

***Trichodina ranaghatensis* sp. nov. (Ciliophora: Trichodinidae)
from Gills of a Freshwater Fish *Mystus vittatus* (Bloch 1794)
in the River Churni, West Bengal, India**

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ABSTRACT

A new species of trichodinid, *Trichodina ranaghatensis* sp. nov. found on the gills of a freshwater fish *Mystus vittatus* (Bloch 1794) is described. *T. ranaghatensis* sp. nov. falls within the bottom range of dimension as a large sized ciliophoran. Blade is broad and truncated. Diameter of the body measures 48.9–67.4 (52.2 ± 1.3) μm . Number of denticles ranges from 22–24. This paper deals with taxonomic descriptions of the species based on wet silver nitrate impregnated specimens along with prevalence and morphometric comparisons with closely related species.

Keywords Ciliophora, Ectoparasite, Fish, *Trichodina ranaghatensis* sp. nov., India.

INTRODUCTION

Trichodinids are parasites or symbionts of invertebrate and vertebrate hosts (Van As and Basson 1989) that are usually found associated with freshwater and marine fishes and molluscs.

Trichodinids are not well studied in India. All the records of trichodinids in India are from West Bengal province only. Several new as well as erstwhile described species belonging to the genera *Trichodina* Ehrenberg 1838, *Paratrachodina* (Lom 1963), *Trichodinella* (Raabe 1950) (Šramek-Hušek 1953), *Dipartiella* (Raabe 1959) (Stein 1961) have so far been reported (Hagargi and Amoji 1979). Mukherjee and Haldar (1982), Mishra and Das (1993), Saha *et al.* (1995), Asmat 2000a, b, (2001), Mitra and Haldar (2004a,b, 2005), Mitra and Bandyopadhyay (2005, 2006a,b, 2009), Mitra *et al.* (2012a, b, 2013), Mitra (2019a, b).

In a survey of freshwater fish parasites in the river Churni, a new trichodinid belonging to the genus *Trichodina* Ehrenberg 1830 was found from the gills of *Mystus vittatus* (Bloch 1794). Taxonomic description of the new species is described herein with comparison with closely related species, prevalence rate, host and locality record.

MATERIALS AND METHODS

Specimens were collected from the local fishermen in the river Churni passing through Ranaghat of West Bengal. Gill and skin smears were made on grease free slides at the river side. Slides containing

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trichodinid ciliophorans were impregnated using Klein's dry silver impregnation technique (Klein 1958). Examinations of prepared slides were made under an Olympus research microscope (Model CH 20i) at 1000X magnification with an oil immersion lens and photographs were taken with an Olympus digital camera. All measurements are in micrometers and follow the uniform specific characteristics as proposed by Lom (1958), Wellborn (1967), Arthur and Lom (1984). In each case minimum and maximum values are given, followed in parentheses by arithmetic mean and standard deviation. In the case of denticles and radial pins, the mode is given instead of the arithmetic mean. The span of the denticle is measured from the tip of the blade to the tip of the ray. Body diameter is measured as the adhesive disc plus border membrane. The description of denticle elements follows the guidelines of Van As and Basson (1989). Sequence and method of the description of denticle elements follows the recommendations of Van As and Basson (1992).

