

# Trichodinid ciliates of fresh water catfishes from Parbhani district (M.S.)

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**Abstract:** The ciliated protozoa from family *trichodinidae* distributed worldwide, which are considered some of the main parasitological agents infecting fresh water catfishes. The genus *Trichodina* was isolated from skin and gills of *Wallago attu* in the month of September 2013 from Masooli reservoir. 38 slides were prepared by using silver nitrate impregnation technique (Kein, 1926-58) and stained with Giemsa for assessment under light microscopy. Out of 38 slides, 05 slides were identified by scraping skin of infected catfishes.

The present *Trichodina* species is medium in size, disc-shaped having 44 to 46µm in diameter. The adhesive disc is 35.2 to 46.1µm in diameter. The denticle blade is sickle-shaped with pointed ends. The numbers of radial pins per denticles are 10 (9-11).

After going through the comparison of previous species with the present species, it is found that it is very close to *Trichodina heterodontata* (Deccan, 1977). Therefore, it is redescribed as *Trichodina heterodontata* (Deccan, 1977).

**Keywords:** Catfishes, *Trichodina heterodontata* (Deccan, 1977 Redescribed), Masooli reservoir.

## Introduction:

*Trichodinids* are among one of the most common ectoparasites in wild and cultivated fish (Basson and Van As, 1994, Martins and Ghiraldelli, 2008). This parasite occurs normally in a few numbers on mucous surface and gills. When the relationship host/parasite/environment is broken by nutritional deficiency, poor water quality, infectious and/or parasitic diseases *trichodinids* may proliferate being responsible for severe epidermal lesions and disease outbreaks, as reported by Madsen et al. (2000), Martins et al. (2002), Khan (2004) and Huh et al. (2005).

*Trichodina* are very common ectoparasites which in most cases are pathogenic to both freshwater and marine fish (Wellborn, 1967). Dogiel (1961) reported that *trichodiniasis* is caused by *Trichodina spp.*; the infection being stimulated by the high density of fish in ponds. Under such conditions, it may be an epizootic. In cases of stress, several species of *Trichodina* may become pathogenic interfering with feeding and respiration of small fish (Sarig, 1968b and Ahmed, 1976).

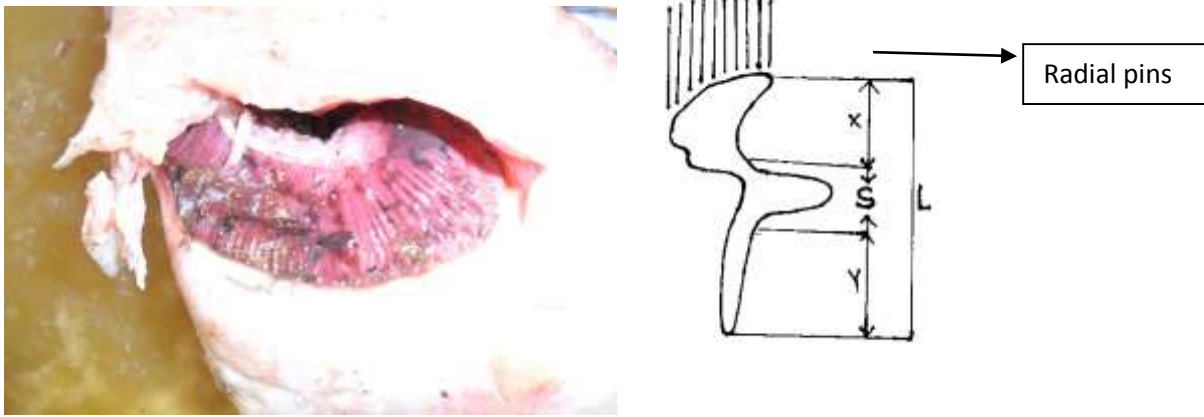
The lesions mostly induced by this parasite are hyperplasia and necrosis of the epidermal cells. These cells are usually subjected to severe attacks by parasites. This results in cellular growth and excess mucus production (Ahmed, 1976). Many authors have observed a complete destruction of gill epithelium in similar cases (Paperna, 1980; McArdle, 1984; and Eisa *et al.*, 1985). Clinical signs and postmortem examination revealed that diseased fish showed sluggish Movement, loss of appetite, emaciation, loss of condition with larger head and darker skin than normal. Some infected fish showed detached scales with pale skin patches and more slimy skin.

The genus *Trichodina* Ehrenberg, 1838 is the largest of this family; more than 200 species have been described from fish (ASMAT *et al.*, 2005). *Trichodinids* have a direct life cycle and they reproduce by binary fission. Most *Trichodinids* are not pathogens, but under certain environmental conditions or when the fish are stressed by other factors, the parasite increases greatly its rate of infestation among fish and can become pathogenic and cause mass mortality of infested hosts.

