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Henneguya spp. (Myxozoa, Myxosporea, Myxobolidae) parasitizing fishes from Paraná river, Brazil

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ABSTRACT. The examination of gills from 240 fish from Paraná river, Brazil, showed the presence of small cysts in five fish species. Observation of the cysts showed they are plasmodia of *Henneguya* spp. (Myxozoa, Myxosporea, Myxobolidae). The morphometric and morphologic characteristics of the parasites are described.

Key words: *Henneguya* sp., *Leporinus friderici, Leporinus obtusidens,* Paraná river, *Prochilodus lineatus, Pseudoplatystoma corruscans, Schizodon borellii.*

RESUMO. *Henneguya* spp. (Myxozoa, Myxosporea, Myxobolidae), parasitas de peixes do rio Paraná, Brasil. O exame das brânquias de 240 espécimes de peixes do rio Paraná, região de Porto Rico, Paraná, Brasil, mostrou que cinco espécies possuíam pequenos cistos, cuja observação revelou constituírem plasmódios de *Henneguya* spp. (Myxozoa, Myxosporea, Myxobolidae). Neste trabalho são referidas as características morfológicas e morfométricas das formas observadas.

Palavras-chave: *Henneguya* sp., *Leporinus obtusidens, L. friderici, Prochilodus lineatus, Pseudoplatystoma corruscans,* rio Paraná, *Schizodon borellii.*

Henneguya spp. are Myxobolidae (Myxozoa, Myxosporea) which parasitize mainly freshwater fish but are also reported in a few species of marine fish. According to Lom and Dyková (1992) this genus comprises more than 120 species, being one of the largest groups of the family Myxobolidae. Several species have been described in freshwater fishes from Brazil, and a recent check-list of Brazilian myxosporidians lists 21 species (Gioia and Cordeiro, 1996). Four other species reported in the last few years (Azevedo and Matos, 1995, 1996; Azevedo *et al.,* 1997; Casal *et al.,* 1997) must be added to that list.

Sampling of fish from Paraná river, at Porto Rico, Paraná State, Brazil, showed that the gills of specimens from 5 different species were infected by *Henneguya* spp. The description of these protozoa is reported in this paper.

Materials and methods

240 fish specimens, belonging to 29 species, were caught in nets in the Paraná river (Porto Rico, Paraná State, Brazil) and their gills were inspected for myxosporean infections. The gills of *Leporinus obtusidens* (Anastomidae, 1 specimen), *L. friderici* (1 specimen), *Schizodon borellii* (Anastomidae, 1 specimen), *Pseudoplatystoma corruscans* (Pimelodidae, 1 specimen) and *Prochilodus lineatus* (Pimelodidae, 11 specimens) were found parasitized by *Henneguya* spp.

The infected gills were fixed in buffered formalin to be observed later on. Cysts were ruptured to release spores and glycerine-gelatine preparations were made. Microscopical observations and photomicrographs were done in Nomarski differential contrast phase. Measurements of spores were made according to Lom and Arthur (1989). The drawings of the spores were made from computer enlarged photographs.

Results

The morphometric features of the *Henneguya* spp. are referred to in Table 1. Photomicrographs and drawings of the observed specimens are presented in Figure 1 and Figure 2.

***Henneguya* sp. from *Prochilodus lineatus*.** The cysts were found in eleven host specimens. They were white, oval in shape and measured about 0.03-0.80 x 0.02-0.28mm. In one specimen several cysts were observed. In others only one cyst was present per specimen. They were located at the tip or in the anterior half of the secondary gill lamellae.

Table 1. Morphometric features (mean and range, in μm) of *Henneguya* spp.: LSB (length of the spore body); WSB (width of the spore body); TSB (thickness of the spore body); LS (total length of the spore); LPC (length of the polar capsule); WPC (width of the polar capsule); LCP (length of the caudal process)

	P. lineatus	*L. obtusidens*	*L. friderici*	*P. corruscans*	*S. borellii*
LSB	12.5(11.2-15.3)	8.7(8.1-9.1)	7.8(7.1-9.1)	13.5(12.2-15.3)	12.2(11.2-13.2)
WSB	4.8(4.0-5.1)	4.6(4.0-5.1)	4.4(4.0-4.5)	5.4(5.1-6.1)	5.6(5.1-6.1)
TSB	3.6(3.0-4.0)	3.0	2.3(2.0-2.5)	4.0	3.5(3.0-4.0)
LS	51.1(51.0-60.1)	36.2(33.6-39.7)	31.2(27.5-35.7)	24.7(21.4-26.5)	30.2(28.4-34.6)
LPC	5.8(5.1-7.1)	3.8(3.5-4.0)	2.9(2.5-3.0)	6.9(6.1-8.1)	5.3(4.0-6.1)
WPC	2.0 (1.5-2.0)	1.5	1.0	1.95	2.0
LCP	37.1(32-45.9)	27.7(26.5-28.5)	20.4(19.3-22.4)	11.6(9.1-12.2)	24.1(22.4-25.5)

Figure 1. Photomicrographs of *Henneguya* sp. from *Prochilodus lineatus* (1), *Leporinus obtusidens* (2), *Pseudoplatystoma corruscans* (3), *Schizodon borellii* (4) and *Leporinus friderici* (5). Bar = 10μm

