



First case of an infection of the metacercariae of *Austrodiplostomum compactum* (Lutz, 1928) (Digenea, Diplostomidae) in *Hypostomus regani* (Ihering, 1905) (Siluriformes: Loricariidae)

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Abstract. *Austrodiplostomum compactum* (Lutz, 1928) (Digenea, Diplostomidae) was recorded infecting the eyes of a *Hypostomus regani* (Ihering, 1905) (Siluriformes: Loricariidae). This is the first report of a loricarid fish infected with *A. compactum*.

Key words: fish disease, diplostomid infection, new host, helminthology, Trematoda.

Resumo: Primeiro caso de infecção por metacercárias de *Austrodiplostomum compactum* (Lutz, 1928) (Digenea, Diplostomidae) em *Hypostomus regani* (Ihering, 1905) (Siluriformes: Loricariidae). Relata-se a ocorrência de *Austrodiplostomum compactum* (Lutz, 1928) (Digenea, Diplostomidae) no olho de *Hypostomus regani* (Ihering, 1905) (Siluriformes: Loricariidae). Este é o primeiro registro de *A. compactum* infectando peixes da família Loricariidae.

Palavras-chave: doença em peixe, infecção por diplostomídeo, novo hospedeiro, helmintologia, Trematoda.

Austrodiplostomum compactum (Lutz, 1928) (Niewiadomska 2002a,b) has been previously reported in *Plagioscion squamosissimus* (Heckel, 1840), *Cichla ocellaris* (Schneider, 1801), *Cichla monoculus* Spix, 1831, *Crenicichla britskii* Kullander, 1982, *Cichlasoma paranaense* Kullander, 1983, *Hoplias malabaricus* (Bloch, 1794), *Satanoperca pappaterra* (Heckel, 1840) and *Geophagus brasiliensis* (Quoy & Gaimard, 1824) (see Machado *et al.* 2005 and references therein, Novaes *et al.* 2006) in Brazil. However, there are no reports on the occurrence of the metacercariae of this species infecting fishes in *Hypostomus* Lacépède, 1803. The aim of this study is to report the infection case of the metacercariae of *A. compactum* in the eyes of *Hypostomus regani* (Ihering, 1905).

The fish was collected on January 9, 2007, in the reservoir of Chavantes (23°43'36.32" S 049°43'52.94" W), medium Paranapanema river,

municipality of Fartura, São Paulo State, Brazil. Eighteen metacercariae (Figures 1 and 2) were removed from the vitreous humor and fixed in AFA solution under cover slip pressure. Ten specimens were stained with carmine and analyzed using a computerized system for image analysis (Qwin Lite 3.1 – Leica). The voucher specimens were deposited in the Coleção Helmintológica (CHIBB) of the Departamento de Parasitologia, Instituto de Biociências, Universidade Estadual Paulista - UNESP, Botucatu city, São Paulo State, Brazil, under register number CHIBB 3213.

The main characteristics of the observed metacercariae were: foliaceous body, slightly concave in the ventral face 1988 (1570-2281) µm long, 756 (543-864) µm wide; small conical segment in the posterior region 179 (73-335) µm long; small subterminal oral sucker 91 (69-102) µm long, 84 (75-99) µm wide; two lateral pseudosuckers in the anterior region – one 132 (93-148) µm long, 118

(68-157) μm wide and the other 131 (78-168) μm long, 119 (85-146) μm wide; oval pharynx, 73 (57-85) μm long, 64 (57-80) μm wide; esophagus, 111 (86-139) μm long; intestinal caeca ending near the posterior region; oval tribocytic

organ 373 (287-414) μm long, 243 (178-310) μm wide; gland cells occupying most of anterior region, extending from the beginning of intestinal caeca in the anterior region to the tribocytic organ (Figure 2).