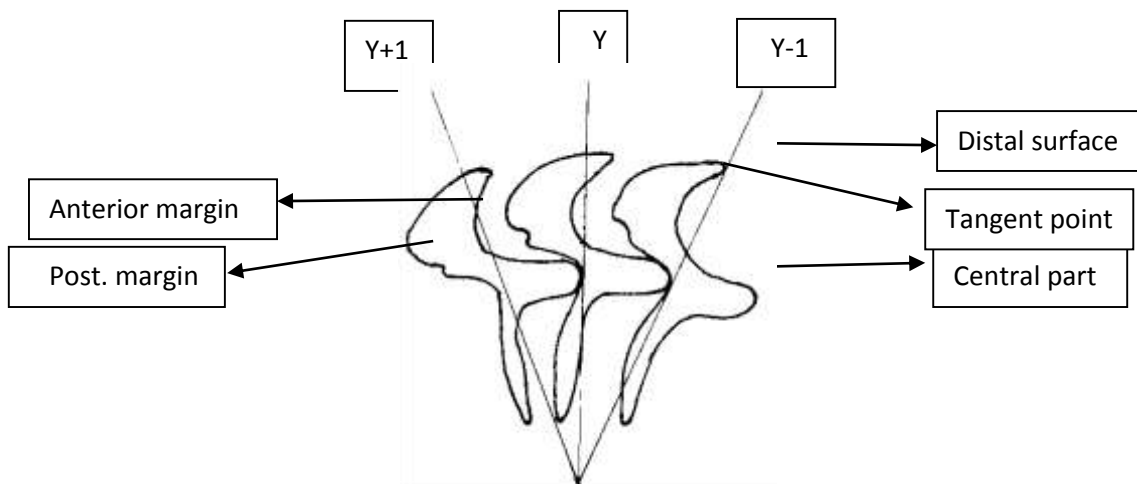
## Materials and Method:

For the study of ciliates protozoan parasites live or freshly killed cultivable and catfishes were collected weekly from Masooli and Jamb Reservoir and fish market of Parbhani District (M.S.) from January 2012 to December 2014. The collected fishes were brought to the laboratory, external diseased characters were observed carefully by using magnifying lens. Skin scraping and gill rashes observations were done to observe the external signs. Ectoparasites ciliates are readily detected in direct microscopic examination of skin and gill scraping from live or freshly killed fishes.

For the study of ciliates protozoan parasite, a thin film of body smear and gill were prepared on clean microscopic slides. The positive slides were left to dry and this air-dried smear slides were passed through Schaudins fixative lugol's iodine and hypo solution. These slides are passed through the ascending series of alcohol (for five minute each) then transfers into the Tungusto phosphoric acid Hematoxyline stain and mount in DPX.

A-Gills of fish showing infestation of *Trichodina* parasite

B- Radial pins per denticle

C- Diagrammatic Structure of denticle of *trichodina heterodentata* (redescribed)**Result:**

In present investigation genus *Trichodina* were isolated from skin of *Wallago attu*, which is collected from Masooli reservoir, District Parbhani (M.S) during the period of January 2012 to December 2014. 38 slides were prepared by using silver nitrate impregnation technique (Kein, 1926-58) to identify *Trichodina parasite*. Out of 38 slides 05 positive slides were identified for *Trichodina* by scraping skin and gills of infected fishes.

**Morphological description:**

The present ciliate protozoan parasite of genus *Trichodina* was identified from the skin and gills of fish *Wallago attu*

The body is medium and disc-shaped. The border membrane is finely striated and measures  $3.9\mu\text{m}$ . The adhesive disc shows clear central zone and measures  $35.2-46.1\mu\text{m}$  in diameter. The diameter of denticle ring is 28 (10-32) and the number of denticles is about 22 (21-26) with somewhat curved and ending is somewhat pointed. The denticle blade is  $4.9\mu\text{m}$  long. The denticle span  $11.2$  ( $11.0-11.4$ )  $\mu\text{m}$ . The central part is visible and measures  $1.5-3\mu\text{m}$  in width. Rays are distinct with little tapering and straight. Blades are evenly having tapering rays with pointed tips. The central disc is small with some dark, irregular spots in the center. The numbers of radial pins are 7 (7-8).

