



First record of lernaeciosis in a native fish species from a natural environment in Minas Gerais state, Brazil

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Abstract. The study detected, for the first time, the occurrence of lernaeciosis in indigenous characid *Astyanax bimaculatus* of the Santo Antônio creek, Paraíba do Sul River basin, Minas Gerais state. This parasitic copepod first appeared due to the extreme culture of ornamental fishes in the largest ornamental pisciculture center in Brazil. It brings concern the occurrence of the anchor worms *Lernaea cyprinacea* (Linnaeus, 1758) in a natural environment because this exotic species is able to spread and to parasitize other species of native fishes.

Keywords: Anchor worms, *Astyanax bimaculatus*, exotic species, *Lernaea cyprinacea*, Paraíba do Sul river.

Resumo. Primeiro registro de lerniose em uma espécie de peixe nativo proveniente de ambiente natural no estado de Minas Gerais, Brasil. O estudo detectou pela primeira vez, a presença de lerniose no caracádeo nativo *Astyanax bimaculatus* do riacho Santo Antônio, bacia do rio Paraíba do Sul, Estado de Minas Gerais. Este copépode parasita surgiu devido ao intenso cultivo de peixes de aquário no maior pólo de piscicultura ornamental do Brasil. É preocupante a presença de Vermes âncora *Lernaea cyprinacea* (Linnaeus, 1758) em um ambiente natural da região pois essa espécie exótica pode disseminar e parasitar outras espécies de peixes nativos.

Palavras-chave: *Astyanax bimaculatus*, espécie exótica, *Lernaea cyprinacea*, rio Paraíba do Sul, vermes âncora.

Copepods are the most numerous among parasitic crustaceans and may be the most common group of fish parasites. They have been found parasitizing skin, gills, eyes, fins and even inside the mouth of fishes, near the palate and nostrils (Eiras 1994).

Among the well known copepods in Brazil, the most observed species is the exotic *Lernaea cyprinacea* (Linnaeus, 1758), introduced during the 80's via the common carp *Cyprinus carpio* Linnaeus, 1758, at the northeast area, spreading to southeastern, mid-west and reaching the southern regions of Brazil (Fortes *et al.* 1998).

Studies on parasites prevalence such as *L. cyprinacea* in cultivated fish are scarce in Brazil (Martins *et al.* 2002) and even more in native species from natural environments, being restricted only to the lambari *Astyanax altiparanae* (Garutti & Britski, 2000), mandi-beiçudo *Iheringichthys*

labrosus Kroyer, 1874, piau *Leporinus elongatus* Valenciennes, 1849, *Leporinus friderici* Bloch, 1794, *Schizodon intermedius* Garavello & Britski, 1990, *Schizodon nasustus* Kner, 1859, pirambeba *Serrasalmus spilopleura* Kner, 1860 from Tibagi and Paranapanema rivers, Paraná River basin at the Paraná, state (Gabrielli & Orsi 2000) and saguirus *Cyphocharax spilotos* Vari, 1987, *C. voga* (Hensel, 1870) and *Steindachnerina biornata* (Braga & Azpelicueta, 1987) from Felizardo stream, Uruguai River basin, Rio Grande do Sul state (Querol *et al.* 2005), both located in southern Brazil.

This study provides the first record of the occurrence of lernaeciosis in a native fish species captured in a natural environment, the lambari *Astyanax bimaculatus* (Linnaeus, 1758) from Paraíba do Sul River basin, Minas Gerais state (Figure 1).

