

Original papers

Trichodina johniusi sp. n. (Ciliophora: Trichodinidae) from *Johnius coitor* (Hamilton, 1822) in the Shitalakshya River, Bangladesh

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ABSTRACT. During a survey on species diversity of trichodinid ciliates from freshwater fishes in the Shitalakshya River of Gazipur district, Bangladesh, a new species of ciliate was identified and described using the silver nitrate impregnation method. The species is described from the gills of *Johnius coitor* in the Shitalakshya River of Gazipur district. *Trichodina johniusi* sp. n. may be characterised by having broad, rounded and slightly curved blades with shallow semilunar curve; relatively short, slim rays having parallel borders, but ill defined ray apophysis; ray tip never touches a well defined, undivided central circle, encircled by undulated perimeter, interspersed with black patches or granules; and the adoral cilia described a turn of approximately 400°. Based on these characters and the unique shape and absence of variability of the denticles among the silver impregnated specimens of the present species, it may be said that to a lesser extent, resembles *T. domerguei*.

Key words: Bangladesh, Shitalakshya River, *Trichodina johniusi,* Ciliophora, Trichodinidae, fish

Introduction

Trichodinids are a widely dispersed group of ectoparasites [1]. Although more than 200 *Trichodina* species have been reported from various parts of the world, trichodinids from Bangladesh still remain an under-studied group. The only published reports on this group are those of Asmat et al. [2–7]; Asmat and Sultana [8], Bhouyain et al. [9], Habib and Asmat [10], Habib et al. [11–12] and Kibria et al. [13–14]. As a result, 20 species of trichodinid ciliates representing the genera *Trichodina*, *Paratrichodina*, *Tripartiella* and *Trichodinella* were identified from different freshwater and estuarine fishes. During a survey on the species diversity of trichodinid ciliates from the Shitalakshya River (23°49′20.11″N 90°33′0.47″E), a branch of the River Brahmaputra, in the Kapasia Upazila of Gazipur district, 70km north-east of Dhaka (Fig. 1), during January 2008 to December 2009, *Trichodina johniusi* sp. n., was identified from the gills of *Johnius coitor*. This is also the first record of a trichodinid species of this genus in a fish of the family Sciaenidae as well as in this subcontinent.

Material and methods

The host fishes were collected from the Shitalakshya River in the Kapasia Upazila of Gazipur district, by seine nets and gill nets. Gill scrapings were made at the river side; air-dried and then were transported to the laboratory. The slides with trichodinid ciliates were impregnated with Klein silver impregnation technique [15] and examined under a research microscope, OSK 9712 T-2 at 10×100 magnifications. Measurements were made according to the recommendations of Lom [16], Wellborn [17], Arthur and Lom [18], and Van As and Basson [19–20], Fig. 2. All measurements given are in micrometers, range in parentheses by the arithmetic mean and standard deviation. For statistical analysis, morphometric measurements of 20 specimens for the species were considered.

Photomicrographs were made in order to have comprehensive morphological analyses of the ciliates. The level of infection was measured as low (1–5 ciliate/slide), medium (6–10 ciliate/slide) and high (more than 10 ciliates/slide). The size of *Trichodina* is classified following Basson and Van As [21].

Results and discussion

During a survey on species diversity of trichodinid ciliates from freshwater fishes in the Shitalakshya River of Gazipur district, Bangladesh, a new species of ciliate was recorded from the gills of a commercially important finfish species of Bangladesh, *Johnius coitor* and described as *Trichodina johniusi* sp. n.

***Trichodina johniusi* sp. n. (Figs. 3–8; Table 1)**

Description. Medium-sized ciliate, 30.3–38.4 (34.6±2.3) in diameter. Adhesive disc concave, 25.2–30.3 (27.8±1.6) in diameter contains centre with clear area. Clear centre somewhat elevated from centre, bears a few darkly stained granules or patches and surrounded by undulated heavily impregnated border (Figs. 3–4). Adhesive disc surrounded by distinct border membrane, 2.0–4.0 (3.4±0.7) wide. Denticulate ring consists of 21–23 (22±0.6) denticles. Number of radial pins per denticle 6–9 (7.0±0.9).

