A new species of *Trichodina* (Ciliophora: Peritricha) from a limnocnidid medusa in the Zambezi system

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During September (spring) 1984 a medusa bloom of the freshwater jellyfish *Limnocnida tanganyicae* (Günther, 1893) was observed in Lake Lisikili bordering on the Zambezi River in the eastern Caprivi. All examined medusas were found to be infested by numerous specimens of a previously unknown trichodinid peritrich. A taxonomic description of this new species, *Trichodina zambeziensis* sp.n. is provided.
S. Afr. J. Zool. 1986, 21: 76–78

Gedurende September 1984 (lente) is 'n medusa-opbloei van die varswater jellievis *Limnocnida tanganyicae* (Günther, 1893) in die Lisikilimeer, aangrensend aan die Zambezirivier in die Oos-Caprivi waargeneem. Alle eksemplare van die jellievis-medusa wat ondersoek is, was besmet met 'n tot dusver onbekende ektoparasitiese *Trichodina*-spesie. 'n Taksonomiese beskrywing van hierdie spesie, *Trichodina zambeziensis* sp.n. word verskaf.
S.-Afr. Tydskr. Dierk. 1986, 21: 76–78

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Received 1 May 1985; accepted 21 August 1985

During a parasitological survey of fish in the eastern Caprivi, a bloom of medusas of a freshwater jellyfish was observed in Lake Lisikili bordering on the Zambezi River, approximately 20 km downstream from Katima Mulilo. Medusas occurred in vast numbers and presented a unique spectacle as thousands floated in the lake. Some were collected and examined microscopically and found hosting hundreds of trichodinid peritrichs (Figure 1A) which upon closer examination proved to be an unknown species of which the taxonomic description is presented below.

Freshwater medusas of the genus *Limnocnida* have been recorded from various localities in central and southern Africa, including the Zambezi River, with the most southerly record from Johannesburg, South Africa (Pitman 1965; Mills 1973; Goy 1977).

Two opposing lines of thought on the number of African species exist: Kramp (1954, 1961) recognizes only one species, namely *L. tanganyicae* (Günther, 1893), whereas Bouillon (1956–1957) accepts three distinct species, *L. congoensis* Bouillon, 1957, *L. tanganyicae* and *L. victoriae* Bouillon, 1957. Subsequent workers (Pitman 1965; Mills 1973; Goy 1977) support the views of Kramp (1954) in recognizing only one species.

It appears that we are in fact dealing with the same species as that found by Pitman (1965) in the Caprivi Strip and until further information becomes available, the limnocnidid medusa will be regarded as belonging to the species *L. tanganyicae*.

Trichodinid peritrichs are found widely amongst freshwater invertebrates, amphibians and fish. Those occurring on fish have received the most attention and a comprehensive work on the fish-associated trichodinid peritrichs of southern Africa has recently been published by Basson, Van As & Paperna (1983). To date no information is available from South Africa on freshwater trichodinids from hosts other than fish, although various reports of their occurrence on *Hydra*, planktonic crustaceans and amphibians are available from elsewhere in the world.

The occurrence of trichodinid peritrichs on limnocnidid medusas has been reported by Annandale (1912) from *L. indica* Annandale, 1912 in India. He identified the organism as *Trichodina pediculus* Ehrenberg, 1838. Arnold & Boulenger (1915) recorded an unidentified *Trichodina* on *L. tanganyicae* and *L. rhodesiae* Boulenger, 1912 and Fantham & Porter (1933) noted the occurrence of trichodinids on *L. rhodesiae* from the Limpopo System.

The specific identification of the trichodinid found on *L. indica* by Annandale (1912) is questioned, as his description

was not based on silver-impregnated specimens. The technique of silver impregnation is now regarded as essential in trichodinid taxonomy. Earlier works on trichodinid peritrichs referred to all specimens collected from aquatic invertebrates as *T. pediculus*, probably because the original description of this species was based on material collected from a *Hydra*. However, subsequent comprehensive works on trichodinid peritrichs (Wellborn 1967; Kazubski & Migala 1968; Basson *et al.* 1983) have shown that *T. pediculus* also occurs on a wide range of fish species.

Taxonomic description

Material

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 characteristics 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 arithmetic mean.