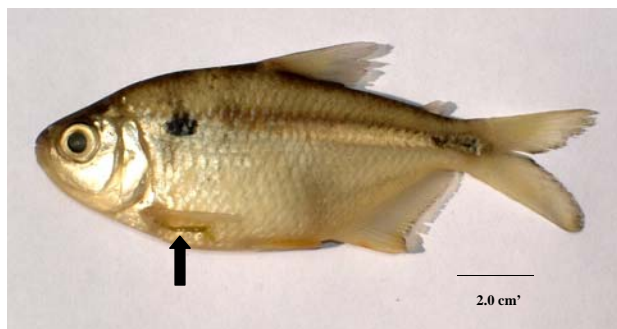


Figure 1. Native lambari *A. bimaculatus* parasitized by anchor worm *Lernaea cyprinacea* (arrow) below of pectoral fin.

Sampling was conducted from January to December, 2005 in Santo Antônio creek (20°58'14''S; 42°17'26''W), Vieiras county, Minas Gerais state, southeastern Brazil (Figure 2).

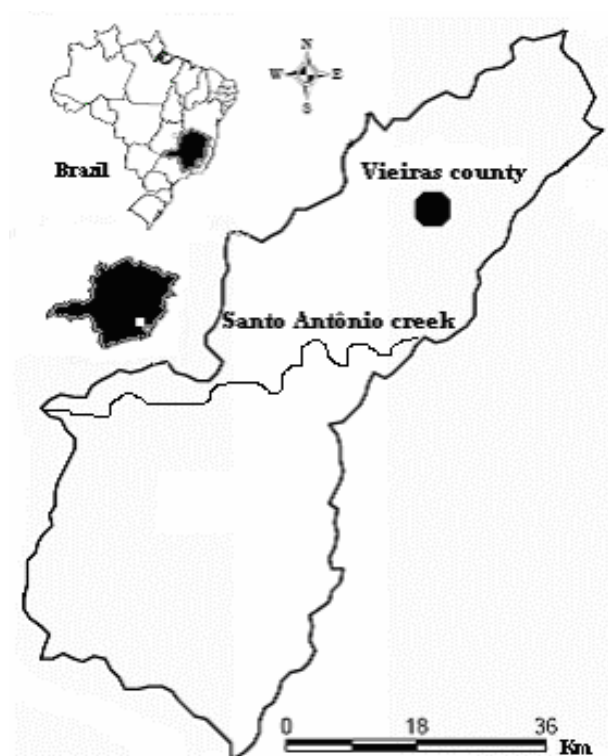


Figure 2. Localization of the study site.

Fishing gear used for fishes capture was sieve (0.5-1.0-cm mesh). The studied ecosystem belongs to an area that has been considered the largest ornamental pisciculture center in Brazil since 1979, with approx. 250 farmers and 3,000 ponds (Vidal Júnior & Costa 2000). The majority of these ponds do not have devices such as protective screens on the effluent pipes to prevent the ornamental species from escaping out (Magalhães, personal observation). The lernaecosis was introduced in the region in the 90's through the goldfish *Carassius auratus* (Linnaeus, 1758) and the ornamental variety of koi carp *C. carpio*, and it is found until today

(Magalhães, personal observation).

The collected fishes (exotics: N = 7,240, 5,282 guppies *Poecilia reticulata* Peters, 1860, 1,178 green swordtails *Xiphophorus hellerii* Heckel, 1848, 420 mollies *P. sphenops* Valenciennes, 1846, 353 variable platyfishes *X. variatus* (Meek, 1904), 7 goldfishes *C. auratus*, natives: N = 1,915, 1,433 acarás *Geophagus brasiliensis* (Quoy & Gaimard, 1824), 363 lambaris *A. bimaculatus*, 98 cascudos *Hypostomus affinis* (Steindachner, 1877), 16 sarapós *Gymnotus* sp., 3 cambevas *Trichomycterus* sp., 2 cascudinhos *Parotocinclus maculicauda* (Steindachner, 1877)) have been examined through stereoscopic microscope to identify the occurrence of *Lernaea* and other ectoparasites (Figure 3).