**Denticle description:**

The shape of denticle blade is sickle-shaped with pointed ends. The distal surface of blade is rounded and slants away from the border membrane. The denticle having strongly fitted blade with pointed tangent point and anterior margin of the blade sharply curves down with small notch at posterior end. The central part of the blade is elongated and wide, tip is somewhat rounded and fitting into the proceeding denticle. The central part extending slightly more than halfway towards y-1 axis. Shape and size of blades are almost equal, but the length of rays is alternatively equal. The first ray is slightly longer than the second ray. The rays are found slightly longer than the blade length. The rays are well developed and parallel or attached to y-axis. The length of short ray is  $5.9\mu\text{m}$  while longer ray is  $6.2\mu\text{m}$ . Length of sections above and below x-axis are not similar. Ray strongly developed extends almost directly from the central part.

**Discussion:**

For comparison and to avoid multiple repetitions in the closely related *Trichodina* species which are previously described are summarized in the table no.1

After going through the morphological characters of present species it is found that, two-three morphological characters resembles *T. heterodontata* (Duccan, 1977) but more morphological characters are differing than *T. heterodontata* (Duccan, 1977).

By comparing the shape of body of present specimen is medium sized having 44-62 $\mu$ m in diameter, which is nearer to *T. heterodontata* (Duccan, 1977), but in other specimen showing smaller or larger than it. Their measurement is given in the table no.1 When we compare the adhesive disc of present species with other specimen, it is found that it has disc shaped adhesive disc which is 35.2-46.1 $\mu$ m in size were found similar in *T. mutabilis* (Kazubski et Migala, 1968), *T. reticulata* (Hirschmann et Partsch, 1955), *T. acuta* (Lom, 1961) and *T. heterodontata* (Duccan, 1977) while in *T. lepissi* (Lom, 1962), *T. batata* (Ali, 1996) and *T. puytoraci* (Lom, 1962) it is concave in shape.

By comparing the denticle span of present specimen it is having 13.9 $\mu$ m which is nearer to *T. reticulata* Hirschmann et Partsch, 1955(13.8 $\mu$ m), but it is differ than other specimens.

The diameter of the denticle ring of the present species, it is 31 (26-32)  $\mu$ m, which is nearer to *T. mutabilis* Kazubski et Migala, 1968 and *T. heterodontata* (Duccan, 1977) but in other specimens it is reported smaller or larger in size, which is mentioned in the comparative chart.

Border membrane of the present specimen is slightly thick and measures 3.9 $\mu$ m in width and it differ than those reported in the earlier specimens.

Texture of center of adhesive disc is found similar i.e (without inclusion of any kind) as *T. heterodontata* (Duccan, 1977), this type of texture not reported in other *Trichodina*.

The number of denticles in denticle ring is important taxonomic point. The present species having 22 (21-23) number of denticles which are almost similar as in other specimens *T. lepissi* Lom, 1962 22 (21-26), *T. batata* Ali, 1996 21 (21-25), *T. heterodontata* Duccan, 1977 23 (21-26), while the number of denticles slightly more reported in *T. puytoraci* Lom, 1962 (28 (27-30) and *T. mutabilis* (Kazubski and Migala, 1968), *T. reticulata* (Hirschmann et Partsch, 1955) having 24 in numbers.

Similarly the number of radial pins per denticle in present specimen having 10 (9-11) which are found similar in *T. mutabilis* Kazubski and Migala, 1968 (11(9-13), *T. reticulata* Hirschmann et Partsch, 1955 (10(9-11), *T. acuta* 10(9-11) and *T. heterodontata* 11(10-13), while in *T. lepissi* Lom, 1962 (6(5-7), *T. puytoraci* Lom, 1962 (8(7-9) and *T. batata* Ali, 1996 (8(7-9) slightly less in number.

When we compare the denticle length in present specimen (12.0 $\mu$ m) with other specimen, it is nearer to *T. heterodontata* Duccan, 1977 (13.1 $\mu$ m), but in other described species the length is too short as *T. lepissi* Lom, 1962 (3.0-4.5 $\mu$ m), *T. puytoraci* Lom, 1962 (6.5-7.5), *T. batata* Ali, 1996 (4.0-5.0 $\mu$ m) and *T. mutabilis* Kazubski and Migala, 1968, *T. reticulata* Hirschmann et Partsch, 1955, *T. acuta* Lom, 1961 are not reported by authors.

Blade length of present specimen (5.8 $\mu$ m) is near about same as it described in comparative chart except *T. lepissi* Lom, 1962 (3-4 $\mu$ m) and *T. acuta* Lom, 1961 (4 (3.9-4.1 $\mu$ m).

Length of ray in present specimen found differs than the other described specimen in comparative chart. The length of rays found equal alternately. First ray having slightly longer 6.2 $\mu$ m than next one which is having length 5.9 $\mu$ m.

The center part of denticle also found similar as in *T. heterodontata* Duccan, 1977 but in shape, size and attachment with proceeding denticle are differ than previously described specimen.