***Trichodina zambeziensis* sp.n. (Figure 1A to C).**

Host and locality. Limnocnida tanganyicae (Günther, 1893), Lake Lisikili (17°25'S/24°30'E), eastern Caprivi.

Type material. Holotype slide 84/9/26–20 and paratype slides 84/9/26–1 and 84/9/26–5 in the collection of the Department of Zoology of the Rand Afrikaans University (RAU), Johannesburg.

Position on host. External surface of the tentacles and manubrium of the medusa.

Description. A small parasite with a high, bell- to cylinder-shaped body, 25,1—34,2 (29,8 ± 2,3; 30) in diameter. Adhesive disc concave, 20,2–28,0 (24,8 ± 2,2; 30) in diameter; surrounded by a finely striated border membrane 2,1–3,8 (2,8 ± 0,4;30) wide. Diameter of denticle ring 11,2–15,7 (13,5 ± 1,2; 30). Number of denticles 16–20 (18;30). Length of denticle 3,6–5,2 (4,3 ± 0,3;30); length of ray 3,2–5,6 (4,2 ± 0,5;30); width of central part 0,9–2,4 (1,4 ± 0,3;30); length of blade 2,4–4,4 (3,4 ± 0,5;30). Blade scimitar shaped, broad distally with a rounded to somewhat sharp apex. Central part strongly developed. Ray slender and straight and of even thickness throughout. Number of radial pins per denticle 6–8 (7;30). Nuclear apparatus consists of a horseshoe-shaped macronucleus, and an oval to round micronucleus. External diameter of macronucleus 19,9–35,2 (27,6 ± 4,1;24); thickness 3,3–7,7 (4,6 ± 0,9;24); distance between two ends of macronucleus 1,7–24,3 (10,7 ± 5,8;24). Position of micronucleus varies between +y, −y and −y′. Length of micronucleus 2,4–5,7 (3,7 ± 1,1;20), width 1,4–3,1 (2,6 ± 0,5; 20); value of y-distance 1,6–18,0 (6,4 ± 4,1;20). Adoral ciliary groove turns 405 to 450 degrees.

