

Digenetic trematode parasites of *Loricariichthys platymetopon* (Loricariidae, Siluriformes) of the upper Paraná river floodplain, Brazil

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ABSTRACT. Two species of digenetic trematodes were found to parasitize *Loricariichthys platymetopon* Isbrücker & Nijssen, 1979, collected at the Upper Paraná River floodplain, Brazil. *Crocodilicola pseudostoma* was found in the digestive tract and *Clinostomum complanatum* occurred on the surface of the body. This is the first record of *Crocodilicola pseudostoma* in this host.

Key words: *Crocodilicola pseudostoma*, *Clinostomum complanatum*, Proterodiplostomidae, Clinostomidae, *Loricariichthys platymetopon*, Paraná river.

RESUMO. Trematódeos digenéticos parasitas de *Loricariichthys platymetopon* (Loricariidae, Siluriformes) da planície de inundação do alto rio Paraná, Brasil. Este trabalho apresenta o registro de duas espécies de trematódeos digenéticos parasitas de *Loricariichthys platymetopon* Isbrücker and Nijssen, 1979, coletados na planície de inundação do Alto rio Paraná, Brasil. Foi registrada a presença de *Crocodilicola pseudostoma* no trato intestinal e *Clinostomum complanatum* encontrado na superfície do corpo. *Crocodilicola pseudostoma* é registrado pela primeira vez neste hospedeiro.

Palavras-chave: *Crocodilicola pseudostoma*, *Clinostomum complanatum*, Proterodiplostomidae, Clinostomidae, *Loricariichthys platymetopon*, rio Paraná.

Introduction

Loricariichthys platymetopon Isbrücker and Nijssen, 1979, known commonly as “cascudo-chinelo”, occurs in the Prata and Solimões basins (Dei Tós *et al.*, 1997). Following closure of the Itaipu Reservoir, *L. platymetopon* colonized the Upper Paraná River, and is currently the most abundant fish species encountered in the floodplain (Agostinho *et al.*, 1997). Cascudo-chinelo serves as food for fish, mammals and birds, thereby functioning as an intermediate host. Previous studies have registered cestode larvae (Schaffer *et al.*, 1992), one species of trypanosome (Eiras and Pavanelli, 1995), metacercariae of *Clinostomum complanatum* Rudolphi, 1814 (Dias, 2002) and the nematode *Raphidascaris* (*Sprentascaris*) *mahnerti* (Petter and Cassone, 1984) (Moravec, 1998; Fortes *et al.*, 1999). This study registers the occurrence of *Crocodilicola pseudostoma* and *Clinostomum complanatum* in *L. platymetopon* of the upper Paraná

river floodplain, Brazil.

Materials and methods

Between March and December 2004, 152 specimens of *Loricariichthys platymetopon* were collected in quarterly samplings in the upper Paraná river floodplain, Brazil (22°50'–22°70'S and 53°15'–53°40'W). Specimens were identified, examined exteriorly and necropsied. All digeneans encountered were collected, fixed and prepared according to Eiras *et al.* (2006). Parasites were identified following Conroy (1986), Eiras *et al.* (1999), Dias (2002) and Dias *et al.* (2003). Standardized morphological measurements were made using an ocular micrometer lens. Mean values in micrometers are presented for each morphological measurement, with the number of specimens measured (n) and range of observed measures given in parentheses. A Nikon YS 2 microscope and drawing tube were used for illustrations. The terminology used throughout this study is according to Bush *et al.* (1997).

Results

Proterodiplostomidae Dubois, 1936

Crocodilicola Poche, 1926

Crocodilicola pseudostoma (Willemoes-Suhm, 1870) Poche, 1925

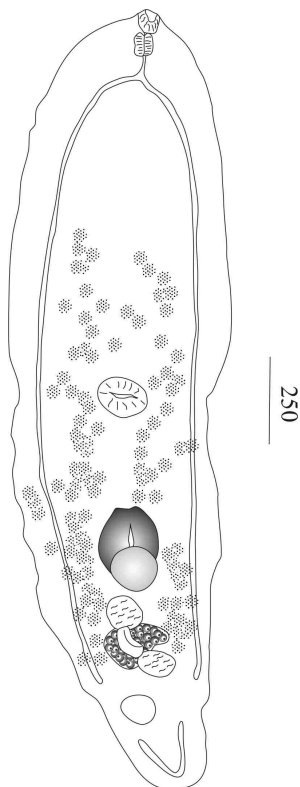


Figure 1. *Crocodilicola pseudostoma* (Willemoes-Suhm, 1870) Poche, 1925 parasite of *Loricariichthys platymetopon* Isbrücker and Nijssen, 1979, of the upper Paraná river floodplain, Brazil.

