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RESEARCH ARTICLE

FIRST REPORT OF TRICHODINID CILIATED PARASITE, TRICHODINA COBITIS LOM, 1961 (CILIOPHORA: TRICHODINIDAE) FROM RANAGHAT, WEST BENGAL, INFECTING SNAKEHEAD FISH, CHANNA STRIATA (BLOCH, 1793)

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ABSTRACT

Background: Trichodinids are the most common protozoan ciliated parasites which are commonly found in aquatic environments behaving as symbionts or parasites of a variety of aquatic vertebrates and invertebrates especially fishes. They are found as ectoparasites of both freshwater and marine fishes infesting the gills, skin and fins of the fishes. Species of trichodinids cause serious disease in fishes known as trichodiniasis. **Objective:** Trichodinids are well identified mainly based on two features- the morphology of denticles and the development of adoral ciliary spiral. The objective of this study is to identify and describe the morpho-taxonomy of the trichodinid ciliated parasites found from different host fishes and from different geographical locations. **Method:** During the survey of trichodinid ciliated parasites in Ranaghat, West Bengal one species of genus *Trichodina* Ehrenberg, 1830 namely, *Trichodina cobitis* Lom, 1961 was found in the gills of snakehead fish, *Channa striata* Bloch, 1793 from November, 2024 to March, 2025. The fishes were collected from Ranaghat fish markets and were identified by using silver impregnation method. **Result:** The parasite has been reported from this geographic region for the first time. This paper provides morphological and taxonomic description of the parasite based on Klein's dry silver impregnation technique. **Conclusion:** Morphological characteristics of that species are confirmed by providing comparative descriptions of the morphological characteristics given by the previous authors. This study adds new host fish and new geographical distribution of the parasite *Channa striata* Bloch, 1793.

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INTRODUCTION

Trichodinids are the most common protozoan ciliated parasites and are widely distributed in many zoogeographical areas (1). They are commonly found in aquatic environments behaving as symbionts or parasites of a variety of aquatic vertebrates and invertebrates especially fishes (2) (3). They are found as ectoparasites of both freshwater and marine fishes infesting the gills, skin and fins of the fishes. Species of trichodinids cause serious disease in fishes known as trichodiniasis, a major concern for fish farming and aquaculture (4). Trichodinids are well identified mainly based on two features- the morphology of denticles and the development of adoral ciliary spiral (5) (4). Till date, more than 400 trichodinids, infesting fishes and other aquatic organisms have been identified throughout the world (6) (7) (8) (9) (10) (11). To explore the species diversity of trichodinid parasites from freshwater fishes in West Bengal, India, the group of snakehead fish, *Channa striata* Bloch, 1793 was examined during the period of November, 2024 to January, 2025. *Channa striata* Bloch, 1793 is an important freshwater food fish which lives in the water bodies by burrowing in the mud. During the survey, one species belonging to genus *Trichodina* Ehrenberg, 1830 namely, *Trichodina cobitis* Lom, 1961 has been reported from the gills of the host fish, *Channa striata* Bloch, 1793. This parasite was reported from the gills of the same host fish in Bangladesh by Asmat, 2017 (12). This paper provides the taxonomic and morphological description of the parasite found from *Channa striata* from Ranaghat, West Bengal, India for the first time. This study will help to expand the knowledge about the pattern of geographical distribution and the distribution of the host fishes of the identified trichodinid parasites.

MATERIALS AND METHODS

Samplings were carried out from the fish markets of Ranaghat (Fig. 1) of District Nadia (Latitude: 23.1793º N, Longitude: 88.5758º E), West Bengal, India. The live host fishes were

Fig. 1. Study area, Ranaghat (Latitude: 23.1793º N, Longitude: 88.5758º E), West Bengal, India

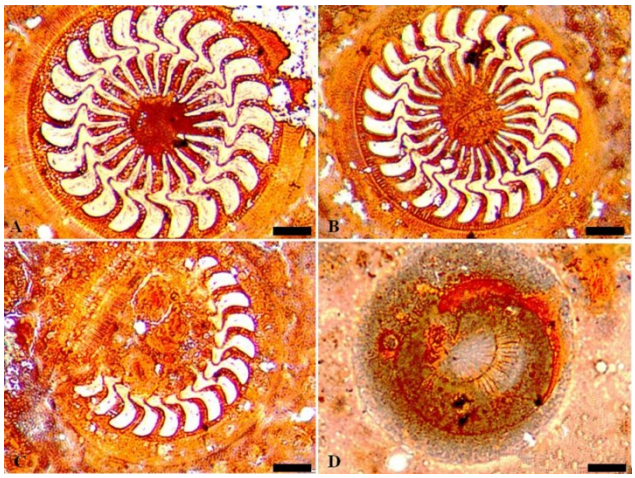

Fig. 2(A-D). Photomicrographs of silver nitrate impregnated adhesive discs of *Trichodina cobitis* Lom, 1961 from *Channa striata* (Bloch, 1793) from India. A-C: aboral side of *Trichodina cobitis* Lom, 1961 (Scale bars - 5µm) D: adoral side of *Trichodina cobitis* Lom, 1961 (Scale bars - 5µm)

