Trichodina magna Van As and Basson, 1989 (Ciliophora: Peritrichia) from cultured Nile tilapia in the state of Santa Catarina, Brazil

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(With 2 figures)

Abstract

Specimens of *Trichodina magna* Van As and Bassson, 1989 (Ciliophora: Peritrichia) from the Nile tilapia *Oreochromis niloticus* collected from October 2004 to June 2005 in fish ponds situated in three regions of Santa Catarina State, Brazil are described here. Wet smears of skin and gills were prepared in the field, air dried, impregnated with Klein's dry silver method and Giemsa's solution. From a total of 146 examined fish, 36 were parasitized on the skin, 14 in the gills and 33 on the skin and gills, simultaneously. The mean diameter of the body of the specimens of *T. magna* was 84.3 ± 12.6 µm, adhesive disc 60.7 ± 10.0 µm, denticulate ring, 38.3 ± 7.4 µm, consisting of 26 (23 to 29) denticles. The only distinguishable difference from the original description was the fact that the ray of the denticle is anteriorly directed and does not extend over the y + 1 axis.

Keywords: Oreochromis niloticus, *Trichodina magna*, Brazil.

Trichodina magna Van As e Basson, 1989 (Ciliophora: Peritrichia) em tilápia do Nilo cultivada no Estado de Santa Catarina, Brasil

Resumo

Espécimes de *Trichodina magna* Van As e Bassson, 1989 (Ciliophora: Peritrichia) em tilápia do Nilo, *Oreochromis niloticus* coletada em viveiros, entre outubro de 2004 e junho de 2005, em três regiões do Estado de Santa Catarina, Brasil, são descritos. Esfregaços da pele e brânquias foram preparados em campo, secos e impregnados com nitrato de prata pelo método de Klein ou corados com Giemsa. De um total de 146 peixes examinados, 36 estavam parasitados na pele, 14 nas brânquias e 33 na pele e brânquias, simultaneamente. O diâmetro médio do corpo de *T. magna* foi 84,3 ± 12,6 µm, do disco adesivo 60,7 ± 10,0 µm, do anel denticulado 38,3 ± 7,4 µm consistindo de 26 (23 a 29) dentículos. A única diferença da descrição original é o fato do raio do dentículo ser anteriormente direcionado não ultrapassando o eixo y + 1.

Palavras-chave: Oreochromis niloticus, *Trichodina magna*, Brasil.

1. Introduction

Trichodinids are commonly found parasitizing marine (Xu et al., 2001) and freshwater fishes (Arthur and Lom, 1984a). Lom (1958) reported on the specific characteristics that have been considered in trichodinids. Since the studies of Lom (1960, 1970) in the surroundings of Prague, new species of *Trichodina* Ehrenberg, 1830 have been described in North America (Wellborn, 1967), Cuba and Russia (Arthur and Lom, 1984a, b), South Africa (Basson and Van As, 1991), Japan (Imai et al., 1991), India (Asmat and Haldar, 1998), Germany (Dobberstein and Palm, 2000), Egypt (Al-Rasheid et al., 2000), China and Korea (Xu et al., 2001). In pond-reared fishes, they have been found on catfish (Basson and Van As, 1991), on perch, and on roach (Halmetoja et al., 1992), in tilapia (Van As and Basson, 1992), in carp (Nikolic and Simonovic, 1998), in eel (Madsen et al. (2000), and in marine cultivated fishes in Korea (Xu et al., 2001). In Brazil, Vargas et al. (2000) and Tavares-Dias et al. (2001) have reported their presence in several cultured freshwater fishes. However, under inadequate conditions of handling, these ciliates may proliferate being responsible for diseases (Madsen et al., 2000; Martins et al., 2002). Nothing is known about trichodinid species from pond-reared fishes in Brazil. In this study, *Trichodina magna* Van As and Bassson, 1989, found on the skin and gills of tilapia, *Oreochromis niloticus* Linnaeus, 1758 collected in three regions in the State of Santa Catarina, Brazil, is described.

2. Material and Methods

Specimens of *O. niloticus* were collected in farms situated in the municipalities of Blumenau (26° 55' 10'' S

and 49° 03' 58'' W) (n = 48), Joinville (26° 18' 16'' S and 48° 50' 44'' W) (n = 63), and Ituporanga (27° 24' 52'' S and 49° 36' 09'' W) (n = 35), Santa Catarina, Brazil, from October 2004 through June 2005. Wet smears of skin and gills were prepared in the field and examined under microscope. When parasites were present the smears were air dried and impregnated with Klein's dry silver method for observation of the adhesive disc as suggested by Lom (1958). Other smears were stained with Giemsa's solution to reveal the nuclear apparatus. The span of the denticle was measured from the tip of blade to the tip of ray as described by Arthur and Lom (1984a). The body diameter is the dimension of the adhesive disc plus the border membrane, and the diameter of the striated membrane is the distance from the outer border of the adhesive disc to the denticulate ring. Wet mounts from the specimens preserved in 5% formalin solution were studied for the observation of adoral ciliature. All measurements are in micrometers and follow the recommendations of Lom (1958) and Van As and Basson (1989). Arithmetic means ± standard deviation is followed, in parentheses, by the minimum and maximum values and number of specimens or structures measured. *t*-test was applied to compare the measurements (from the averages) of these specimens with the original description.