Blade broad, rounded, occupies entire space between y+1 axis, sometimes crosses that axis (Figs. 5–6). Distal margin of blade close to border membrane, slightly curved with blunt tangent point which lies slightly lower than distal margin. Anterior margin smoothly curves down and forms rounded apex. Apical depression not always distinct and never impregnates. Anterior blade apophysis not visible. Blade connection thick. Posterior margin forms a shallow semilunar curve leaving narrow space between apex of one denticle

Table 1. Morphometric and meristic comparison of *Trichodina johniusi* with *T. domerguei* presented by other authors

Species	***Trichodina domerguei* (n=20)**	***Trichodina domerguei* (n=6)**	***Trichodina johniusi* sp. n. (n=20)**
Host	*Scopthalmus meoticus*	*Gasterosteus aculeatus*	*Johnius coitor*
Locality	Black Sea coast, Romania	Airthery Loach, UK	Shitalakshya River, Bangladesh
Location	Gills	Skin, very rarely gills	Gills
Reference	Lom [24]	Gaze and Wootten [25]	Present study
Diameter of:			
Body	30–42	–	30.4–38.4 (34.6±2.3)
Adhesive disc	22–23	39.8–46.5 (43.7±2.5)	25.2–30.3 (27.8±1.6)
Denticulate ring	13–19	25.6–29.8 (27.9±1.5)	14.1–19.2 (16.2±1.6)
Central area	–	–	6.1–10.1 (7.9±0.9)
Width of border membrane	–	4.6–5.4 (4.8±0.3)	2.0–4.0 (3.4±0.7)
Number of:			
Denticles	20–27	23–27 (27)	21–23 (22±0.6)
Radial pins/denticle	–	8–11 (9.2±1.2)	6–9 (7.0±0.9)
Span of denticle	–	11.9–13.8 (13.2±0.7)	7.1–9.1 (8.1±0.6)
Length of:			
Denticle	3.8	7.6–9.6 (8.2±0.7)	3.0–5.0 (4.2±0.6)
Ray	2.2	4.8–5.6 (5.0±0.3)	2.5–3.5 (3.0±0.3)
Blade	2.2	4.9–6.1 (5.7±0.5)	3.0–4.0 (3.3±0.4)
Width of central part	1.3	2.2–2.6 (2.4±0.1)	1.3–2.0 (1.8±0.2)
Adoral ciliature	360°	390°	400°