Measurements [based on 8 specimens] Body elongated, slightly flattened, 2,364 (2,075-2,575; n = 7) long and 662 (500-800; n = 8) wide. Oral sucker small, subterminal, 64 (60-70; n = 5) long and 58 (50-70; n = 6) wide. Prepharynx absent. Pharynx short, 56 (50-70; n = 6) long and 55 (50-60; n = 6) wide. Intestinal caeca extending dorsally to near posterior testis. Acetabulum oval, bigger than oral sucker, 124 (110-150; n = 8) long and 145 (110-190; n = 8) wide. Oval tribocytic organ located behind the acetabulum, 206 (170-260; n = 8) long and 182 (150-230; n = 8) wide. The prostate gland was found in the posterior edge of the tribocytic organ. Ovary between testes, 97 (70-120; n = 7) long and 85 (60-110; n = 7) wide. Few large yellow eggs 96 (80-120; n = 6) long and 74 (50-80; n = 6) wide. Few vitellaria developed. Testes nearly symmetrical, behind tribocytic organ. Anterior testis 82 (70-100; n

= 4) long and 172 (160-180; n = 4) wide, and posterior testis 70 (50-90; n = 4) long and 145 (110-200; n = 4) wide.

Host: *Loricariichthys platymetopon* Isbrücker and Nijssen, 1979.

Locality: upper Paraná river floodplain, Brazil.

Site of infection: digestive tract.

Prevalence: 5.92%

Mean intensity: 1.89

Remarks

Genus *Crocodilicola* is considered a digestive tract parasite of alligators and crocodiles in North, Central and South America (Conroy, 1986). Adults of *Crocodilicola pseudostoma* have also been registered in at least three fish species. Conroy (1986) found *C. pseudostoma* in *Rhamdia hilarii*, presenting the same characteristics as the specimens found in this study. This parasite species was also registered in *Hemisorubim platyrhynchus* of the upper Paraná river floodplain, Brazil by Guidelli *et al.* (2003), and in *Rhamdia guatemalensis* in México by Pérez-Ponce de Leon *et al.* (1992). This study is the first record of *Crocodilicola pseudostoma* in *L. platymetopon*, as well as the first record of any adult digenea in this host species.

Clinostomidae (Lühe, 1901)

Clinostomum (Leidy, 1856)

Clinostomum complanatum Rudolphi, 1814

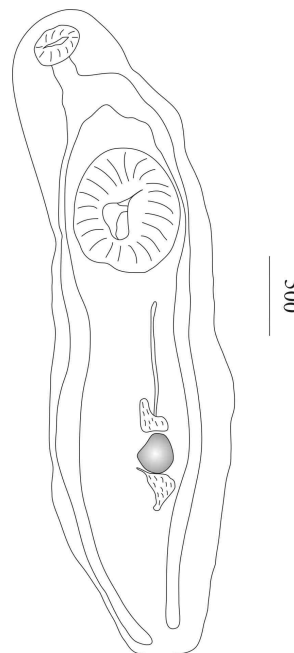


Figure 2. *Clinostomum complanatum* Rudolphi, 1814 parasite of *Loricariichthys platymetopon* Isbrücker and Nijssen, 1979, of the upper Paraná river floodplain, Brazil.

Measurements [based on 8 specimens] (metacercariae) Body elongated, 6,650 (6,300-8,200; n=8) long and 2,490 (2,380-2,630; n=8) wide. Oral sucker small, subterminal, 366 (350-390; n=8) long and 340 (280-400; n=8) wide. Acetabulum 1,070 (1,020-1,110; n=8) long and 980 (950-1,020; n=8) wide.

Host: *Loricariichthys platymetopon* Isbrücker and Nijssen, 1979.

Locality: upper Paraná river floodplain, Brazil.

Site of infection: surface of the body.

Prevalence: 26.31%

Mean intensity: 10.05

Remarks

This species was previously registered for *Loricariichthys platymetopon* in the upper Paraná river floodplain by Eiras *et al.* (1999), Dias (2002) and Dias *et al.* (2003), presenting similar morphology as the specimens found in this study. Metacercariae of *C. complanatum* have been registered on other fish species from the Paraná River floodplain, including *Hoplias* aff. *malabaricus*, *Gymnotus carapo*, *Parauchenipterus galeatus* and *Hoplosternum littorale* (Pavanelli *et al.*, 2004). The life-cycle of this parasite in the Paraná River floodplain was studied by Dias *et al.* (2003). Mollusks (e.g. *Biomphalaria peregrina*) are the first intermediate host, fish the second intermediate host, and birds (e.g. *Ardea cocoi*) are definitive hosts. All these hosts are abundant in the Paraná river floodplain, favoring development of *C. complanatum*.