3. Results

From a total of 146 examined fish, 36 were parasitized on the skin, 14 in the gills and 33 on the skin and gills. The parasite was characterized as a large trichodinid with disc-shaped body; convex adoral surface with ciliature of about 370° ± 6.7 (360-384) measured in 17 specimens; central contractile vacuole; aboral side with slightly concave adhesive disc provided by 26.0 ± 1.2 (23-29, 55) denticles and central area of the adhesive disc provided with dark granules. The denticles are inserted into one another characterized by blade slightly falcate with a smooth anterior margin; central part very long and sharp-pointed in Giemsa-stained specimens, but slightly robust in silver-impregnated specimens reaching y + 1 axis; ray long and slender anteriorly directed but do not pass y + 1 axis, slightly curved tapering gradually along its length provided by a relatively long apophysis (Figure 1).

Wet mounted measurements: body 79.5 ± 13.8 (56-100, 26) in diameter; adhesive disc diameter 58.7 ± 11.5 (44-76, 26); denticulate ring diameter 38.3 ± 7.4 (28-48, 26); length of denticles 20.8 ± 3.3 (16-24, 28), length of blade 7.3 ± 1.7 (6-15, 28), width of central part 4.6 ± 0.8 (4-7, 28), length of ray 12.0 ± 1.9 (9-15, 28), denticle span 30.5 ± 5.1 (24-39, 28).

Air dried measurements: body 84.31 ± 12.6 (47-104, 55) in diameter surrounded by a border membrane 7.2 ± 1.5 (4-12, 55) wide; width of striated membrane 11.0 ± 2.8 (8-17, 55); adhesive disc diameter 60.7 ± 10.0 (33-83, 55); denticulate ring diameter 38.5 ± 6.8 (28-48, 55); radial pins per denticle 7.7 ± 0.6 (7-9, 46); length of denticles 20.3 ± 3.1 (15-26, 151), length of blade 7.0 ± 1.1 (3-8, 151), width of central part 3.6 ± 0.7 (2-6, 151), length of ray 11.3 ± 2.3 (8-15, 151), length of ray apophysis 1.1 ± 0.4 (1-2, 151); denticle span 28.6 ± 3.9 (17-36, 151). Macronucleus horseshoe-shaped 49.1 ± 10.3 (24-64, 28) in external diameter; 9.9 ± 2.5 (7-16, 28) thickness; distance between the terminations of macronucleus 10.5 ± 3.4 (7-17, 28). Micronucleus not detected.

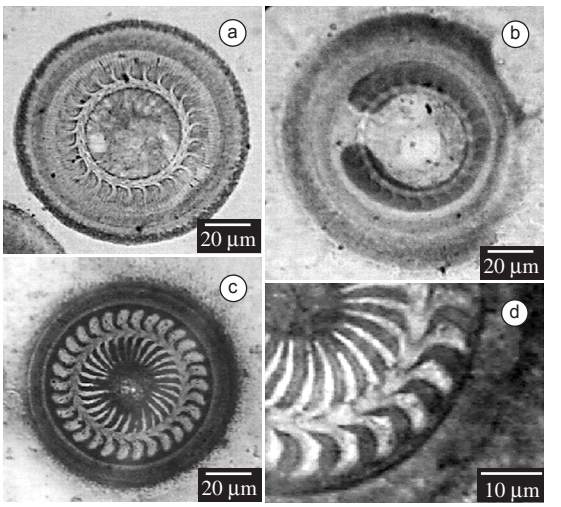

Figure 1. Photomicrographs of *Trichodina magna* from *Oreochromis niloticus* cultured in the State of Santa Catarina. Stained by Giemsa (a-b) and silver impregnated specimens (c-d).

4. Remarks

Up until the present, in Brazil, trichodinids have been referred to as *Trichodina* sp. The following species of trichodinids are presently to be found in tilapia: *T. pediculus* Ehrenberg, 1838 (see Basson et al., 1983); *T. nigra* Lom, 1960; *T. acuta* Lom, 1961; *T. heterodentata* Duncan, 1977; *Trichodinella tilapiae* Duncan, 1977; *T. centrostrigeata* Basson, Van As and Paperna, 1983; *T. minuta* Basson, Van As and Paperna, 1983; *Paratrichodina africana* Kazubski and El-Tantawy, 1986; *Trichodina magna* Van As and Basson, 1989; *T. velasquezae* Bondad-Reantaso and Arthur, 1989 (see Asmat and Haldar, 1998); *T. compacta* Van As and Basson, 1989; *T. migala* Van As and Basson, 1989; *T. linyanta* Van As and Basson, 1992 and *T. kalimbeza* Van As and Basson, 1992 were described.

