

A new species of *Tripartiella* (Ciliophora: Trichodinidae) from *Aequidens tetramerus* (Perciformes: Cichlidae) in north Brazil

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(With 2 figures)

Abstract

A new species of *Tripartiella* is described from the gills of the wild saddle cichlid *Aequidens tetramerus* in north Brazil. Wet smears of skin and gills of examined fish were air-dried at room temperature and impregnated with Klein's dry silver method for examination of the adhesive disc's structures and denticles. Total prevalence of parasitism was 65%. This ciliate is characterized as a small-sized trichodinid, body diameter $37.03 \pm 4.9 \mu\text{m}$, adhesive disc $30.50 \pm 2.71 \mu\text{m}$, denticulate ring $13.28 \pm 0.8 \mu\text{m}$ and 24 ± 2.0 denticles. Taxonomic and morphometric data for the new species are discussed.

Keywords: fish, protozoan, parasite, trichodinid, morphology.

Uma nova espécie de *Tripartiella* (Ciliophora: Trichodinidae) em *Aequidens tetramerus* no norte do Brasil

Resumo

Um nova espécie de *Tripartiella* encontrada nas brânquias de *Aequidens tetramerus* da região Norte do Brasil é descrita. Esfregaços de pele e brânquias de peixes examinados foram secos à temperatura ambiente e impregnados pelo método de Klein para observação das estruturas do disco adesivo e denticulos. A prevalência do parasitismo foi de 65%. Este ciliado é caracterizado como pequeno trichodinídeo, com corpo medindo $37,03 \pm 4,9 \mu\text{m}$ de diâmetro, disco adesivo com $30,50 \pm 2,71 \mu\text{m}$, anel denticulado com $13,28 \pm 0,8 \mu\text{m}$ e $24 \pm 2,0$ denticulos. Dados taxonômicos e morfométricos para a nova espécie são discutidos.

Palavras-chave: peixe, protozoário, parasito, trichodinídeo, morfologia.

1. Introduction

Trichodinids (Trichodinidae Claus, 1874) are a widely distributed group of ciliated ectoparasites of mollusks, fishes and amphibians (Mitra et al., 2013). Representatives of the genus *Tripartiella* Lom 1959, however, are only found on the gills of marine and freshwater fish (Tang et al., 2013). Up to now, there is only one *Tripartiella* species reported in Brazil, which is *Tripartiella pseudoplatystomae* Pinto, Garcia, Figueiredo, Rodrigues and Martins 2009, parasite of the pintado *Pseudoplatystoma corruscans* in the state of Mato Grosso do Sul, Central-Western Brazil. However, considering the wide variety of fish species in Brazil and the great abundance of fish trichodinids, it

is reasonable to accept that much more species are yet to be reported.

The saddle cichlid *Aequidens tetramerus* (Heckel 1840) (Cichlidae) is endemic to South America and is commonly used as ornamental fish, sport fishing and also as food for the Amazon riverine populations (Tavares-Dias et al., 2014). In course of a parasitological survey of the protozoan parasites of this cichlid in north Brazil, a new *Tripartiella* species was found.

This study characterizes morphologically *Tripartiella tetramerii* n.sp. parasite of *A. tetramerus* from north Brazil. Taxonomic and morphometric data for the new species are discussed.

2. Material and Methods

Sixty-three specimens of *A. tetramerus* were collected by net in November 2011 in the municipality of Macapá (00° 02' N, 51° 03' W), Amapá State, Brazil.

Wet smears of fish skin and gills of collected fish were air-dried and impregnated with Klein's dry silver method for observation of the adhesive disc as suggested by Lom (1958). The span of the denticle was measured from the tip of blade to the tip of ray as described by Arthur and Lom (1984). The body diameter is the dimension of the adhesive disc plus the border membrane. 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). Mean \pm standard deviation is followed, in parentheses, by the minimum and maximum values and number of specimens or structures measured.

3. Results

A total of 65% of examined fish were parasitized by the new *Tripartiella* species (mean intensity of infection: $2,379 \pm 1,344$ (1,233-3,567)). Morphologically, it is

characterized as a small-sized trichodinid, disc shaped. Blade of denticle elongated and straight, narrowing at distal end (Figure 1). Blade greater than ray. Tangent point rounded, lower than distal blade margin. Blade touching Y+1 and Y axes. Anterior blade projection broad, prominent and wide, fitting into indentation of next denticle. Section connecting anterior projection and central part constricted. Central part of the denticle with a remarkable rounded spine directed backwards. Ray slender, lower than blade, straight, rounded in its distal extremity and directed towards the center of the adhesive disc. Central part extends Y+1, Y and Y-1 axes (Figure 2). Adoral ciliature spiral 381°. Morphometrical data is presented in Table 1.