RESULTES AND DISCUSSION

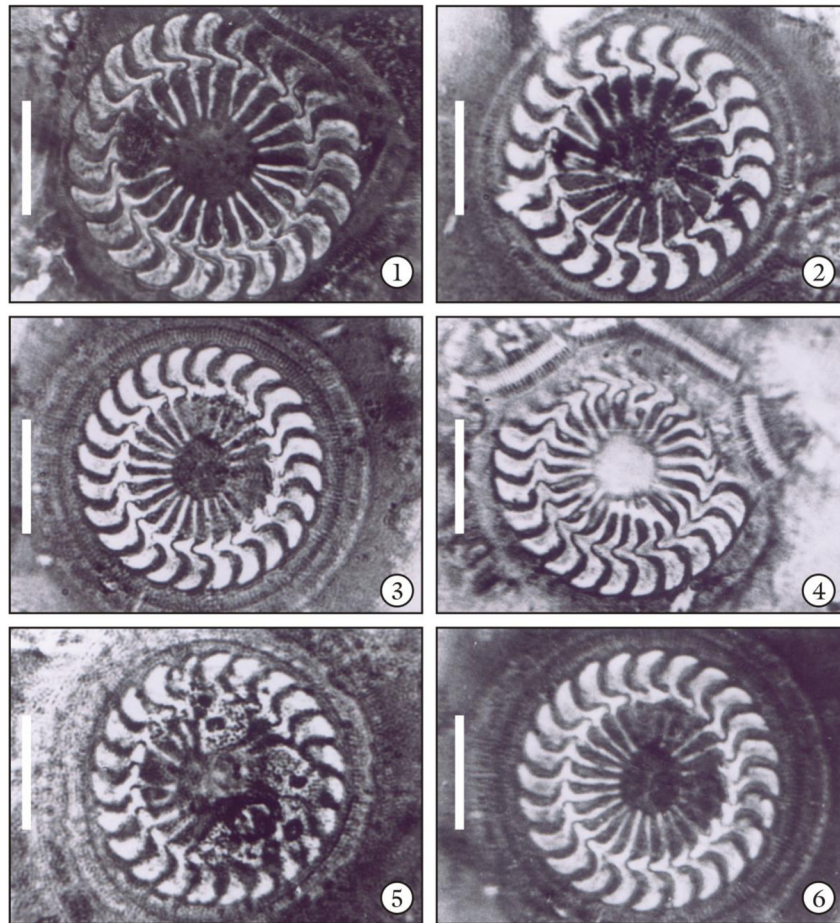
One new species of trichodinid ciliophorans belonging to the genus *Trichodina* Ehrenberg 1830 was obtained from the host fish *Mystus vittatus* (Bloch 1794).

Trichodina ranaghatensis sp. nov. (Figs. 1-7, Table 1)S

This saucer to disc shaped trichodinid falls within the bottom range of dimension as a large sized ciliophoran. Adhesive disc concave and is surrounded by a finely striated border membrane. Blade is broad, covering almost entire area between y axes. Tangent point is round, lower than distal margin of blade. Anterior and posterior margin of blade are not parallel. Apex is not prominent. In most cases blade barely extends beyond y+1 axis. The apex of anterior margin of blade is situated at same level as deepest point of posterior margin's curve. Blade connection is thin. Central part is conical, touches or sometimes

Table 1. Morphometric comparison of *Trichodina ranaghatensis* sp. nov. with *T. uniforma* Van As and Basson (1989).

Species	<i>T. ranaghatensis</i> sp. nov.	<i>T. uniforma</i> Van As and Basson 1989
Host	<i>Mystus vittatus</i> (Bloch 1794)	<i>C. auratus</i>
Locality	Churni River system, India	Komati river system, South Africa
Location	Gills	Skin, fins, gills
References	Present study	Van as and Basson (1989)
Diameter of		
body	48.9-67.4 (52.2 ± 1.3)	47.9-74.8 (61.4 ± 8.3)
adhesive disc	32.4-54.3 (46.3 ± 1.2)	37.6-62.5 (51.1 ± 5.2)
Dimension of body		
denticulate ring	22.8-32.6 (25.4 ± 0.8)	24.5-40.6 (31.8 ± 3.2)
central area	10.8-14.9 (12.7 ± 0.9)	-
clear area		
Width of the border membrane	4.7-5.3 (4.9 ± 0.2)	3.9-7.4 (5.5 ± 0.7)
Number of denticles	22-24 (22)	24-29 (25)
Number of radial pins/denticle	10.12 (11)	-
	-	-
Dimension of denticle		
span	6.4-17.2 (12.9 ± 0.9)	-
length	4.1-8.3 (6.0 ± 1.8)	
Dimension of denticle components		
length of the ray	3.9-7.2 (5.4 ± 1.2)	5.8-9.5 (7.1 ± 0.7)
length of the blade	4.2-8.3 (5.8 ± 1.7)	5.5-8.3 (6.7 ± 0.7)
width of the central part	1.2-2.1 (1.6 ± 0.9)	2.0-3.5 (2.8 ± 0.3)
Adoral ciliary spiral	360°	400°



Figs. 1-6. Silver impregnate adhesive discs of *Trichodina ranaghatensis* sp. nov. (Scale bar 10 μ m).

extends halfway to the y-1 axis. Tip of the central part is rounded. Denticles are loosely fitted with the preceding denticles. Sections above and below x axis are similar. The ray apophysis is absent. Rays are mostly straight, of same thickness throughout the length or tapering slightly and directed towards the geometrical center of the adhesive disc. Point of ray is rounded in most of the cases, but some younger specimens have sharp tip of the rays. Adoral ciliary spiral takes a turn not exceeding 360°.

