

## *Trichodina marplatensis* sp. n. (Ciliophora: Trichodinidae) from Combjelly, *Mnemiopsis mccradyi* (Mayer, 1900) in Argentine Sea

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**Summary.** A new species of trichodinid, *Trichodina marplatensis* sp. n., found on the comb plates of the coastal ctenophore *Mnemiopsis mccradyi* is described. Only three species were previously reported from coelenterates, *i.e.*, *Trichodina pediculus*, *T. zambeziensis* and *T. ctenophorii*. This new ciliate is compared with other similar congeners including *T. ctenophorii* because it was reported from the same host. *T. marplatensis* differs from *T. ctenophorii* by having denticles with broad club-shaped blades and wide S-shaped rays, rather than falcate blades and thin, straight rays. The denticles of *T. marplatensis* are not similarly shaped to those of other described trichodinids. The new species is the first reported from a planktonic host in the Argentine Sea and the second species found associated with ctenophores.

**Key words:** Trichodinid, ctenophore, South Atlantic.

### INTRODUCTION

Trichodinids are parasites or symbionts of invertebrate and vertebrate hosts (Van As and Basson 1989) that are usually found associated with freshwater and marine fishes and mollusks. Only 3 of trichodinids have been reported from coelenterates till now, *i.e.*, *Trichodina pediculus* (Müller 1786) Ehrenberg, 1838 from a freshwater hydra (James-Clark 1866), and the medusa of *Limnognathia indica* (Annandale 1912); *T. ctenophorii* Estes, Reynolds and Moss, 1997 from the ctenophore *Mnemiopsis mccradyi* from the northern coast of the Gulf of Mexico and *T. zambeziensis* Van As and Basson, 1986 from the medusa of *Limnognathia tanganyicae* in Lake Lisikili, Namibia.

Trichodinids remain poorly studied in Argentina. The few existing reports from Argentina lack formal descriptions (Domitrovic *et al.* 1991, Viozzi 1996, Mancini *et al.* 2000, Cremonte and Figueras 2004, Cremonte *et al.* 2005, Vázquez *et al.* 2006).

In a survey of jellyfish parasites from the South Atlantic Ocean, a new trichodinid was found from *M. mccradyi*. This new ciliate is herein described and compared with other similar species with special reference to *T. ctenophorii* because it was reported for the same host.

### MATERIALS AND METHODS

Specimens of *M. mccradyi* were collected from coastal areas of Mar del Plata (Buenos Aires, Argentina) (38°00'S and 57°33'W) between April 2006 and March 2007. Specimens were transported to the laboratory in sea water containers and examined under a stereo-microscope for parasites. Foissner's modifications of Klein's

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dry silver nitrate technique (Foissner 1992) was used to impregnate the specimens to study the adhesive disc and its elements.

Smears of comb-plates infested with trichodinids were made on albuminised glass slides. Slides were then washed with distilled water to remove salt, air-dried, and then impregnated with 4% silver nitrate aqueous solution for 5 minutes, washed with distilled water and re-dried. Dried slides were then exposed to a 50 watt electric dichroic light bulb at a distance of 5 cm for 60 seconds. Slides were then covered with a few drops of fine grain methol-hydrochinone powder film developer for 60 seconds, rinsed with tap water for 10 seconds, immersed in hyposulfite based fixative, washed for 5 minutes in 100% alcohol, air-dried and finally mounted in synthetic neutral mounting medium. For studying details of the nuclear apparatus dry smears were hydrated, stained 3 minutes in hematoxylin, washed in tap water, dehydrated and mounted in natural Canada balsam. Live specimens, stained with metyleneblue were also used for nuclear observations.

Examinations of prepared slides were made with a Olympus microscope at x100 magnification. Differential interference contrast (DIC) was used in all photomicrographs. Measurements were done following Lom (1958), Lom and Dyková (1992), and for the descriptions of denticle elements, the method of Van As and Basson (1992) was followed.

All measurements are presented in micrometers with minimum and maximum values, followed by the arithmetic mean and standard deviation in parentheses.

Type material was deposited in the Museo de La Plata, Argentina, Invertebrate Collection under the numbers: MLP030, MLP031.