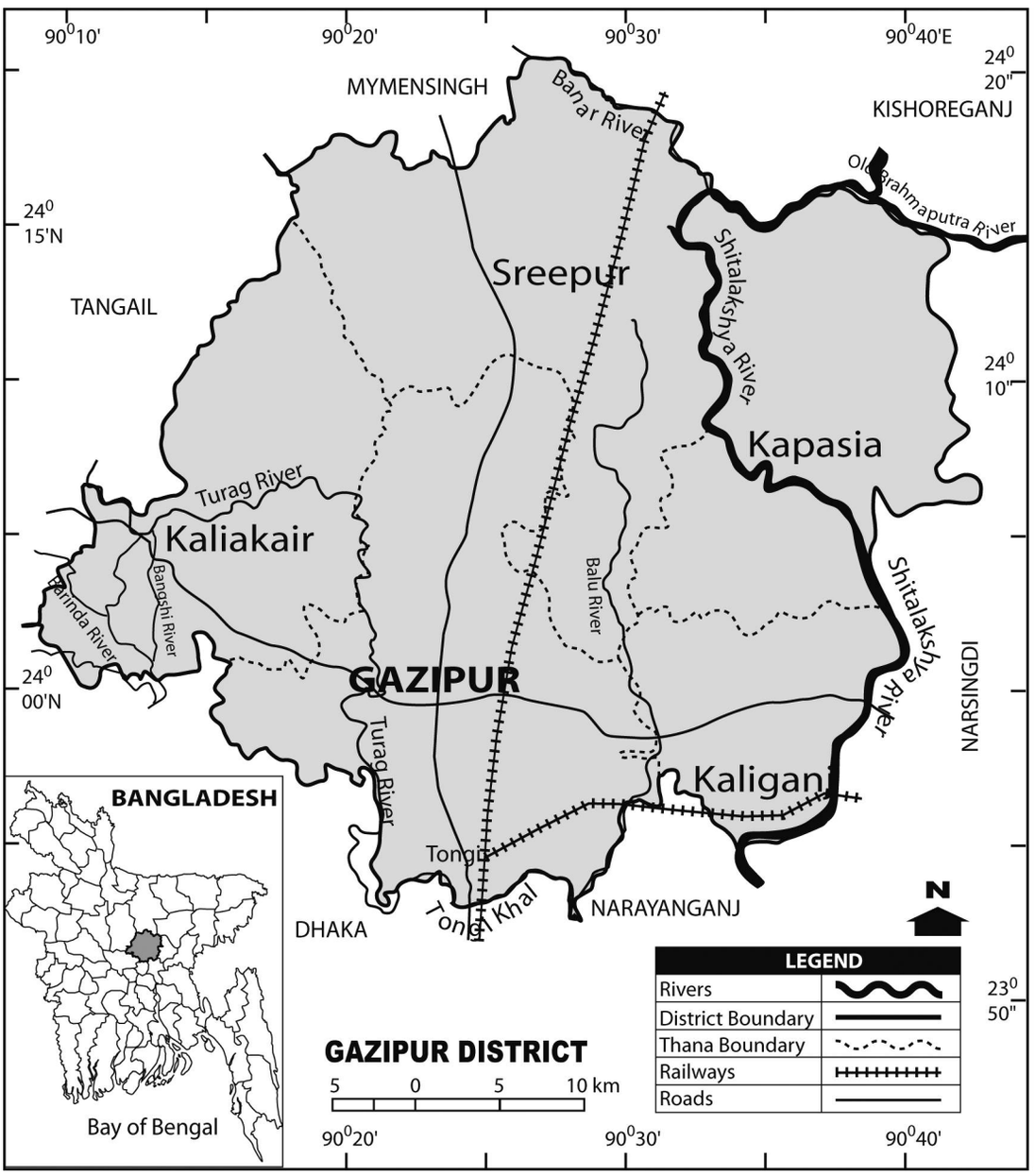


Fig.1. Map of sampling area from where fishes were collected from the Shitalakshya River

and semilunar curve of other (Figs. 5–6). Deepest point of curve at same level of apex. Posterior projection not visible.

Central part wide-triangle with bluntly rounded point which rarely extends more than half of y–1 axis and interposed firmly with following denticle. Section above and below x axis similar. Lower central part bears no indentation.

Ray connection broad, almost inseparable from central part. Ray apophysis and central groove absent. Ray short and slim with parallel borders. Each ray, although slightly curved posteriorly, slanted to some extent in anterior direction (Figs. 5–6), sometimes touches y+1 axis. Tip of ray bluntly rounded, never touches central clear area. Degree of adoral ciliature approximately 400°. Micro- and macronucleus could not be seen.

Trichodina johniusi sp. n. may be characterised by having broad, rounded and slightly curved blades with shallow semilunar curve; relatively short, slim rays having parallel borders, but ill defined ray apophysis; ray tip never touches a well defined, undivided central circle, encircled by undulated perimeter, interspersed with black patches or granules; and the adoral cilia described a turn of approximately 400°. Based on these characters and