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References

AGOSTINHO, A.A. *et al.* Composição, abundância e distribuição espaço-temporal da ictiofauna. In: VAZZOLER, A.E.A.M. *et al.* (Ed.). *A planície de inundação do alto rio Paraná: aspectos físicos, biológicos e econômicos*. Maringá: Eduem, 1997. p. 179-208.

BUSH, A.O. *et al.* Parasitology meets ecology on its own terms: Margolis *et al.* revisited. *J. Parasitol.*, Lawrence, v. 83, p. 575-583, 1997.

CONROY, G.A. *Crocodilicola pseudostoma* (Willemoes-Suhm, 1870) Poche, 1925 (Trematoda: Proterodiplostomatidae), endoparasito del bagre pimelódido *Rhamdia hilarii* Val., 1840 del Estado de São Paulo, Brasil. *Rev. Iber. Parasitol.*, Madri, v. 46, p. 35-38, 1986.

DEI TÓS, C. *et al.* Population structure and reproductive biology of *Loricariichthys platymetopon* (Siluriformes, Pisces) in the upper River Paraná. *Braz. Arch. Biol. Technol.*, Curitiba, v. 40, p. 793-807, 1997.

DIAS, M.L.G.G. *Ciclo de vida e aspectos ecológicos Clinostomum complanatum* (Rudolphi, 1814) (Trematoda: Clinostomidae). 2002. Tese (Doutorado em Ciências Ambientais)–Universidade Estadual de Maringá, Maringá, 2002.

DIAS, M.L.G.G. *et al.* The life cycle of *Clinostomum complanatum* Rudolphi, 1814 (Digenea, Clinostomidae) on the floodplain of the high Paraná river, Brazil. *Parasitol. Res.*, Berlin, v. 89, p. 506-508, 2003.

EIRAS, J.C. *et al.* Histological studies on the effects of *Clinostomum marginatum* (Digenea, Clinostomidae) in its second intermediate host *Loricariichthys platymetopon* (Osteichthyes, Loricariidae) of the upper Paraná river, Brazil. *Acta Sci. Biol. Sci.*, Maringá, v. 21, p. 237-241, 1999.

EIRAS, J.C. *et al.* *Métodos de estudo e técnicas laboratoriais em parasitologia de peixes*. 2. ed. Maringá: Eduem, 2006.

EIRAS, J.C.; PAVANELLI, G.C. *Trypanossoma* spp. (Protozoa, Kinetoplastida) parasitas de peixes do rio Paraná (Porto Rico), PR, Brasil. *Acta Parasitol. Port.*, Lisboa, v. 2, p. 75-77, 1995.

FORTES, E. *et al.* Presença de *Raphidascaris* (*Sprentascaris*) *mahnerti* (Petter et Cassone, 1984) Nematoda, Anisakidae em *Loricariichthys platymetopon* (cascudo viola), da bacia do rio Uruguai médio, Uruguaiana, Rio Grande do Sul, Brasil. *Rev. Bras. Med. Vet.*, São Paulo, v. 21, p. 13-14, 1999.

GUIDELLI, G.M. *et al.* Endoparasite infracommunities of *Hemisorubim platyrhynchos* (Valenciennes, 1840) (Pisces: Pimelodidae) of the Baía river, upper Paraná river floodplain, Brazil: specific composition and ecological aspects. *Braz. J. Biol.*, São Carlos, v. 63, p. 261-268, 2003.

MORAVEC F. *Nematodes of freshwater fishes on the neotropical region*. Ceské Budejovice, Czech Republic: Academia, 1998.

PAVANELLI, G.C. *et al.* Helminth fauna of fishes: diversity and ecological aspects In: THOMAZ, S.M. *et al.* (Ed.). *The upper Paraná river and its floodplain: physical aspects, ecology and conservation*. Leiden: Backhuys Publishers, 2004. p. 309-329.

PÉREZ-PONCE DE LEON, G. *et al.* Helminthofauna del “juile” *Rhamdia guatemalensis* (Pisces: Pimelodidae), del lago de Catemaco, Veracruz. *Rev. Soc. Mex. Hist. Nat.*, México, D.F., v. 43, p. 25-31, 1992.

SCHAEFFER, G.V. *et al.* Peritoneal and visceral cestode larvae in Brazilian freshwater fishes. *Mem. Inst. Oswaldo Cruz*, Rio de Janeiro, v. 87, p. 257-258, 1992.

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