LARVAE OF *Porrocaecum* sp. (NEMATODA: ASCARIDIDAE) IN THE SWIM BLADDER OF CULTURED *Piaractus mesopotamicus* (OSTEICHTHYES: CHARACIDAE) IN BRAZIL

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ABSTRACT

This work describes the presence of larvae of *Porrocaecum* sp. (Nematoda: Ascarididae) in the swim bladder of pacu, *Piaractus mesopotamicus* (Osteichthyes: Characidae) cultivated in Uberaba, Minas Gerais State, Brazil. Thirty fish measuring 11.9+0.7 cm total length and weighting 34.3+6.2 g were examined. After sedation blood smears for differential count of leukocytes were performed. Seventeen percent of prevalence with a mean intensity of 10 (1-36) parasites per host was the data of infection. The larvae showed differences in the length of esophagus and intestinal caecum, distance of excretory pore from anterior end and tail when compared to *Porrocaecum reticulatum*, *P. crassum*, *P. semiteres* and *P. ensicaudatum* larvae. The blood smears were composed mainly by lymphocyte and no difference between infected and healthy fish was related. This work contributes to knowledge of helminth fauna in Brazilian cultivated fish and presents a new host for larvae of *Porrocaecum* sp.

Key words: Nematoda; *Porrocaecum;* swim bladder; cultured fish; *Piaractus mesopotamicus*, leukocytes

LARVAS DE *Porrocaecum* sp. (NEMATODA: ASCARIDIDAE) NA BEXIGA NATATÓRIA DE *Piaractus mesopotamicus* (OSTEICHTHYES: CHARACIDAE) EM CULTIVO NO BRASIL

RESUMO

Este trabalho descreve a presença de larvas de *Porrocaecum* sp. (Nematoda: Ascarididae) na bexiga natatória de pacu, *Piaractus mesopotamicus* (Osteichthyes: Characidae) cultivado em Uberaba, Estado de Minas Gerais, Brasil. Um total de 30 peixes medindo 11,9+0,7 cm de comprimento total e pesando 34,3+6,2 g foram examinados. Após a anestesia extensões sangüíneas foram confeccionadas para contagem diferencial de leucócitos. Observou-se 17% de prevalência e intensidade média de infecção de 10 (1-36) parasitos por hospedeiro. As larvas mostraram diferenças no comprimento do esôfago e ceco intestinal, da distância do poro excretor até a extremidade anterior e cauda quando comparadas às larvas de *Porrocaecum reticulatum*, *P. crassum*, *P. semiteres* e *P. ensicaudatum*. As extensões sangüíneas foram compostas principalmente por linfócitos, sendo que nenhuma diferença estatisticamente significativa entre peixes sadios e infectados foi observada. Este trabalho contribui para o conhecimento da helmintofauna de peixes cultivados no Brasil e apresenta um novo hospedeiro para larvas de *Porrocaecum* sp.

Palavras-chave: Nematoda; *Porrocaecum*; bexiga natatória; peixe cultivado; *Piaractus mesopotamicus*; leucócitos

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INTRODUCTION

Piaractus mesopotamicus HOLMBERG, 1887 commonly called "pacu" is one of the most cultivated freshwater fish in the States of São Paulo, Minas Gerais and Mato Grosso. The main parasites that have been affected the health of this fish are *Piscinoodinium pillulare* LOM, 1981, ciliated protozoan as trichodinids and *Ichthyophthirius multifiliis* FOUQUET, 1876, *Henneguya piaractus* MARTINS and SOUZA, 1997, *Anacanthorus penilabiatus* BOEGER, HUSAK and MARTINS, 1995 and *Lernaea cyprinacea* LINNAEUS, 1758 (TAVARES-DIAS *et al*., 2002). However, endoparasitic infections in Brazilian cultivated fish have presented little importance when compared to ectoparasitic ones. Larvae of anisakid nematodes commonly occur in wild fish (MORAVEC *et al*., 1993; MACHADO *et al*., 2000; MANCINI *et al*., 2000; MARTINS *et al*., 2003). In fish of economic importance, BARROS and CAVALCANTI (1998) have related larvae of *Contracaecum* RAILLIET and HENRY, 1912.