Taxonomic summary

Type Host: *Aequidens tetramerus* (Heckel, 1840)

Type locality: Macapá, Amapá State, north Brazil (00° 02' 20" N, 51° 03' 59" W)

Site of infection: gills

Etymology: The specific epithet "*tetramerii*" is derived from the name of the host species.

Reference material: Holotype and paratype slides are deposited in the National Institute of Amazonian Research (INPA 006, 007), Manaus, AM, Brazil.

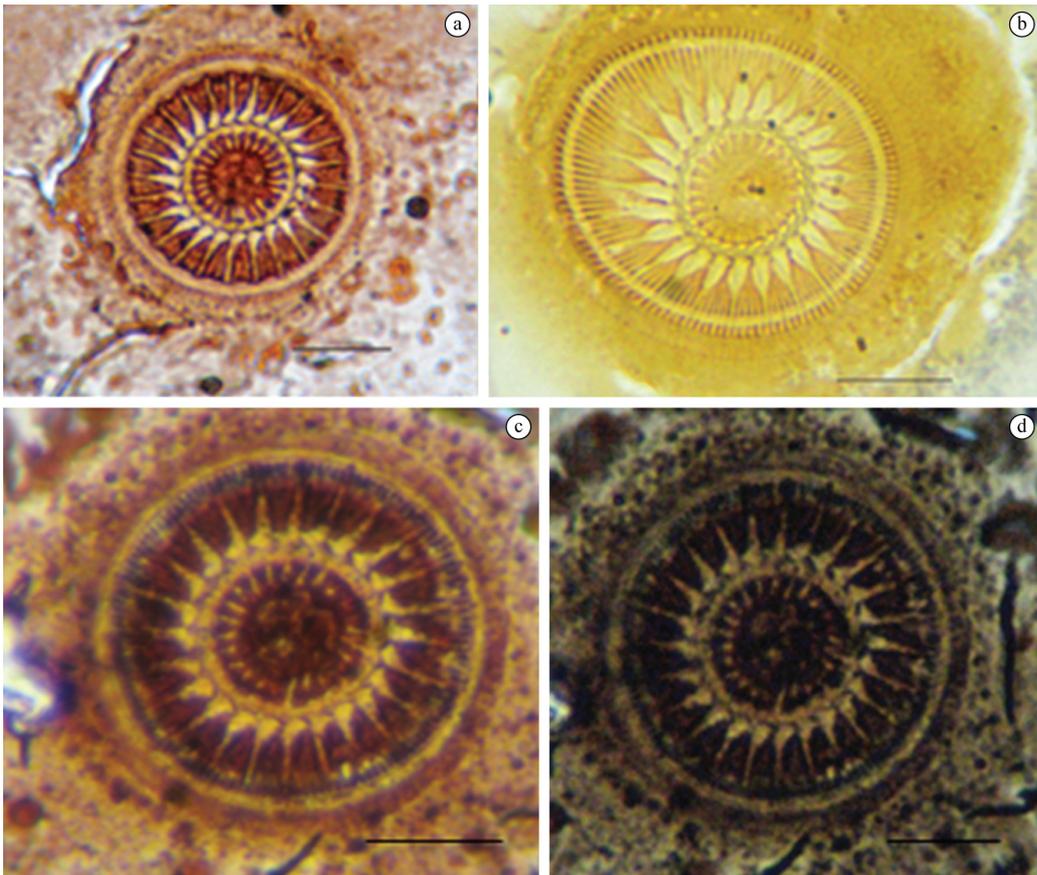


Figure 1. Photomicrographs (a and b) of silver impregnated adhesive discs of *Tripartiella tetramerii* n. sp. from *Aequidens tetramerus* in north Brazil. Bar: 10 μ m.

4. Remarks

According to Gong et al. (2005), trichodinids are one of the most common parasitic ciliates that are well characterized by two main features: the morphology of the denticles in the adhesive disc and the development of the adoral ciliary spiral.