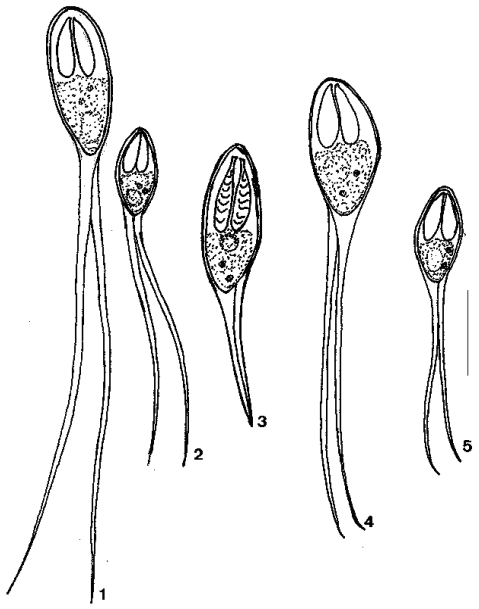

Figure 2. Schematic drawings of *Henneguya* sp. from *Prochilodus lineatus* (1), *Leporinus obtusidens* (2), *Pseudoplatystoma corruscans* (3), *Schizodon borellii* (4) and *Leporinus friderici* (5). Bar = 8.4μm

The spore body is more or less ellipsoidal with a blunt anterior end. The two tails have the same length and their extremity is frequently curved. The polar capsules are elongated, parallel, sometimes one of them being a little shorter than the other. The number of coils of the polar filament is difficult to distinguish in the preserved material (apparently 8 coils are observed). A large and conspicuous vacuole is present in the sporoplasm in the posterior part of the spore body. Two nuclei are positioned immediately above the vacuole.

***Henneguya* sp. from *Leporinus obtusidens*.** One round and white cyst (about 0.1mm in diameter) was observed in the middle region of one secondary gill lamella.

The spore body is ellipsoidal, each valve tapering to a long tail (about two and half times the length of the spore body), the two tails being of the same length. In some specimens the tails lie close together; in others they diverge near the basis or from the middle. The polar capsules, pyriform and converging anteriorly, occupy less than half the spore body. The polar filament is indistinct in the preserved material. One large vacuole and two nuclei are observed in the sporoplasm.

***Henneguya* sp. from *Pseudoplatystoma corruscans*.** Five white cysts, round or elongated, measuring about 0.5mm in diameter, to about 1mm (maximal dimension), were observed in the middle region of the secondary gill lamellae.

The spores are ellipsoidal, the two valves tapering to a tail shorter than the spore body. One of the tails can be slightly shorter (about 2-3μm) than the other. Usually the two tails are parallel, straight throughout their lengths to slightly curved at the tips, in some specimens diverging near the end. The pyriform and somewhat bottle-shaped polar capsules have the same length, occupy about half of the spore body and converge anteriorly. The polar filament has 7-8 coils. The sporoplasm contains a large vacuole placed immediately after the polar capsules and two nuclei between the vacuole and the posterior extremity of the spore body.

***Henneguya* sp. from *Schizodon borellii*.** Only one plasmodia in the form of a round white cyst was found. It lay near the tip of the secondary gill lamella and measured about 0.5mm in diameter.

The spore body is ellipsoidal with a blunt anterior end, each valve tapering to a tail whose length is a little more than twice the length of the spore body. The two tails have the same length and in most of the specimens are parallel throughout their lengths. In others they diverge slightly and the final part can be slightly curved. The polar capsules are pyriform and converge anteriorly, the number of coils of the polar filament being indistinct in the preserved material. In some specimens one polar capsule is slightly longer than the other. In the sporoplasm there is a prominent vacuole and two nuclei.

***Henneguya* sp. from *Leporinus friderici*.** One small cyst, round and white, lay in the middle region of the secondary gill lamella.

The spore body is ellipsoidal with a blunt anterior end, the two valves tapering to a long tail, about two and half times longer than the spore body. The two tails diverge throughout the entire length and are slightly curved in most of the specimens. The polar capsules are pyriform and of the same length, converge anteriorly, and their anterior extremity is sharp. The number of coils of the polar filament is indistinct in the preserved material. The sporoplasm contains a small vacuole and two nuclei.

Discussion

Myxosporea systematics is based on morphological and morphometric characteristics of the spore, and on the comparison with other descriptions of already known species. Therefore, for comparative purposes, the availability of all the other descriptions is crucial for the identification of new species. The genus *Henneguya* is one of the largest within the family Myxobolidae and comprises more than 120 species, in 1992 (Lom and Dyková, 1992). Thence, several new species have been described and the descriptions are scattered in a large number of journals.

As far as it was possible to verify, the forms reported in this paper are different from most of the species described so far for Brazilian fishes. However, due to the impossibility of comparison of the present specimens with all the described species of the same genus, the authors do not go further than the genus level in the identification of the observed material. A synopsis of the known *Henneguya* species described so far would prove extremely useful. Such a synopsis is being prepared by one of the authors.

The *Henneguya* species from Brazilian fishes comprise about 25 species. Taking into account the extreme diversity of the fish fauna of South America, which most likely includes more than 2,500 species in Brazil, it is highly probable that a great number of *Henneguya* species as well as other myxosporeans remain to be identified.

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