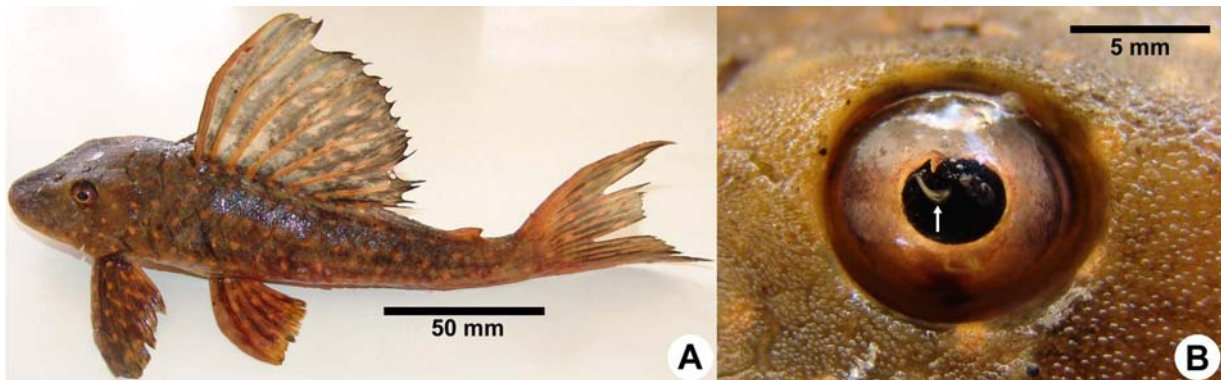


Figure 1. Metacercaria of *Austrodiplostomum compactum* (Lutz, 1928) Dubois, 1970 (Diplostomidae) in a specimen of *Hypostomus regani* (Ihering, 1905) (Loricariidae) from Chavantes reservoir, medium Paranapanema river, São Paulo State, Brazil. A) general view of the infected host; B) detail of a metacercaria of *A. compactum* in the eyes of the infected host (white arrow).

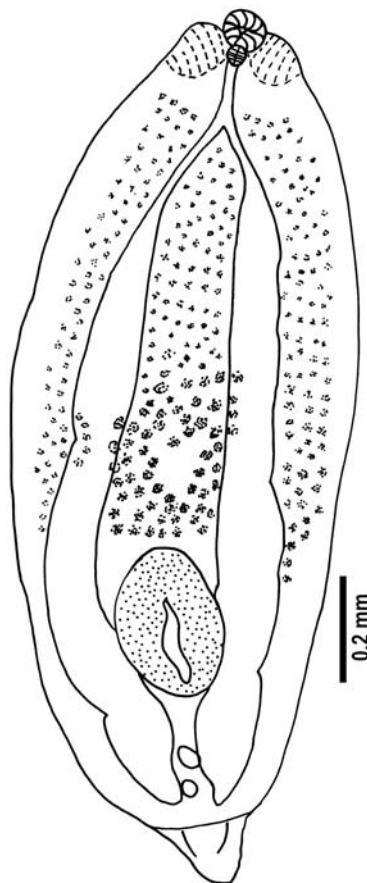


Figure 2. Metacercaria of *Austrodiplostomum compactum* (Lutz, 1928) Dubois, 1970 (Diplostomidae) found in the eye of *Hypostomus regani* (Ihering, 1905) (Loricariidae) from Chavantes reservoir, medium Paranapanema river, São Paulo State, Brazil.

Some studies have demonstrated that *P. squamosissimus* is highly susceptible to infection by *A. compactum* and the observed prevalence was higher than 90% while in *C. ocellaris* the prevalence

was lower (Santos *et al.* 2002). Kohn *et al.* (1995) found this infection in 100% of *P. squamosissimus* from the Paraná river. Machado *et al.* (2005) reported *A. compactum* infection in six fish species

from the Paraná river floodplain and the prevalence varied from 11.11 to 95.06% with the highest and lowest prevalence observed in *P. squamosissimus* and *H. malabaricus*, respectively.