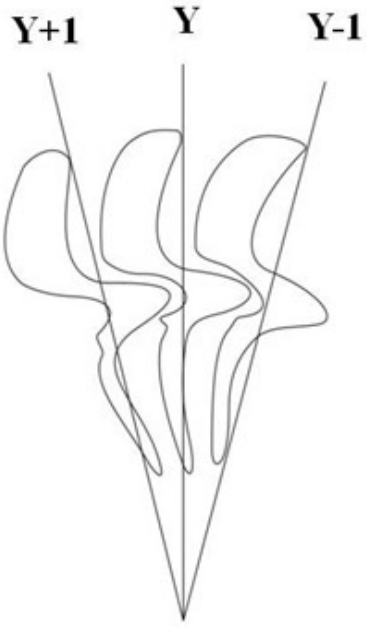

Fig. 3. Diagrammatic drawing of the denticles of *Trichodina cobitis* Lom, 1961 from *Channa striata* (Bloch, 1793) from India by using Corel Draw Software

collected and the smears of the gills of the fishes were made on the grease-free slides on the spot of fish collection and then air dried. The slides were carried to the laboratory of Department of Zoology (Diamond Harbour Women's University) for investigation. The slides with positive result were impregnated using Klein's dry silver impregnation technique (13). Examination of the stained slides was made under Olympus BX43 microscope at 1000X magnification with oil-immersion lens and photographs of the parasites were taken with the help of Cellsense Software. All measurements follow the specific rules provided by (14) (15) (16) (5) (17) and the same are given in micrometers. The detailed description of denticles was made following the guidelines proposed by (5). In each case of measurement, minimum and maximum value along with their arithmetic mean and standard deviation are given. The value of arithmetic mean and standard deviation is given in parentheses. Only in case of number of denticles and number of radial pins the mode value is given instead of arithmetic mean.

RESULTS

***Trichodina cobitis* Lom, 1961 (Table I, Fig. 2A-D & 3)**

Taxonomic Summary:

Host: *Channa striata* (Bloch, 1793)
Locality: Ranaghat, West Bengal ((Latitude: 23.1793º N, Longitude: 88.5758º E)
Location: Gills
Prevalence: 8/52 (15.4%)
Symbiotype: CRW/01 is deposited in the museum of Department of Zoology, Diamond Harbour Women's University, Sarisha, Diamond Harbour 743368, West Bengal, India.

Holotype: CS/03 is deposited in the museum of Department of Zoology, Diamond Harbour Women's University, Sarisha, Diamond Harbour 743368, West Bengal, India.
Paratype: CS/01 is deposited in the museum of Department of Zoology, Diamond Harbour Women's University, Sarisha, Diamond Harbour 743368, West Bengal, India.

Denticle Morphology: Medium sized trichodinid. The shape of blade is angular. The width of the blade is almost same throughout the length. Distal surface of blade is truncated, runs parallel to the border membrane. Tangent point is sharp and somewhat pointed and is situated at the same level or somewhat above the margin of distal surface. Anterior margin of blade moves downward angularly and forms a conical apex at the base. Anterior margin may or may not touch Y+1 axis. Apex of blade is somewhat conical and is formed at the base of blade.

Anterior apophysis of blade is not visible. Posterior margin of blade makes a smooth, elongated, semi-lunar curve with the deepest point. The curve is formed at the same level of apex. Blade connection is well developed. Posterior projection of blade is absent. Central part is somewhat triangular in shape, strong, thick and with bluntly rounded point which extends mostly past Y-1 axis. Section of denticle above X-axis and below X-axis is quite similar. Ray is slightly longer than blade, moderately thin and of uniform thickness. Ray is straight but sometimes tends to posterior direction. Tip of the ray is rounded. Ray apophysis is present and antero-distally directed. Ray connection is short and thin.