Only *Lernaea* was found (exotics: N = 15, 10 *P. reticulata*, 2 *X. hellerii*, 1 *X. variatus*, 1 *P. sphenops*, 1 *C. auratus*, natives: N = 17, 17 *A. bimaculatus*), and there were no other parasites in the native species. Parasites were removed out of the fish's structures, where they were attached, and put into bottles with 10% formalin solution. After, the parasites were identified and prepared on a glass slide, according to Amato *et al.* (1991). Similar pattern occurred in Tibagi and Paranapanema Rivers, Paraná River basin, Paraná state, where massive escapes from fish farms (N = 1,292,000 individuals belonged to 12 exotic fish species) were responsible for lernaecosis in seven native fish species (Orsi & Agostinho 1999; Gabrielli & Orsi 2000).

In this study, the parasite considered as the cause of lernaecosis in ornamental exotic fish species and in the *A. bimaculatus* was *L. cyprinacea*. It has an elongate, tubular body, which is differentiated into a cephalothorax, thoracic region and abdomen. The worm's head is distinctly round with antennae and antennules attach laterally on the anterior portion and a posterior anchor processes. Oral appendages and the first pair of swimming legs are situated in the ventral surface of the cephalothorax. The second, third and fourth pairs of swimming legs are attached to the thorax, whereas the abdomen bears the fifth and sixth pairs of swimming legs. The abdomen is slightly broadened and curved at the posterior region. The anchors by which the female attaches itself to its host are a series of outgrowths from the cephalothorax, the posterior portion of the "head". The anchors are cylindrical with a pair of ramified, Y-shaped or T-shaped dorsal processes and a second no ramified ventral pair (Robinson & Avenant-Oldewage 1996). It has been found pregnant and no-pregnant females, which parasitize lambaris and they carried two caudal greenish egg sacs with about 60-70 eggs each.

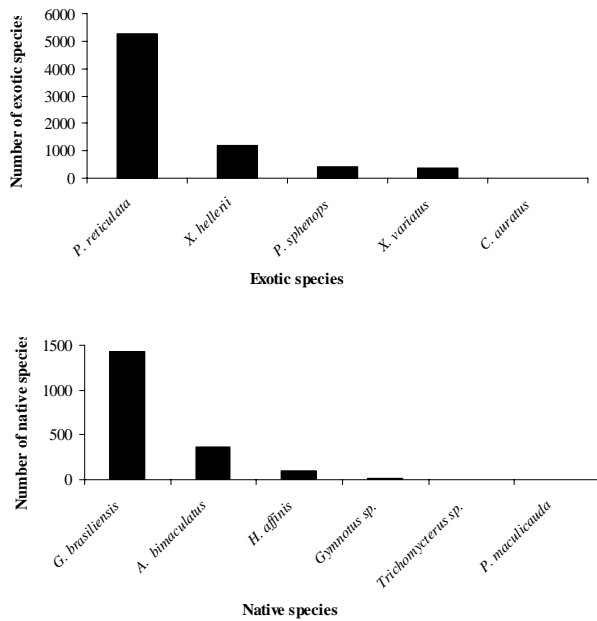


Figure 3. Number of exotic and native fish species captured in the Santo Antônio creek in the period from January to December, 2005.

The parasite *L. cyprinacea* and most exotic species have been a worldwide environmental concern. Regarding the lernaeosis found in a native fish inhabiting a natural environment in Minas Gerais, the complexity of the problem is high. This crustacean can spread out of control due to the intermittent escapes of ornamental fishes. In order to address the problem is necessary the urgent involvement of governmental sectors of the state. They should be able to discuss and set rules to prevent the spreading of fishes, anchor worm and other parasites and pathogens (e.g., fish louse *Argulus* sp. and white spot disease *Ichthyophthirius multifiliis* Fouquet 1876), which come from the ornamental fish farms in the region. The immediate alternative to stop these introductions should be environmental education among the people who work directly with ornamental fish farms. Otherwise, fish escapes out of most 3,000 ponds will go on.

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Received March 2006

Accepted April 2006

Published online April 2006