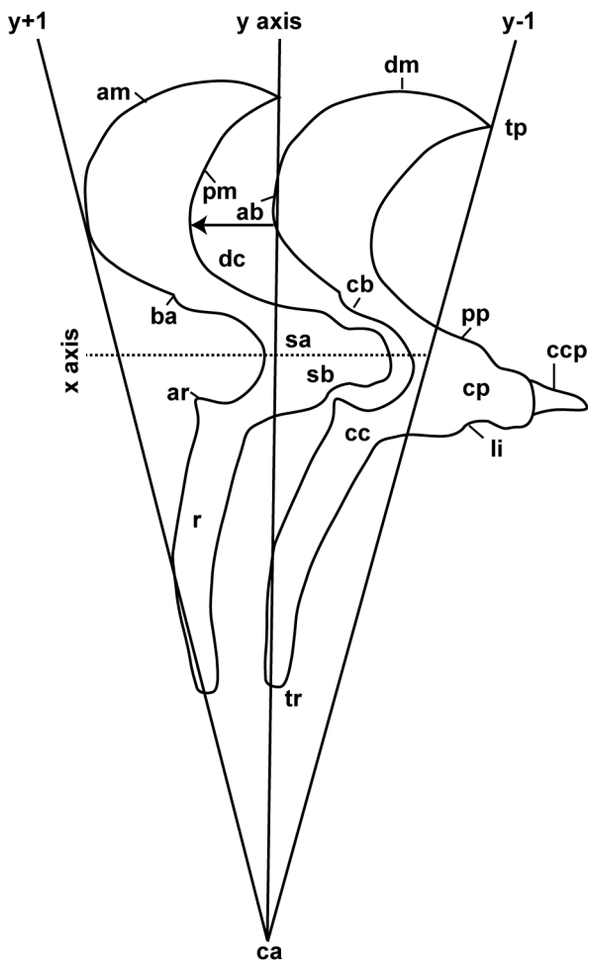


Fig. 2. Denticle structure and construction of X and Y axes as fixed references for description of denticles (after Van as and Basson [19]. Explanations: **AB**, apex of blade; **AM**, anterior margin of blade; **AR**, apophysis of ray; **B**, blade; **BA**, apophysis of blade; **CA**, central area of adhesive disc; **CB**, section connecting blade and central art; **CC**, secton connecting central part and ray; **CCP**, central conical part; **CP**, central part of blade; **DC**, deepest point of semilunar curve relative to apex; **DM**, distal margin of blade; **PM**, posterior margin of blade; **PP**, posterior projection; **R**, ray; **SA**, section of central part above x axis; **SB**, section of central part below x axis; **TP**, tangent point; **TR**, tip of ray.

the unique shape and absence of variability of the denticles among the silver impregnated specimens of the present species, it may be said that to a lesser extent, resembles *T. domerguei* [22].

T. domerguei was first recorded by Wallengren [22] as *Cyclochaeta domerguei* from five fishes, *Pungitius pungitius*, *Gastrostens aculeatus*, *Carassius carassius*, *Phoxinus phoxinus* and *Leucaspis dilineatus.* This ciliate was reported by Lom [23] from the Romanian Black Sea coast, Lom and Stain [24] from Baltic Sea, Gaze and Wootten [25] from the United Kingdom, Özer [1,26–27], and Özer and Erdem [28–29] from Turkey, Asmat [30] from Indian coast, Morozinska-Gogol [31] from Baltic Sea and Rolbiecki [32] from Poland. The described species showed similarities to *T. domerguei* in having broad, rounded and slightly curved blades; relatively short rays having parallel borders; and a well defined central circle, encircled by undulated perimeter, interspersed with black patches or granules. Despite all similarities the presently described species differs from *T. domerguei* in following points. For example, in *T. domerguei*: blade broad and large (vs. broad and rounded); distal margin of blade is more rounded (vs. angularly rounded); gap between the distal margin and border membrane is moderate (vs. large); tangent point is blunt, forms a line (vs. never forms a line); anterior apophysis prominent (vs. indistinct); apex of blade always extends beyond the y+1 axis (vs. rarely extends the y+1 axis); central part of denticle is robust and sharply pointed (vs. moderate, wide angular and bluntly pointed); tip of central part almost touches y–1 axis (vs. tip of central part rarely cross half of y–1 axis); indentation on the lower central part sometimes prominent (vs. not visible); ray apophysis and central groove distinct (vs. absent); central clear area surrounded by undulated or notched border (vs. moderately undulated or notched border); space between the tip of ray and the central clear area forms a very narrow impregnated ring (vs. moderate impregnated ring); adoral cilia described a turn of 390 (vs. 400°); and infest marine or estuarine fishes (vs. infest freshwater fish). The two species also differs in morphometrical data (Table 1).

Type host: *Johnius coitor* (Hamilton, 1822) (Actinopterygii, Perciformes, Sciaenidae)

Type locality: Shitalakshya River (23°36′24″N 90°30′50″E) at Kapasia Upazilla of Gazipur district, Dhaka Division, Bangladesh

