

## An endoparasitic trichodinid (Ciliophora: Peritrichia) from the urinary system of *Barbus trimaculatus* Peters, 1852

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During parasitological surveys in Gazankulu, an infection of a trichodinid peritrich was found in the urinary bladder and ureters of the three-spot barb, *Barbus trimaculatus* Peters, 1852, collected from Hudson-Ntsanwisi Dam in the Olifants River system. A taxonomic description of this new species, *Trichodina uretra* sp. n. is provided.

Tydens parasitologiese opnames in Gazankulu is 'n besmetting van 'n *Trichodina*-spesie in die urinêre blaas en ureters van die driekol ghielemientjie, *Barbus trimaculatus* Peters, 1852, vanuit Hudson-Ntsanwisidam in die Olifantsrivierstelsel versamel. 'n Taksonomiese beskrywing van hierdie nuwe spesie, *Trichodina uretra* sp. n. word verskaf.

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Although trichodinid peritrichs are found widely distributed amongst freshwater invertebrates, amphibians and fish, where they either occur as endo- or ectoparasites, attention has mainly been focussed on ectoparasites of fish worldwide. This was also the case in southern Africa, where a comprehensive study on the ectoparasitic trichodinids of fish was done by Basson, Van As & Paperma (1983) and Basson & Van As (1987). Some attention was also given to those ciliates associated with other aquatic as well as terrestrial hosts on the African subcontinent, i.e. from a freshwater medusa (Van As & Basson 1986), amphibians (Van der Bank, Basson & Van As 1989) and terrestrial molluscs (Sirgel 1983).

Seven endoparasitic species belonging to the genus *Trichodina* Ehrenberg, 1830 have been described from both freshwater and marine fish, all from Eurasia and North America. Of these, four species are restricted to freshwater hosts. The most recently described species, *T. algonquinensis* Li and Desser, 1983, found in the bladder of *Perca flavescens* and *Notropis cornutus* in Lake Sasejewun, Ontario by Li & Desser (1983), is, however, regarded as a synonym of *T. urinaria* Dogiel, 1940 by Arthur & Lom (1984). These authors are of the opinion that the morphometric data and micrographs presented by Li & Desser (1983) agree closely with those obtained for their specimens of *T. urinaria*, as well as the fact that Lom & Haldar (1976) previously reported the presence of *T. urinaria* in *Perca flavescens* from Lake Opeongo, Ontario.

That leaves three valid species occurring as endoparasites in freshwater fish, i.e. *T. urinaria*, *T. polycirra* Lom, 1960, as well as *T. schiztoraci* Ashurova and Shtein, 1972.

During parasitological surveys of fish in Northern Transvaal and the neighbouring black states, a light infection of an endoparasitic trichodinid was found in a three-spot barb in Gazankulu. This trichodinid was found to differ significantly from the three endoparasitic

species from freshwater fish mentioned above, and is therefore described as a new species.

### Taxonomic description

#### Material

The description is based on material prepared by haematoxylin staining and silver-impregnated specimens, using the methods described by Basson *et al.* (1983). All measurements given below are in micrometres and follow the uniform specific characteristic system proposed by Lom (1958). Minimum and maximum values are provided, followed in parentheses by the arithmetic mean, standard deviation and number of specimens measured. In the case of the number of denticles and number of radial pins, the mode is given instead of the arithmetic mean.