Trichodina magna, reported in this study resembles *T. fultoni* Davis, 1947; *T. funduli* Wellborn 1967; *T. hoffmanii* Wellborn, 1967; *T. noturi* Wellborn, 1967; *T. platyformis* Davis, 1947; *T. reticulata* Hirschmann and Partsch, 1955 (see Wellborn, 1967); *T. mutabilis* Kazubski and Migala, 1968 (see Lom, 1970); *T. rostrata* Kulemina, 1968 (see Arthur and Lom, 1984); *T. carassii* Lian-xiang, 1990 and *T. claviformis* Dobberstein and Palm, 2000 in the body diameter and number of denticles. *Trichodina funduli*, *T. platyformis*, *T. reticulata*, *T. mutabilis*, *T. izumovae* Arthur and Lom, (1984) showed similar diameter of the adhesive

Table 1. Comparative measurements of *Trichodina magna.*

Characters	Present work	Van As and Basson (1989)[1]	Van As and Basson (1992)[2]
Body[D]	84.3 (47-104) a	99.1 (71-112) b	82.3 (62-98) a
Adhesive disc[D]	60.7 (33-83) a	81.7 (60-95) b	69.2 (46-80) a
Border membrane[W]	7.2 (4-12) a	8.9 (6-14) b	6.2 (4-8) a
Denticulate ring[D]	38.5 (24-56) a	50.0 (36-57) b	42.9 (31-52) c
Denticle number	26.0 (23-29) a	25.0 (24-27) a	27.0 (24-30) b
Pins/denticle	7.7 (7-9) a	11.0 (10-13) b	12.0 (9-14) c
Denticle span	28.6 (17-36) a	-	21.5 (15-25) a
Denticle[L]	20.3 (15-26) a	10.9 (7-14) b	9.5 (7-12) c
Blade[L]	7.0 (3-8) a	8.6 (6-11) b	7.6 (6-9) a
Central part[W]	3.6 (2-6) a	5.6 (4-7) b	3.2 (1-4) a
Ray[L]	11.3 (8-15) a	13.0 (8-13) a	10.7 (7-14) a
Macronucleus[D]	49.1 (24-64) a	62.2 (47-82) b	-
Macronucleus[TH]	9.9 (7-16)	8.1 (6-10)	-
Macronucleus[LT]	10.5 (7-17)	14.9 (7-38)	-
Adoral ciliature	360-384	400°	407-410°

[1]From *Oreochromis andersoni, O. mossambicus, Tilapia rendalli rendalli, T. rendalli swierstrae, T. sparrmanii;* [2]from *O. andersoni, T. rendalli rendalli, Serranochromis angusticeps.* [D]diameter, [W]width, [L]length, [TH]thickness, [LT]length between terminations of macronucleus. Means followed by the same letters are not significantly different (P > 0.05)

disc, denticulate ring and macronucleus. The specimens of *T. magna* described herein differ from these species in having different shape and length of denticles, blade and ray in which are important specific diagnostic characteristics for trichodinids. In spite of the similarity in the body diameter, adhesive disc and denticulate ring, *T. heterodentata*, described by Duncan (1977), has a smaller number of denticles and smaller denticle measurements when compared to the present specimens. Moreover, *T. heterodentata* differs from the specimens of *T. magna* from Santa Catarina in having considerably more variability in the shape of the denticle. The specimens of *T. magna* used in the original description (Van As and Basson, 1989) are similar to the present material (Table 1). Specimens from Santa Catarina, however, have smaller macronucleus diameter when compared to the ones described by Van As and Basson (1989). The apophysis morphology of the prominent ray of the denticle had a similar structure, although Van As and Basson did not give its measurements. The micronucleus was not detected corroborating the findings of Van As and Basson (1989). Another point that must be considered is that, in silver-impregnated specimens, the length of the apophysis of the ray may vary or may not even be detectable. Based on this information, commented by Vans As and Basson (1989), the apophysis measurements in Giemsa-stained specimens were performed in this study. The unique most distinguishable difference was the fact that the ray of denticle is anteriorly directed, extending over the y + 1 axis in the specimens of Van As and Basson (1989) (Figure 2) while in the present description the ray is situated between the y and y + 1 axes. In spite of the difference in position of the ray in relation to the axes and the lack of significant difference in morphology these specimens must be considered members of *T. magna*. This study shows the variability that can be seen in the different populations of trichodinid species, corroborating the observations of Van As and Basson (1989).

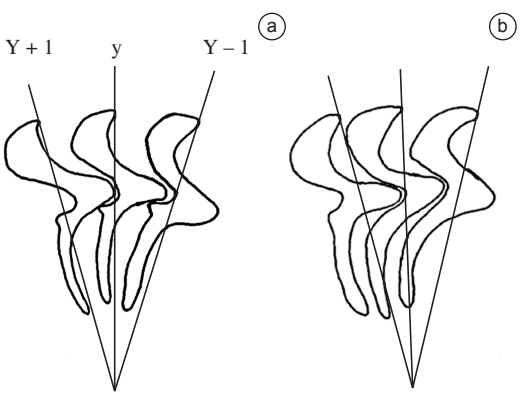

Figure 2. Diagrammatic representation of the denticles of the present description a) and b) *Trichodina magna* Van As and Basson (1989)

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