These data demonstrate that infection by the metacercariae of *A. compactum* is frequently high but rarely observed in loricariid fishes. Amato *et al.* (2001) reported the only case of diplostomid metacercariae of an undetermined species found over and in the kidney ducts, over the liver and the peritoneum, in the abdominal cavity and in the brain of *Loricariichthys anus* (Valenciennes, 1840) from Rio Grande do Sul State, Brazil. *Hypostomus regani* is a new host recorded for *A. compactum*.

Austrodiplostomum compactum is generally located in the vitreous humor, but some larvae can also be found parasitizing the aqueous humor (Garcia *et al.* 1993) and the brain of their hosts (Conroy *et al.* 1985, Pineda-López 1985). According to Eiras (1994), the presence of this parasite in the eyes can cause blindness or harm vision, making the fish susceptible to predation that facilitates transmission of the parasite to the definitive host. For the diplostomids of *H. regani*, as the infection was observed in only one specimen, histopathological analyses were not accomplished. However, no morphological changes were noted by macroscopical examination.

Austrodiplostomum compactum metacercariae were found in the eyes of *H. regani* from the Chavantes reservoir, medim Paranapanema river. More than two thousand fish species have been described in Brazil (Buckup *et al.* 2007), however, only a few of them have been recorded as hosts for these metacercariae (Machado *et al.* 2005 and references therein, Novaes *et al.* 2006). These data suggest that other environmental features or the genetics of the hosts can contribute for the host-parasite interaction, in order to facilitate the infection for some fish species better than for others.

The species previously reported as hosts for *A. compactum* are mainly included in the Order Perciformes. *Hoplias malabaricus* is the only species of another order (Characiformes) parasitized by these diplostomid metacercariae. Pojmanska & Chabros (1993) demonstrated that the prevalence of diplostomids was significantly lower in native fishes and higher for the introduced species. These data were also observed by Machado *et al.* (2005) in Brazil. Probably, this metacercaria species was

introduced together with the hosts and has utilized native fish as the second intermediate hosts (Machado *et al.* 2005). The loricariid fishes are not phylogenetically related to Perciformes and

Characiformes. Thus, we suggest that the infection by metacercariae of *A. compactum* in these fishes may be associated with an environmental factor. Since the first intermediate host is an aquatic snail and the loricariid specimens are usually bottom fishes, the infection can occur because both use the same habitats, which increase the possibility of the encounter between host and parasite.

Species of *Biomphalaria* Preston, 1910 have aquatic environments with muddy or stony, shallow river-beds, with vegetation rooted closer to the banks as their preferential habitats (Neves *et al.* 2005). Lutz (1928) *apud* Amarista *et al.* (2001) observed that *B. prona* could be found on aquatic plants such as *Potamogeton* sp. Linnaeus, 1753 and species of Characeae Linnaeus, 1763. Amarista *et al.* (2001) reported that this mollusk was observed on *Eichhornia crassipes* (Martius, 1823) Solomons-Laubach, 1883 (Pontederiaceae Kunth), but it was more frequent on sandy and stony substrata. The fishes previously reported as hosts for metacercariae of *A. compactum*, occupy the same habitat, at least in some stage of their biological cycle, or use it as site for food intake (*P. squamosissimus*, *C. monoculus*, *C. britski* and *H. malabaricus*) (Almeida *et al.* 1997, Novaes *et al.* 2004) or as shelter for young specimens (*G. brasiliensis* and *C. paranaense*) (Bialetzki *et al.* 2002). *Hypostomus regani* also occupies these areas of the reservoir as a place for food and refuge (Delariva & Agostinho 2001). We conclude that all host species, including *H. regani*, are exposed to infection by *A. compactum* in that habitat, which would explain the eye infection only in a few fish species of the reservoir. Further studies will be carried out to investigate the prevalence of this infection in *Hypostomus* species in the reservoir at Chavantes, São Paulo State, Brazil.

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