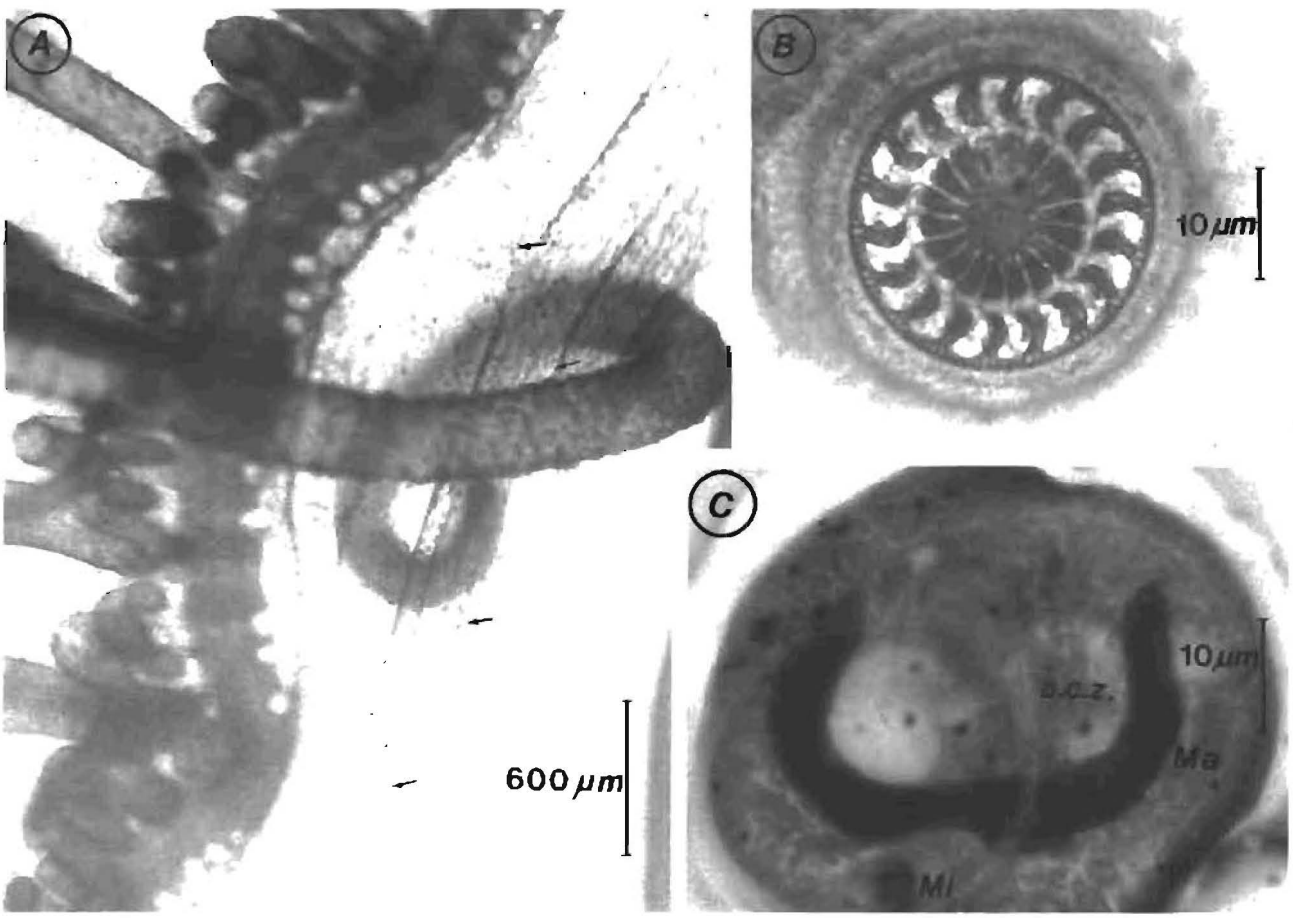

Figure 1 (A) Stereomicrograph of part of the umbrella margin of *Limnocnida tanganyicae* (Günther, 1893) from Lake Lisikili. Numerous specimens of *Trichodina zambeziensis* sp. n. can be seen on the medusa (the arrows point to some of the organisms). (B) Micrograph of silver impregnated adhesive disc of *T. zambeziensis*. (C) Micrograph of hematoxylin stained *T. zambeziensis*. Ma — macronucleus; Mi — micronucleus; a.c.z. — adoral ciliary zone.

Remarks. The material presented in this paper was collected from the external surface of the tentacles and manubrium of medusas. Arnold & Boulenger (1915) also noted trichodinids inside the circular canals of medusas, but did not find any difference in morphological structure between these organisms and those found on the external surface. It is, however, unlikely that any significant morphological differences would have been noticed by these authors, as they did not employ silver staining. Some trichodinid species are commonly found as endoparasites in amphibians and fish as well as terrestrial molluscs (Lom & Haldar 1976; Sirgel 1983). These endoparasites show significant differences in taxonomic features such as the number of denticles, which are constantly greater in number than those of ectoparasites. In the present study no trichodinid specimens were found in the circular canals of the medusas.

T. zambeziensis is a small trichodinid with a body diameter less than that of the smallest species so far known from Africa, i.e. *T. minuta* Basson, Van As & Paperna, 1983 where the body diameter averages 33. The length of the ray, however, is notably longer and the overall shape differs significantly from that of *T. minuta* which has so far only been found on cichlid and cyprinid fishes (Van As & Basson 1984). *T. zambeziensis* with a mode of 16 denticles is the trichodinid with the smallest number of denticles so far known. This species differs significantly in taxonomic features from all the known species of the genus. A distinctive feature of this species is the variability of the micronucleus position which was found in different specimens to occur in +y, −y and −y′ positions. In some specimens the micronucleus was situated in a distinct indentation in the macronucleus on the opposite side to the open end (Figure 1C). This variation in the position of the micronucleus may be due to uneven distortions of the cylindrical body when dry smears are prepared. Similar observations with regard to the variability of micronucleus position, although not to the same extent, were made in other trichodinid species with an exceptionally high body, e.g. *T. centrostrigata* Basson, Van As & Paperna, 1983.

Acknowledgements

This study forms part of a research programme in the eastern Caprivi carried out with the permission of the Department of Agriculture and Nature Conservation of South West Africa/Namibia. The authors would like to thank Mr. Manie Grobler for assistance during field work.

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