In the present work, the authors described larvae of *Porrocaecum* sp collected from the swim bladder of cultivated *P. mesopotamicus*, a fish of economic importance in Brazil, and its effects on differential count of leukocytes.

MATERIAL AND METHODS

Thirty *P. mesopotamicus* commonly called "pacu", measuring 11.9+0.7 cm total length and weighting 34.3+6.2 g, were collected from rearing ponds situated at Uberaba, Minas Gerais State, Brazil. Fish were dissected and the swim bladder washed with 0.65% saline solution. Nematodes were carefully collected and fixed in AFA 65ºC to posterior preservation in alcohol 70%. Twenty one larvae were examined after alcoholic dehydration and clarification with glycerine by evaporation of alcohol or in 30% acetic acid solution and drawn with the aid of camera lucida. Parasite identification was according to HARTWICH (1974), VICENTE *et al*. (1985) and MORAVEC (1994). All measurements are given in micrometers with average and variation in parentheses unless otherwise stated. The animals were immersed in a benzocaine solution 1 g/l for sedation and the blood withdrawn (0.5 ml) from the fishes' caudal vein into a syringe containing a drop of a 10% EDTA solution. For differential count of leukocytes, air-dried blood smears were prepared using the ROSENFELD (1947) method in which a hundred cells were counted for establishment of each cell percent. Mean values of differential count were submitted to the variance analysis using *F* test ($P<0.05$) (BANZATO and KRONKA, 1995). Specimens deposited at Coleção Helmintológica do Instituto Oswaldo Cruz (CHIOC) Rio de Janeiro.

RESULTS

Five out 30 analyzed fish (17% prevalence) were infected with mean intensity of 10 (1-36) parasites per host. None signs of inflammation in the swim bladder or mortality associated to nematode presence was related. The helminthes were identified as larvae of *Porrocaecum* RAILLIET and HENRY, 1912 (Nematoda: Ascarididae) as shown in Figures 1 to 3.

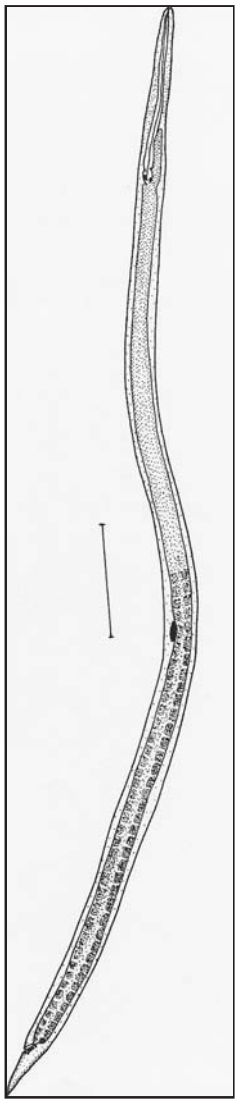

Figure 1. *Porrocaecum* sp. larva from *Piaractus mesopotamicus* HOLMBERG, 1887. General view. Note the presence of genital primordium (bar=200 μm)