After going through the comparative study, it is found that the present species is somewhat nearer to *T. heterodontata* (Duccan, 1977) with the following points.

- 1) Diameter of body (44-62 $\mu$ m Vs 45-64 $\mu$ m)
- 2) Shape of adhesive disc (Disc-shaped Vs disc-shaped)
- 3) Center of adhesive disc (Without inclusion of any kind Vs without inclusion of any Kind).
- 4) Number of denticles 22 (21-23) Vs 23 (21-26)
- 5) Denticle length 12.0 $\mu$ m Vs 13.1 $\mu$ m
- 6) Blade length 5.1  $\mu$ m vs 5.2  $\mu$ m
- 7) Center part of blade (2.6-3.0 $\mu$ m Vs 3(2.3-4.6 $\mu$ m).

The Present *Trichodina* species differ than *T. heterodontata* (Duccan, 1977) with following characters.

- 1) Denticle span 13.9 $\mu$ m Vs 17.2 (12.5-23.9 $\mu$ m)
- 2) Border membrane (3.9 $\mu$ m Vs 4-5 $\mu$ m)
- 3) Length of ray (Unequal Vs equal)

On the basis of taxonomic study of *Trichodina* characters, five characters are considered key points for the identification of generic level of any *Trichodina* species (According to Lom, 1956). Hence according to these seven similar characters, it is come to conclusion that the present *Trichodina* species is considered as *T. heterodontata* (Duccan, 1977) redescribed species are enough to create a new species.

Type species *T. heterodontata* (Duccan, 1977) redescribed  
 Host *Wallago attu*  
 Habitat Skin  
 Locality Masooli reservoir  
 Date of collection 14<sup>th</sup> Sep

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Table No.1 Comparative chart showing different species of genus *Trichodina*

Characters/ Name of genus	<i>Trichodina lepisii, Lom, 1962</i>	<i>Trichodina puytoraci Lom, 1962</i>	<i>Trichodina batala Ali, 1996</i>	<i>Trichodina mutabilis Kazubski et Migala, 1968</i>	<i>Trichodina reticulate Hirschmann et. Partsch, 1955</i>	<i>Tricho dina acuta Lom, 1961</i>	<i>Trichodin a heterodent ata Duccan, 1977</i>	<i>Trichodi na heterode ntata (Redescri bed)</i>
Location	Skin/ gill	Skin/ gill	Skin/ gill	Fins/ gill	Skin/ fins	Skin	Skin/ fins	Skin
Body (shape and diameter)	Small sized (25- 30)	Medium sized (36.9-50)	Medium sized (32-44)	Medium to large	Medium to large (55- 70)	Mediu m	Medium to large (45-64)	Medium sized (44-62)
Adhesive disc	Concave (22-27)	Concave (31.5- 42.3)	Concave (25-34)	Disc shaped (40.5- 55.7)	Disc-shaped (48-55)	Disc- shaped (33.8)	Disc- shaped (37-55) (56.9)	Disc- shaped (35.2- 46.1)
Denticle span	6.2-7.0	6.5-7.5	4.0-5.0	15.4	13.8	12.4	17.2(12.5- 23.9)	13.9
Denticle ring	13-19	20-26.3	23-28	27.6 (24- 37.5)	30.4 (26- 3.3)	20.7	31.2 (24.7- 37.4)	28 (19- 32)
Border membrane	2-5	4.1-5	3-5	----- -	-----	----- ---	4-5	3.9
Center of adhesive disc	Texture the same as rest of adhesive disc	Dotted with irregular spots	Texture showed different degree of fragmentation which ranged from 1-5 fragments	Without inclusion of any kind	Icosahedral inclusions	Roughly circular inclusion	Without inclusion of any kind	Without inclusion of any kind
Number of denticles	22 (21-26)	28 (27-30)	21 (21-25)	24 (22-26)	24 (23-25)	16	23 (21-26)	22 (21- 23)
Number of radial pins per denticle	6 (5-7)	8 (7-9)	8 (7-9)	11 (9-13)	10 (9-11)	10(9- 11)	11 (10-13)	10 (9-11)
Denticle length	3.0-4.5	6.5-7.5	4.0-5.0	----- -	-----	----- -----	13.1	12.0
Blade length	3-4	4.5-5.5	3-4.6	5.6	5.6 (4.8- 6.7)	4 (3.9- 4.1)	5.2	5.8
Ray length	1-2	5.5-6.6	2-4	7.3	5.2 (4.2- 5.8)	5.3	7.9	6.2 (long),5. 9 (short)
Central part (µm)	2.5-3	2-3.1	1.5-2.5	1.9	2.5	2.4	3 (2.3-4.6)	2.6-3.0

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