared on 15.01.1996, paratypes in the above mentioned slide and in other slides prepared on different dates in the collection of the Protozoology Laboratory, Department of Zoology, University of Kalyani, Kalyani 741235, West Bengal, India.

DISCUSSION

Trichodinids are distinguished by the silver nitrate impregnated adhesive disc. The combination of large clear central area, reduced blade, well-developed ray and robust central part of the trichodinid from *Mystus gulio*, made it unique among the described trichodinids. The only species could be compared is the member of a different genus, i.e. *Hemitrichodina robusta* Basson and Van As, 1989 (Fig. 12). The genus *Hemitrichodina* with its only species *H. robusta* is characterized by the denticulate ring consisting of denticles with well-developed rays and central parts, but number of blades is reduced. The adoral ciliary spiral in *Hemitrichodina* describes an arc of more than 360°, but less than two full circles. Basson and Van As (1989) originally described *H. robusta* from the host fish, *Marcusenius macrolepidotus* from the Olifants River system in the eastern Transvaal, South Africa. Later, Van As and Basson (1992) also recorded it from two other host fish, *Hepsettus odoe* from the Lake Liambesi and *Micralestes acuitidens* from the Zambesi River in South Africa. The



Figs.1-8. Photomicrographs of silver nitrate impregnated adhesive discs of *Trichodina canningensis* sp. n. from *Mystus gulio* showing variation in appearance. Scale bar - 30 μ m



Figs. 9-12. Diagrammatic drawings of denticles of trichodinids. **9-11** - *Trichodina canningensis* sp. n. from India; **12** - *Hemitrichodina robusta* Basson and Van As, 1989; redrawn from Basson and Van As (1989) from South Africa

Table. 1. Morphometric comparison between *Trichodina canningensis* sp. n. and *Hemitrichodina robusta* Basson and Van As, 1989

Species	<i>Trichodina canningensis</i> sp. n. n=14	<i>Hemitrichodina robusta</i>
Reference	Present paper	Basson and Van As (1989)
Host	<i>Mystus gulio</i>	<i>Marcusenius macrolepidotus</i> , <i>Micralestes acutidens</i> , <i>Hepsettus odoe</i>
Location	Gills	Skin, fins, occasionally gills
Geographic Locality	Matla River, Canning, West Bengal, India	Olifants River, Loskop Dam, Eastern Transvaal, South Africa
Diameter of:		
body	47.0-56.1 (51.1 ± 2.8)	52.3-82.7 (63.8 ± 7.1)
adhesive disc	40.8-47.9 (43.9 ± 2.1)	42.9-70.1 (53.2 ± 6.2)
denticulate ring	28.6-35.7 (32.5 ± 2.1)	27.3-44.9 (33.5 ± 4.2)
central area	11.2-17.8 (15.3 ± 1.8)	-
clear area	10.2-16.3 (14.2 ± 1.5)	12.4-20.0 (16.0 ± 2.0)
Width of border membrane	3.1-4.1 (3.6 ± 0.4)	4.5-6.8 (5.6 ± 0.8)
Number of:		
denticles	22-29 (25.4 ± 2.1)	18-24 (23.0)
radial pins/denticle	7-10 (8.5 ± 0.8)	8-11 (9.0)
Dimensions of denticle:		
span of denticle	11.2-14.8 (12.9 ± 0.9)	-
length of:		
denticle	7.1-8.2 (7.3 ± 0.8)	6.9-10.9 (8.6 ± 1.1)
ray	5.6-8.6 (7.1 ± 0.9)	4.9-10.0 (6.7 ± 1.3)
blade	1.5-3.1 (2.6 ± 0.5)	3.0-5.3 (4.0 ± 0.5)
width of central part	2.0-3.6 (3.1 ± 0.4)	2.4-4.1 (3.0 ± 0.5)
Degree of adoral ciliature	-	405-450°

described trichodinid in having reduced blade; stout and robust central part; elongated ray having parallel borders and a large clear circle at the centre containing argentic particles closely resembles *H. robusta*. How-

ever, the new species differs from *H. robusta* in having blades not as reduced as recorded by Basson and Van As (1989) but slightly developed with sharp tangent point and without any protrusion on distal margin. The species

under discussion is also distinct from *H. robusta* in having straight and gradually tapered ray and of smaller body dimensions (Table 1).

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