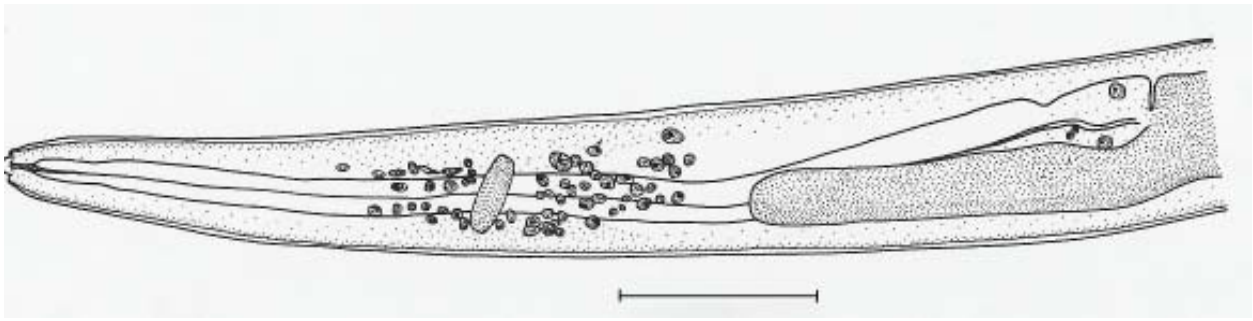

Figure 2. *Porrocaecum* sp. larva from *Piaractus mesopotamicus:* anterior end of body (bar=200 μm)

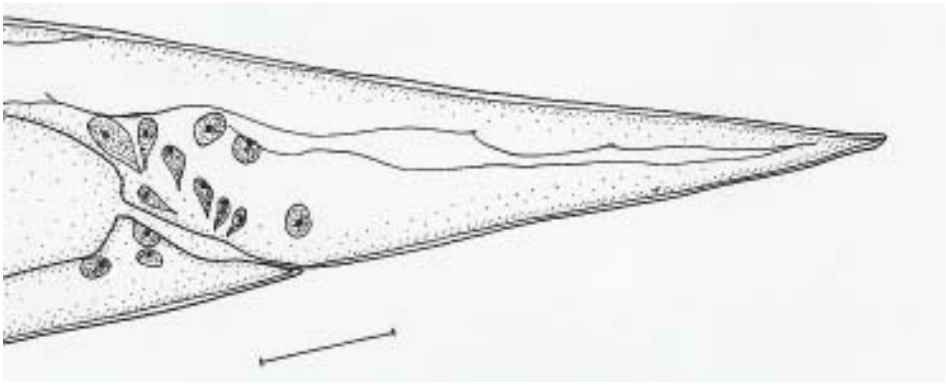

Figure 3. *Porrocaecum* sp. larva from *Piaractus mesopotamicus :* tail in lateral view (bar=200 μm)

Body 2.0 (1.8-2.4) mm long by 44 (40-58) widths at the intestinal cecum level; along the body lateral alae can be observed. Mouth provided with three lips, each having a single papilla and a pair of cuticular lobes. According to the terminology of MAGGENTI (1981) the nematode has a cheilostome between the buccal cavity measuring 8 (7-9); oesophagus without pseudobulb 285 (210-346) long by 16 (12-18) width measured near the pseudobulb; terminal pseudobulb 28 (21-38) long by 18 (17-24) width; nerve ring 134 (117-167) from the anterior end; the excretory pore of difficult visualization is visible in five out of 21 examined nematodes situated posteriorly to the nerve ring 151 (150-154) from the anterior end; intestinal cecum 113 (85-142) long by 17 (16-21) width. The reproductive system was not developed, but a structure with cell formation situated 1.1 (1.0-1.3) mm from the anterior end having 42 (27-66) long was observed; tail 89 (79-96) long.

Differential count of leukocytes did not show significant difference (P>0.05) between infected fish and healthy fish. The blood smears were composed mainly by lymphocyte as shown in Figure 4.