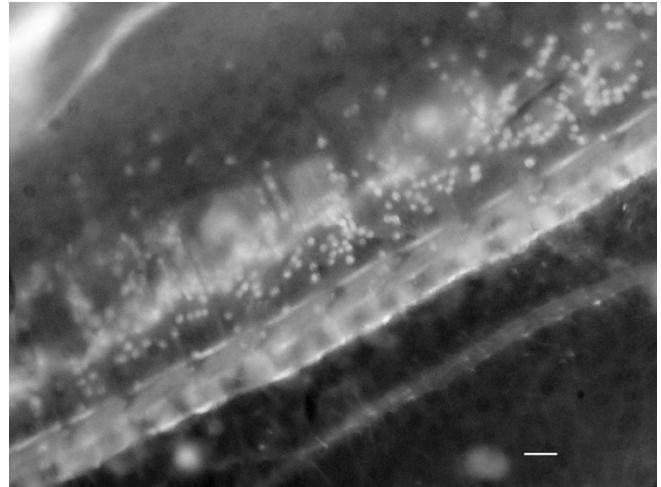
## RESULTS

### *Trichodina marplatensis* sp. n. (Figs 1–6; Table 1)

**Description:** Based on 10 stained and mounted specimens. Medium size, marine trichodinid with disk-shaped body and striated border membrane. Body very thick and dome-shaped when viewed orally; cell diameter 42.0–69.2 (57.1±9.9). Adhesive disc diameter 39.0–66.0 (54.0±9.4). Centre of disc 32.0–47.0 (39.5±4.8) in diameter without any granules. Border membrane 2.0–4.0 (3.2±0.7) wide. Denticulate ring diameter 34.0–54.0 (45.6±7.9). Number of denticles 49.0–57.0 (51.0).

Number of radial pins per denticle 6.0–7.0 (6.0). Denticle span 6.9–7.9 (7.3±0.3). Denticle length 4.1–4.7 (4.4±0.2). Blade broad and club-shaped to semilunar, 2.3–2.8 (2.6±0.1) in length, filling most of space between y-axes.

Anterior blade surface curved, not extending past y+1 axis; posterior blade surface nearly on same level as y-axis; blade apex absent. Distal blade surface rounded, lower than tangent point. Apophysis and posterior projection not visible. Blade connection thin.



**Fig. 1.** *Trichodina marplatensis* sp. n., live specimens on comb-plates of *Mnemiopsis mccradyi*. Scale = 150 µm.

Central part broad, well developed with rounded point fitting into preceding denticle, and extending to y-1 axis, almost touching. Shape of sections above and below the x-axis similar. Width of central part 1.4–1.9 (1.7±0.2).

Ray connection broad and short, double the thickness of blade connection. Ray well developed, S-shaped and very wide; proximal part broad, extending towards y+1; distal part more slender and distinctly curved towards y-1 axis. Ray apophysis absent. Ray length 3.1–4.1 (3.5±0.3). Ratio of denticle above and below x-axis 0.8–1.3.

Adoral ciliary spiral turns 350°–360° around peristomial disc (Fig. 5).

Macronucleus horse-shoe shaped; external diameter (n=6) 36.0–42.7 (39.2±2.7); distance between terminations of macronucleus (n=6) 10.0–15.8 (13.0±2.4). Micronucleus not detected.

### Taxonomic summary

**Type-host:** *Mnemiopsis mccradyi* Mayer 1900 (Ctenophora, Lobata).

**Type-locality:** Mar del Plata (38°00'S and 57°33'W), Argentina.

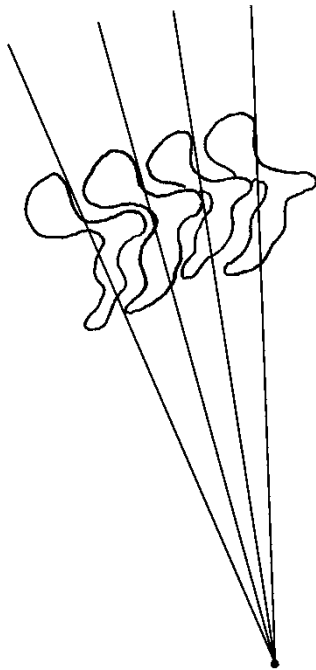
**Location:** Comb-plates.