Denticles of both *Triptariella* and *Trichodinella* species are wedged together both by central parts and anterior

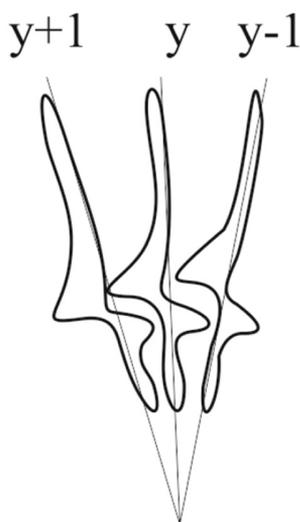


Figure 2. Schematic drawing of the denticles of *Triptariella tetramerii* n.sp. from *Aequidens tetramerus*.

blade projection (Lom and Haldar, 1977). However, whereas in the former genus it bears developed straight rays, the latter possesses short ray curved along the delicate central part.

Concerning to *Triptariella*, the type species *Triptariella copiosa* Lom, 1959 has been regularly reported on the gills of Cyprinidae and Cobitidae fish throughout the European and Asian continents (Lom and Haldar, 1977; Mitra et al., 2012; Mohilal and Hemananda, 2012). Morphologically, its ray resembles those of *T. tetramerii* n.sp. (both the species have thin rays, terminating in a rounded point); however, the shape of the blade of *T. copiosa* (broad, directed backwards) differs completely from the present studied specimens (narrow and straight), besides almost all biometrical data (Table 1).

Triptariella pseudoplatystomae also shows similarities with *T. tetramerii*. Their blades are similar in shape, although in *T. tetramerii* it suffers a narrowing process through its apex (differently from the former, with the same width along the entire length). In addition, anterior blade projection of *T. pseudoplatystomae* is directed upwards, differently from the new species (Figure 1). Morphometric data between the two also differ in some characters (e.g. denticulate ring and number of denticles, see Table 1). Finally, the tip of ray in *T. pseudoplatystomae* is thin and pointed while in *T. tetramerii* it is slender and rounded. All other *Triptariella* species differ from the new species in the shape of denticles and, therefore, are not discussed in the present study.

Table 1. Morphometric comparison of *Triptariella tetramerii* n. sp. with *Triptariella pseudoplatystomae* and *Triptariella copiosa*.

Host	<i>Triptariella tetramerii</i> n.sp. Present study	<i>Triptariella pseudoplatystomae</i> Pinto, Garcia, Figueiredo, Rodrigues and Martins (2009)	<i>Triptariella copiosa</i> Lom 1959 in Mohilal and Hemananda (2012)
	<i>Aequidens tetramerus</i>	<i>Pseudoplatystoma</i> <i>corruscans</i>	<i>Cirrhinus mrigala</i> <i>Labeo rohita</i> , <i>Catla catla</i> , <i>Cyprinus carpio</i>
Site of infection	Gills	Gills	Gills
Body ^D	37 ± 4.9 (30.0-50.7; 17)	36.2 ± 3.7 (28.0-42.0; 25)	18.65 (15.5-23.5)
Adhesive disc ^D	30.5 ± 2.7 (27.3-37.5; 17)	31.9 ± 3.6 (23.0-36.9; 19)	16.9 (15.0-19.5)
Denticulate ring ^D	13.2 ± 0.8 (11.8-14.8; 17)	17.3 ± 1.3 (14.0-19.0; 19)	7.85 (6.5-9.0)
Number of denticles	24 (23-25; 13)	29.6 ± 1.2 (27.0-31.0; 24)	22.6 (20-25)
Pins per denticle	4.4 ± 0.6 (4-6; 13)	5.9 ± 1.2 (5-7; 10)	3.4 (3-4)
Denticle ^L	2.5 ± 0.4 (1.8-3.4; 20)	3.5 ± 0.6 (3.0-4.0; 34)	1.4 (2.5-3.5)
Blade ^L	7.1 ± 0.4 (6.3-8.0; 20)	5.9 ± 0.8 (4.0-8.0; 35)	4.0 (3.5-4.5)
Central part ^w	1.2 ± 0.1 (0.9-1.6; 20)	1.4 ± 0.3 (1.0-2.0; 34)	0.7 (0.5-1.0)
Ray ^L	2.0 ± 0.2 (1.5-2.4; 23)	1.6 ± 0.2 (1-2; 34)	1.75 (1.0-2.5)
Span	10.6 ± 0.7 (9.2-11.8; 25)	9.0 ± 1.2 (7.0-12.0; 35)	5.3 (4.5-6.0)

Mean ± standard deviation is followed, in parentheses, by the minimum and maximum values and number of specimens or structures measured. Mean values are given in micrometers. ^D Diameter, ^L Length, and ^w Width.

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