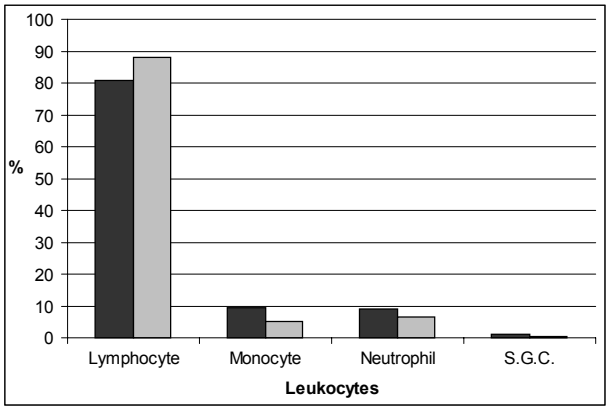

Figure 4. Mean values of differential count of leukocytes in healthy (black bars) *Piaractus mesopotamicus* HOLMBERG, 1887 and infected (grey bars) by larvae of *Porrocaecum* sp. in Minas Gerais State, Brazil. S.G.C.: special granulocytic cell. Lymphocyte: F=1.96, Variation Coeficient (VC)=11.17; Monocyte: F=3.40, VC=25.17; Neuthrophil: F=0.40, VC=43.11; S.G.C.: F=0.48, VC=54.78 (P>0.05)

REMARKS

Larvae of *Porrocaecum* sp differ from larvae of *Amplicaecum* sp. by the esophagus provided with spherical or elongated ventriculus as recorded by BAYLIS (1920), VICENTE *et al*. (1985) and MORAVEC (1994). Larvae of *Amplicaecum* sp. were observed in the swim bladder of *Brycon lundi*, *Pseudoplatystoma* sp. and *Leporinus* sp. collected from Emas, Pirassununga, SP (TRAVASSOS *et al*., 1928). Later, these larvae were observed in the visceral cavity of *Triurobrycon lundii*, *Leporinus copelandi* and *Steindachneridion parahybe* by TRAVASSOS and KOHN (1965) and in the intestines of *Hoplias malabaricus* and *L. copelandii* collected from Mogi Guassu River, SP by KOHN and FERNANDES (1987) and VICENTE and PINTO (1999). In the present work, the larvae were provided with a small and distinct ventriculus, found also in the swim bladder. In spite of the fact that the larvae of *Amplicaecum* sp. described by TRAVASSOS *et al*. (1928) and VICENTE *et al*.(1985) were also found in the swim bladder of fish, the larvae here described showed similarity with *Porrocaecum* sp. also described by those authors in fish intestines. Later, MORAVEC (1994) related larvae of *P. reticulatum*, *P. crassum*, *P. semiteres* and *P. ensicaudatum* encapsulated in the serosa of the visceral cavity of infected fish of Europe, Africa, Asia, Australia, North, Central and South America. When comparing to *P. reticulatum* larvae (MORAVEC, 1994) the larvae here described showed smaller measurements. Differences in the length of oesophagus and intestinal caecum, distance of excretory pore from anterior end and tail were observed in relation to larvae of *P. reticulatum*, *P. crassum*, *P. semiteres* and *P. ensicaudatum*. As MORAVEC (1994) have related, its biology involves fish-eating birds (mainly herons) as definitive hosts. By the fact that the adult nematodes of these species occur in birds, in the present work was not possible the specific identification. Nevertheless, male and female of *P. draschei* (BAYLIS, 1927) and *P. paivai* (MOTTA and GOMES, 1968) were found in the stomach and intestines of *Arapaima gigas* and *Scomberomorus cavalla*, respectively.

The presence of nematodes in the intestines of cultured *P. mesopotamicus* is common and can be related to *Rondonia rondoni* TRAVASSOS , 1919 (MARTINS and URBINATI (1993); PARRA *et al*., 1997). In this case parasites were normally present without cause abnormalities on behavior of the host. The importance of this work is emphasized by the fact that this is the most cultivated fish in the States of São Paulo and Minas Gerais. When fish is submitted to stressful situations like high stocking density may occur proliferation of opportunistic parasites and reduced disease resistance is also observed (HEDRICK, 1998; MARTINS *et al*., 2002). Differential count of leukocytes was according to the normal parameters observed by TAVARES-DIAS *et al*. (2002) in the same fish.

Moreover, this work relates a new host for larvae of *Porrocaecum* sp. and emphasize their presence in cultured freshwater fish, eventhough the haematological characteristics were normal.

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