**Etymology:** This species is named after the type locality.

**Type-specimens:** Deposited in the Museo de la Plata, Invertebrates Collection. La Plata, Argentina (MLP030, MLP031).

## DISCUSSION

*Trichodina marplatensis* can be compared with *T. ctenophorii* reported from *M. mccradyi* and *Beroe ovata* from the Gulf of Mexico (Estes *et al.* 1997),



**Fig. 2.** *Trichodina marplatensis* sp. n., diagrammatic drawings of the denticles.

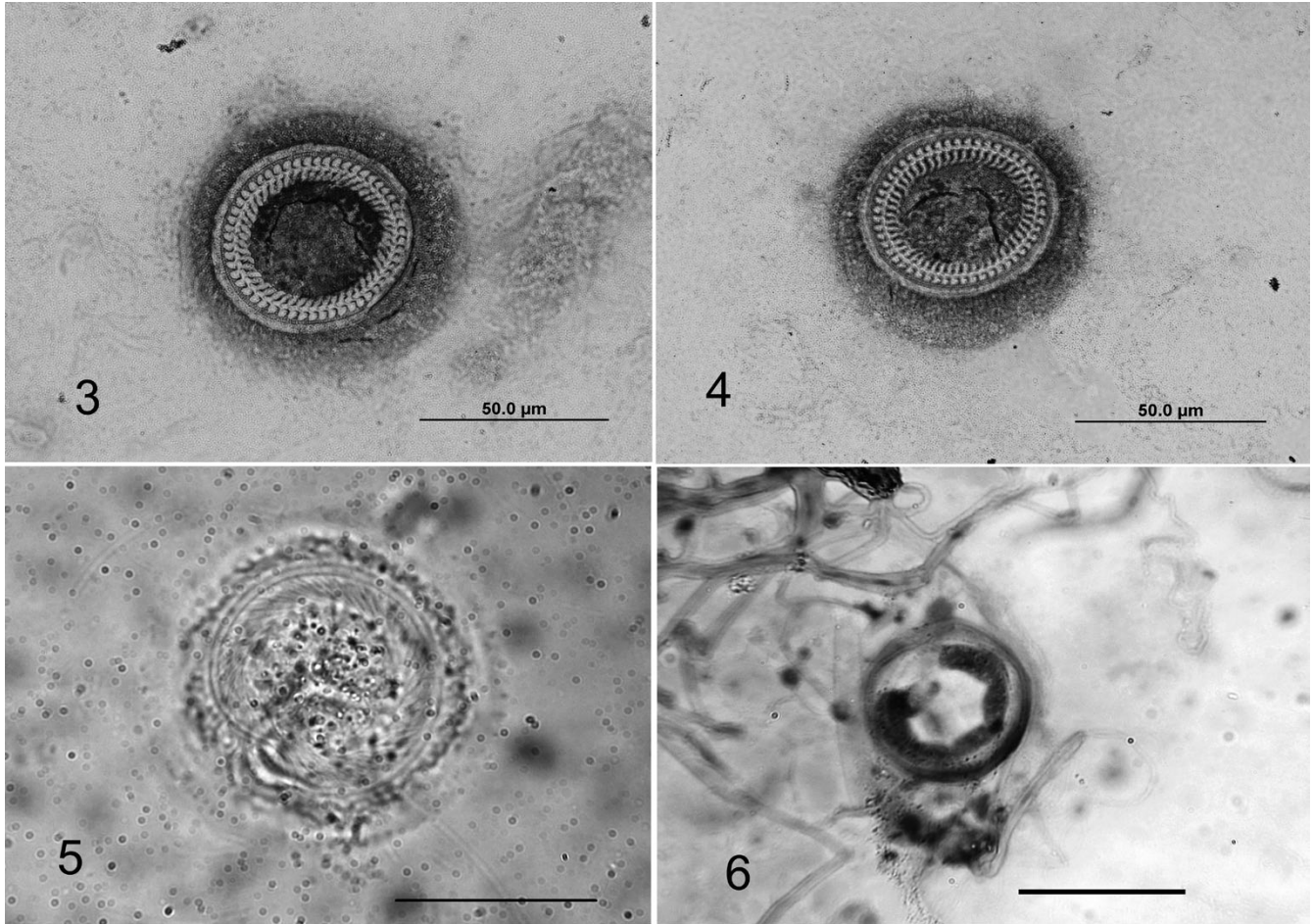
*T. pediculus* described from *Hydra* by Müller, 1786 (in Lom 1970), and later reported from fishes, tadpoles and other hydras (Hagargi and Amoji 1979, Kazubski 1991a, b, c), and *T. zambeziensis* reported from *L. tanganyicae* in Lisikiki lake, Namibia.

Based on the morphometrical data and denticle morphology, *T. marplatensis* differs from *T. ctenophorii* in having a larger adhesive disc diameter, greater number of denticles, and larger denticulated ring diameter, with its central part being greater in width. Additionally, denticle shape is completely different between the 2 species. *Trichodina marplatensis* has broad club-shaped blades and wide S-shaped rays, while *T. ctenophorii* has falcated blades and thin straight rays in *T. ctenophorii*.