Taxonomic summary

Type host: *Mystus vittatus* (Bloch 1794).

Type locality: River Churni, Ranaghat (Latitude: 23.17°, Longitude: 88.57°), West Bengal, India.

Location: Gill filaments.

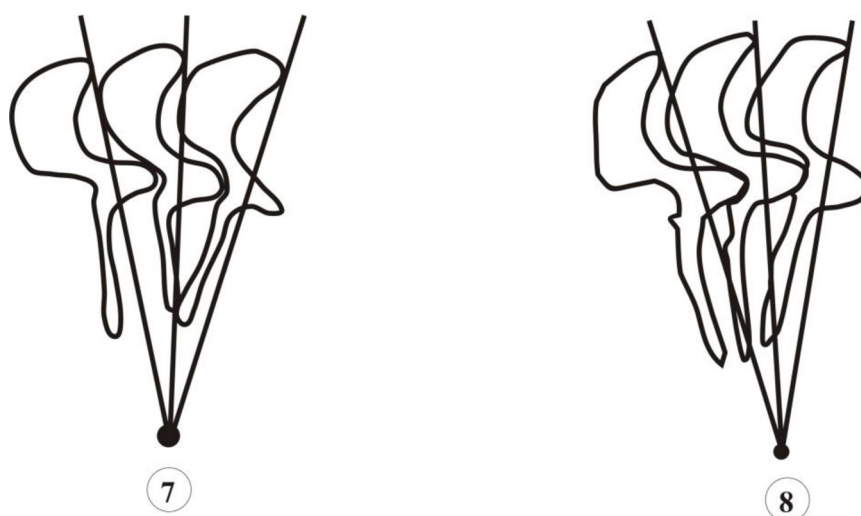
Prevalence: 24/66 (36.4 %).

Holotype: In slide no. mv-3/2011, deposited in the collection of the Department of Zoology, Ranaghat College, Ranaghat, Nadia, West Bengal, India.

Paratypes: In the above mentioned slide and other slides, deposited in the collection of the Department of Zoology, Ranaghat College, Ranaghat, Nadia, West Bengal, India.

Etymology: The species is named after the type locality.

After a through comparison between *Trichodina ranaghatensis* with other freshwater, estuarine and marine trichodinids, only *Trichodina uniforma* (Van



Figs. 7-8. Diagrammatic drawings of the denticles of trichodinids. *Trichodina ranaghatensis* sp. nov. from *Mystus vittatus* (Bloch 1794) in the present study. *Trichodina uniforma* Van As and Basson 1989 from *C. auratus* in South Africa.

As and Basson 1989) found to have some similarities with *T. ranaghatensis*.

The body dimension of the new species is smaller than that of *T. uniforma* Van As and Basson 1989. Apart from body dimension, both the species differ in denticle structure. Blades in both the species occupy most area between y-axes. Distal margin of blade in the new species is flat and smoothly rounded, which is truncated in *T. uniforma*. Tangent point of blade in the new species to y-axis on lower level as distal surface, that contrasts to *T. uniforma* where it is on same level as distal surface. In the new species, both margins of blade are not parallel as seen in *T. uniforma*. In the trichodinid obtained from gills of *Mystus vittatus*, anterior margin of blade barely passes beyond y+1 axis. But in *T. uniforma* anterior blade margin passes beyond y+1 axis. In the new species, the apex of anterior margin is situated at same level as deepest point of posterior margin's curve, which is lower in *T. uniforma*. In the proposed new species central part of blade delicate, conical and extending halfway past y-axis. But in *T. uniforma*, central part bold and rectangular. Tips of central part rounded in both species. *T. uniforma* is well characterized by having small indentation on proximal side of central part corresponding to anterior ray apophysis. But

such indentation or ray apophysis are absent in the new species. Orientation of ray in both species is different. In the new species, most rays are straight and directed towards center of the adhesive disc. But rays in *T. uniforma* directed anteriorly passing beyond y-axes. Adoral ciliary spiral in the new species never crosses 360°, but reaches up to 400° in *T. uniforma*.

With these distinct and important differences in denticle structures, it is justified to give a new species status to the ciliate isolated from *Mystus vittatus* (Bloch 1794) and we propose the trichodinid ciliophoran as, *Trichodina ranaghatensis* sp. nov.

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