Table I. Morphometric comparison of *Trichodina cobitis* Lom, 1961 obtained from present study, with those of other authors

Species	*Trichodina cobitis*	*Trichodina cobitis*	*Trichodina cobitis*
Host	*Channa striata*	*Channa striata*	*Cobitis taenia*
Locality	West Bengal, India	Chittagong, Bangladesh	Czechoslovakia
Location	Gills	Gills	Gills
Reference (s)	Present study	Asmat et al. (2017)	Lom (1961)
Diameter of			
body	58.6-64.1 (61.3 ± 2.7)	42.8-63.2 (52.7 ± 5.5)	41-58 (55)
adhesive disc	46.3-49.4 (47.8 ± 1.5)	32.6-52.0 (42.7 ± 5.3)	32-38 (45)
Dimension of body			
denticulate ring	30.7-31.6 (31.1 ± 0.4)	20.9-30.6 (26.0 ± 2.8)	20-24 (21)
Central area	11.8-12.6 (12.2 ± 0.4)	6.1-13.8 (10.1 ± 2.3)	
width of border membrane	5.1-6.2 (5.6 ± 0.5)	4.1-5.1 (5.0 ± 0.4)	5.5
Number of denticles	23-26 (23)	22-29 (24.9 ± 1.6)	23-30 (25)
radial pins/ denticles	8-9 (8)	7-9 (7.6 ± 0.6)	8-10
Dimension of denticle			
span	16.2-18.4 (17.3 ± 1.1)	11.7-16.3 (14.5 ± 1.3)	
length	7.0-9.2 (8.1 ± 1.1)	5.1-8.3 (7.0 ± 0.7)	8
Dimension of denticle components			
length of the ray	7.2-8.4 (7.8 ± 0.6)	5.1-7.6 (6.5 ± 0.7)	6
length of the blade	6.8-7.9 (7.3 ± 0.5)	4.6-6.6 (5.5 ± 0.6)	5.5
width of central part	2.2-2.6 (2.4 ± 0.2)	2.0-3.1 (2.6 ± 0.5)	2.5
Adoral ciliary spiral	380°	more than 380°	

DISCUSSION

Trichodina cobitis Lom, 1961 was described originally by Lom (1961) (18) as *Trichodina nigra f. cobitis* from the gills of *Cobitis taenia* from Czechoslovakia. But according to Lom, 1970 (19) the concept of subspecies for species belonging to genus *Trichodina* is no longer useful. The relative level of distinctness existing between the subspecies of *Trichodina nigra* has been obscured by the profusion of new species, described from freshwater fishes in such a way that they are now no longer considered to be more closely related to each other than to other closely allied members of the genus (16). On the basis of this conception the subspecies of *T. nigra* i.e. *T. nigra f. cobitis* is regarded as a separate taxon (16) (12). *Trichodina cobitis* Lom, 1961 was reported from *Channa striata* Bloch, 1793 for the first time by Asmat, 2017 (12) from Bangladesh. It was the first record of the parasite from that host fish from the South Asia. The present paper reports the presence of *T. cobitis* Lom, 1961 from *C. striata* for the first time from West Bengal, India. The denticle morphology of T. cobitis Lom, 1961 in the present paper resembles with the description by Asmat, 2017 (12). The overall shape of the blade and denticle morphology of the parasite has similarities with *T. cobitis* described by Asmat, 2017 (12) only the span of denticle (16.2-18.4 µm in present study vs. 11.7-16.3 µm in description by Asmat, 2017); dimension of denticle length (7.0-9.2 µm in present study vs. 5.1-8.3 µm in description by Asmat, 2017); length of ray (7.2-8.4 µm in present study vs. 5.1-7.6 µm in description by Asmat, 2017) and length of blade (6.8-7.9 µm in present study vs. 4.6-6.6 µm in description by Asmat, 2017) show slight variation from the description by Asmat, 2017 (12). Whereas, the measurements shows quite similarities with the original description of the parasite by (18) only the mean value of length of blade (7.3 µm in present study vs. 5.5 µm in description by Lom, 1961) slightly differs. According to (16) the range of morphological variability exhibited by species of *Trichodina* depends on the geographical distribution of the host and environmental factors. Therefore, it can be proposed that the slight variation in the measurements of the parasite from the previous authors is due to the change in geographical region and somewhat change in the environmental factors. This paper confirms the presence of *Trichodina cobitis* Lom, 1961 in *Channa striata* from a new geographical region and also reported from India for the first time. A comparison of measurements of the morphological descriptions of present study with those of other authors is presented in Table I.

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KEY POINTS

- Morphological and taxonomic description of the parasite, *Channa striata* Bloch, 1793 has been provided here.
- The parasite has been reported from the geographical region, Ranaghat (Latitude: 23.1793º N, Longitude: 88.5758º E), District Nadia, West Bengal, India for the first time.
- The parasite has been reported from the gills of the Snakehead fish, *Channa striata* Bloch, 1793.

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