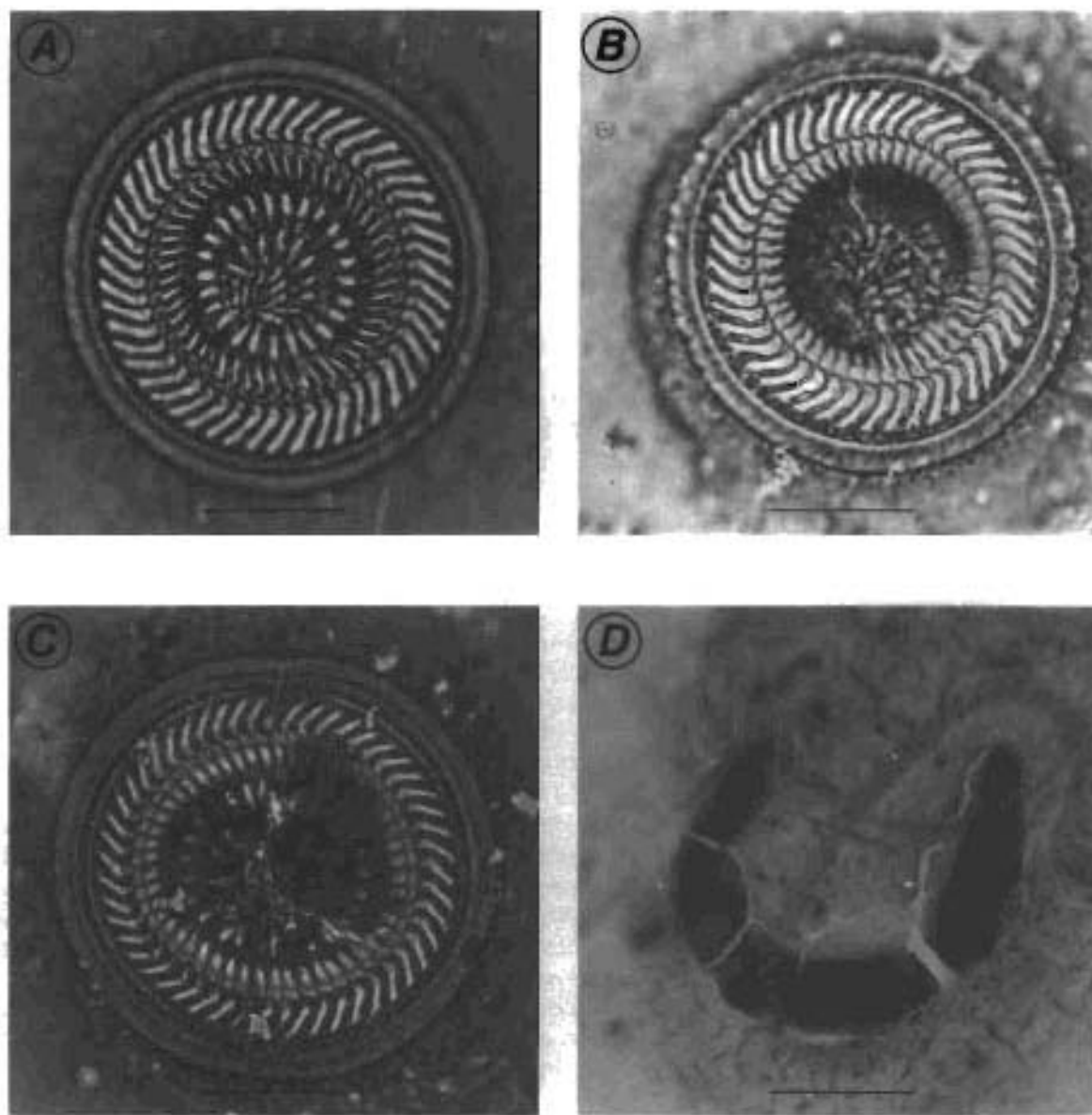
#### *Trichodina uretra* sp.n. (Figures 1A–D, 2A)

*Host and locality.* *Barbus trimaculatus* Peters, 1852, Hudson Ntsanwisi Dam (23°10'S / 30°40'E), Gazankulu.

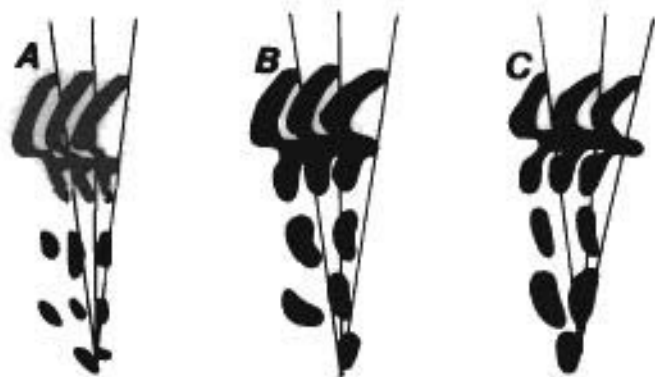
*Type material.* Holotype slide 83/4/6–27 in the collection of the Department of Zoology and Entomology of the University of the Orange Free State (UOFS), Bloemfontein.

*Position on host.* Urinary bladder and ureters.