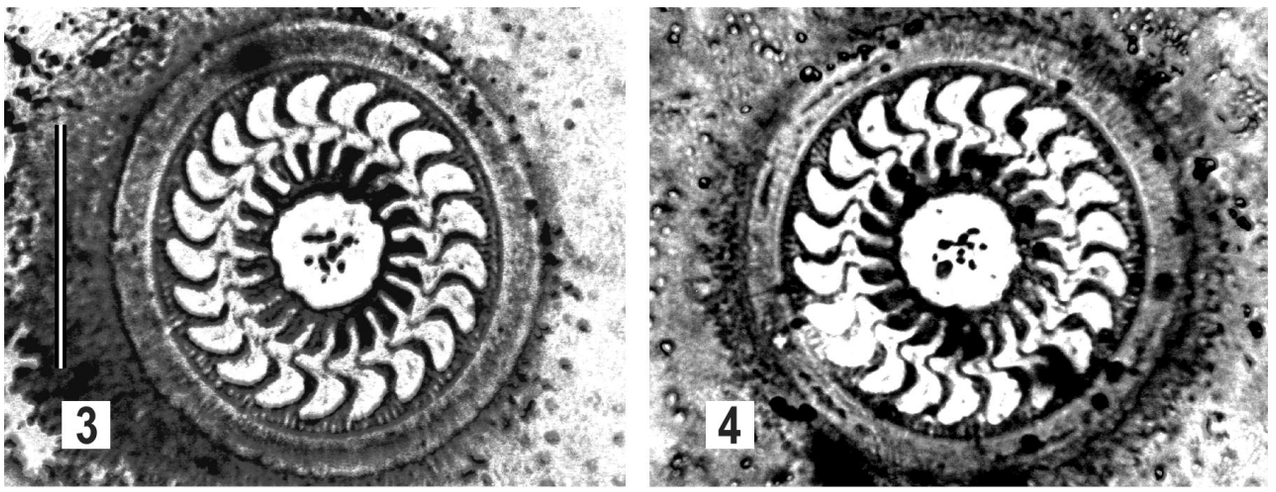
Location: gills

Prevalence: 6 of 62 examined (9.7%);

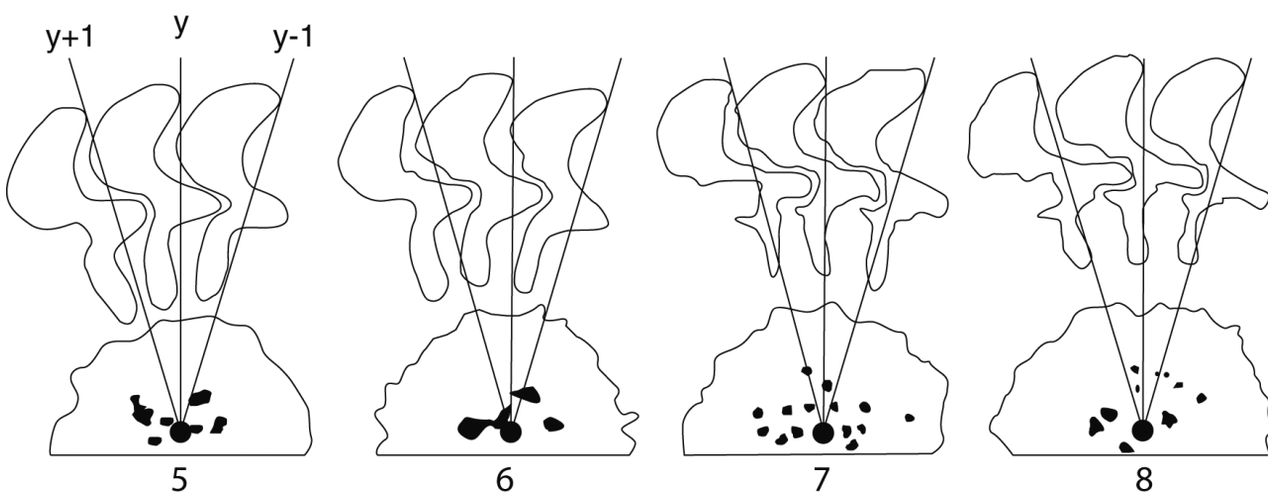
Infection: low

Etymology: specific name derived from the species name of host fish

Type specimens: One holotype (JC-1 prepared on 07/04/2009) of dry silver stained slide; and two paratypes (JC-2 and JC-3 prepared on 07/04/2009) of silver stained slides are deposited in the Museum of the Department of Zoology, University of Chittagong, Chittagong 4331, Bangladesh.



Figs. 3–4. Photomicrograph of silver impregnated adhesive discs of *Trichodina johniusi* sp. n. Scale bar =30 μm.



Figs. 5–8. Schematic drawing of denticles of *Trichodina* species.
Figs. 5–6. *Trichodina johniusi* sp. n.; figs. 7–8. *Trichodina domerguei* from *Pungitius pungitius* and *Gastrostens aculeatus*, redrawn from Lom and Stain [22].

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