Considering the description of *T. pediculus* given by Wellborn (1967) and Kazubski (1991 a), *T. marplatensis* differs from former species by having a greater number of denticles, fewer radial pins per denticle, smaller blade length and smaller central part width. Denticle shape also differs between the 2 species. Denticles in *T. pediculus* have a sickle-shaped blade with slightly curved rays, while those in *T. marplatensis* have

**Table 1.** Morphometric comparison of *Trichodina marplatensis* sp. n. with *T. ctenophori* Estes, Reynolds et Moss, 1997, *T. zambeziensis* Van As & Basson 1986, and *T. pediculus* cited by Wellborn (1967). Measurements in µm.

| Species                           | <i>T. marplatensis</i> sp. n. | <i>T. zambeziensis</i>  | <i>T. ctenophori</i>          | <i>T. pediculus</i> | <i>T. pediculus</i> |
|-----------------------------------|-------------------------------|-------------------------|-------------------------------|---------------------|---------------------|
| Reference                         | present study                 | Van As and Basson, 1986 | Estes, Reynolds et Moss, 1997 | Wellborn, 1967      | Kazubski, 1991      |
| Diameter of                       |                               |                         |                               |                     |                     |
| body                              | 42.0–69.2                     | 25.1– 34.0              | 20.0–50.0                     | 61.0–85.0           | 80.4                |
| adhesive disc                     | 39.0–66.0                     | 20.2–28.0               | 20.0–35.0                     | 45.0–47.0           | 46.8                |
| Diameter of                       |                               |                         |                               |                     |                     |
| denticulated ring                 | 34.0–54.0                     | 11.2–15–7               | 11.0–21.0                     | 25.0–35.0           | 40.6                |
| central area                      | 32.0–47.0                     |                         |                               |                     |                     |
| Width of border membrane          | 2.0–4.0                       | 2.1–3.8                 | 0–2.8                         | 3.0–5.0             |                     |
| Number                            |                               |                         |                               |                     |                     |
| denticle                          | 49.0–57.0                     | 16–20                   | 23.0–30.0                     | 22.0–26.0           | 28.3                |
| radial pins / denticle            | 6.0–7.0                       | 6–8                     | 5.0–6.0                       | 10.0–13.0           |                     |
| Width of central part             | 1.4.0–1.9                     | 0.9–2.4                 | 0.6–1.3                       | 2.0–3.0             |                     |
| Dimension of denticle             |                               |                         |                               |                     |                     |
| length                            | 4.1–4.7                       | 3.6–5.2                 |                               | 10.0–12.0           | 3.4                 |
| span                              | 6.9–7.9                       |                         |                               |                     | 14.83               |
| Dimension of denticle components  |                               |                         |                               |                     |                     |
| length of blade                   | 2.3–2.9                       | 2.4–4.4                 | 1.9–3.3                       | 5.5–7.0             |                     |
| length of ray                     | 3.1– 4.1                      | 3.2–5.6                 | 1.8–3.5                       | 7–9.0               |                     |
| Adoral ciliary spiral             | > 360                         | 405–450                 | 380.0–415.0                   | 380.0–390.0         |                     |
| Diameter of external macronucleus | 36.0–42.7                     | 19.9–35.2               |                               | 30.0–36.0           |                     |
| Distance between ends             | 15.8–10.0                     | 1.7–24.3                |                               | 10.0–19.0           |                     |



**Figs 3–6.** *Trichodina marplatensis* sp. n. **3–4** photomicrographs of dry-silver impregnated adhesive disc scale. Scale = 50 µm; **5** – live specimens with adoral ciliature visible. Scale = 50 µm; **6** – macronucleus stained with methyleneblue. Scale = 50 µm.

club-shaped blades S-shaped rays. Moreover, the ratio between the length of the blade and the ray is larger in the present species.

*Trichodina zambeziensis* is clearly distinguished from *T. marplatensis* by their smaller adhesive disc and denticulate ring diameter, fewer number of denticles (Table 1), and by having denticles with scimitar-shaped blades and slender rays.

No comparison between the present species and trichodinids reported previously in Argentina (Dimitrovic *et al.* 1991, Viozzi 1996, Cremonte and Figueras 2004, Cremonte *et al.* 2005, Vázquez *et al.*, 2006, Mancini *et al.* 2000) was possible as these reports did not include descriptions and therefore voucher specimens were not deposited.

*Trichodina marplatensis* shows no similarity to any other trichodinid and the most significant difference lies in the unique ray morphology. The new species is

the first reported from planktonic hosts in the Argentine Sea and the second species found associated with ctenophores.

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