*Description.* A medium to large parasite with a disc-shaped body, 48,0–74,3 (59,8 ± 7,3; 8) in diameter. Adhesive disc concave, 42,7–65,4 (52,2 ± 6,8; 8) in diameter; surrounded by a finely striated border membrane 2,2–4,5 (3,4 ± 0,7; 8) wide. Diameter of denticle ring 27,0–48,3 (36,0 ± 6,1; 8). Number of denticles 47–54 (48; 8). Length of denticle 4,8–6,2 (5,6 ± 0,5; 8); length of ray 2,3–5,2 (3,4 ± 0,8; 8) width of central part 1,8–3,0 (2,3 ± 0,4; 8); length of blade 5,6–7,0 (6,4 ± 0,5; 8). Blade narrow, sickle-shaped. Distal surface flattened. Tangent point slightly lower



**Figure 1** Photomicrographs of *Trichodina uretra* sp. n. A–C. Silver-impregnated adhesive discs. C. Cell starting binary fission. D. Combination of silver impregnation and haematoxylin staining of nuclear apparatus. Ma = macronucleus. Scale in all figures indicates 20  $\mu\text{m}$ .



**Figure 2** Diagrammatic drawings of the denticles of, A. *Trichodina uretra* sp. n., B. *T. polycirra* Lom, 1960 from Lom (1960) and C. *T. polycirra* from Lom & Haldar (1976).

than distal surface. Posterior margin indentation forms a deep curve, with deepest point near connection between blade and central part, touching  $y + 1$  line. Anterior margin rounded with apex of blade situated far into  $y + 1$  quadrant. Connection between blade and central part delicate. Central part squat, touching or extending slightly past  $y$  axis. Point of central part flattened, not in close association with following denticle. Connection between central part and ray strongly developed. No apophysis of ray present. Central part above  $x$  axis with a deep notch. Shape of central part above  $x$  axis not the same as section below  $x$  axis. Ray slender and short, of equal thickness, with a blunt rounded point. Ray straight, directed slightly posteriorly, almost touching  $y - 1$  axis. Ratio between denticle above and below  $x$  axis 2,9.

Three rows of central structures present in the centre

of adhesive disc. Number of radial pins per denticle 6–7 (7; 8). Nuclear apparatus consists of an open C-shaped macronucleus. External diameter 29,0–45,1 ( $37,9 \pm 4,8$ ; 6); thickness 7,5–11,0 ( $9,8 \pm 1,2$ ; 6); distance between two ends of macronucleus 11,2–26,9 ( $22,1 \pm 5,9$ ; 6). Adoral ciliary groove turns  $360^\circ$ – $380^\circ$ .

#### Remarks

The only endoparasitic trichodinid that shows some resemblance to *T. uretra* is *T. polycirra*, described from the urinary tract of the roach, *Rutilus rutilus* by Lom (1960) and Kashovsky (1974), as well as the bream *Abramis brama* by Lom & Haldar (1976). All of the above records are from Czechoslovakia and the USSR. Although overall morphometric data do not differ significantly between these two species, the most important differences can be found in the denticle shape, host preference, as well as geographical distribution.

According to the method proposed by Van As & Basson (in press) for the description and comparison of denticles, the denticle shape of these two endoparasites differ significantly (Figure 2A, B & C). The posterior margin (y axis) of the blade in *T. uretra*, coincides with the y + 1 axis, while in *T. polycirra* it lies halfway between the y – and y + 1 axes. The anterior margin of *T. uretra* lies in the second half (more than 75% of the way) of the following y axis quadrant, whilst in *T. polycirra*, described by Lom & Haldar (1976), it lies on the y + 1 axis and in the population described by Lom (1960) in the first half of the quadrant. The ray of *T. uretra* is delicate, straight and directed posteriorly, whilst in *T. polycirra* it is robust and strongly developed and directed anteriorly. The population of *T. polycirra* described by Lom & Haldar (1976) has a long, slender central part, while the population of Lom (1960) shows a shorter and more robust central part (Figure 2B & C). In the case of *T. uretra*, the central part is almost rectangular and lies on the same plane as the y axis, with a deep notch in section of the central part above x axis. In the population of *T. polycirra*, described by Lom & Haldar (1976), it passes the y axis. The ratio between length of blade and length of ray in *T. polycirra* is 1,8, while in *T. uretra* it is 2,9.

The differences in denticle shape, host range and geographical distribution are considered sufficient to

consider this parasite from *B. trimaculatus* as a new species.

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