FIRST REPORT OF DIGENEANS: CLINOSTOMIDAE METACERCARIA INFECTING PIRAPITINGA IN THE STATE OF ACRE, BRASIL

PRIMEIRO RELATO DE DIGENEANS: METACERCARIA DE CLINOSTOMIDAE INFECTANDO PIRAPITINGA NO ESTADO DO ACRE, BRASIL

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ABSTRACT

This article presents the first report of *Clinostomum* sp. infecting *Piaractus brachypomus* in Acre. Specimens of *Clinostomum* sp. were identified in fish cultured in fish farming in the rural municipality of Bujari, Acre. This was the first report of *Piaractus brachypomus* as secondary host of *Clinostomum* sp. in the state of Acre, being another parasite with zoonotic potential in it. A greater extent of occurrence of *Clinostomum* sp. in Brazil was verified.

Keywords: *Piaractus brachypomus*, fish, parasite, distribution.

The gender *Clinostomum* Leidy, 1956 is a Digeneans, whose life cycle begins when the host birds of the adult parasite eliminate the embryonated eggs in water, mixed with the stool (PAVENELLI et al. 2015). The eggs begin their cycle in the first intermediate host, particularly molluscs and snails [1]. Then, the parasite cercariae eliminated by the first host, enter the second intermediate hosts, mainly fish, amphibians and reptiles [1,2], becoming metacercariae, completing its cycle in the body of birds that feed on these secondary hosts, closing the cycle as definitive host [2].

The first report of occurrence of *Clinostomum* spp. in fish in Brazil occurred in 1981 [3], when in the analysis of *Cichla ocellaris* and *Crenicichla* sp. samples, metacercariae of *Clinostomum complanatum* were found, being the latest reports occurred in 2013 and 2015, identified as *Clinostomum heluans* and *Clinostomum* sp., respectively in samples of *Geophagus proximus* [4] and *Sciades props* [5]. In Brazil, the occurrence of *Clinostomum* spp. has been reported in form of metacercaria, in 36 species of freshwater fish and estuary, as intermediate hosts [6].

This study aims to present the first report, in Acre state, of *Clinostomum* sp. infecting *Piaractus brachypomus*.

Specimens of *P. brachypomus* were collected in the municipality of Bujari, Acre state, Brazil, in March 2015, where they found 11 samples of *Clinostomum* sp. the musculature of nine individuals of *P. brachypomus* processed in Atenção à Vida Silvestre Laboratory at the Federal University of Acre. The fish were required from a fish farm located at BR 364, km 51, municipality of Bujari, Acre, Brazil (lat. 9°75'71''S, long. 68°07'37''W). The parasites were found at the completion of ecotoxicology research, which had a total of 210 individuals of *P. brachypomus* having a parasitaemia by *Clinostomum* sp. of 5.2%.

The taxonomic classification of parasites occurred in Tropical Medicine Laboratory at the Federal University of Acre following the standard described by Thatcher [3], through the morphological characteristics viewed in optical microscope, with 40x magnification (Figure 1), restricting on gender level, considering the great interspecific morphological similarity between the species *Clinostomum* sp. The main features observed were oval-elongated body with concave ventral anterior, small oral sucker and ventral sucker.

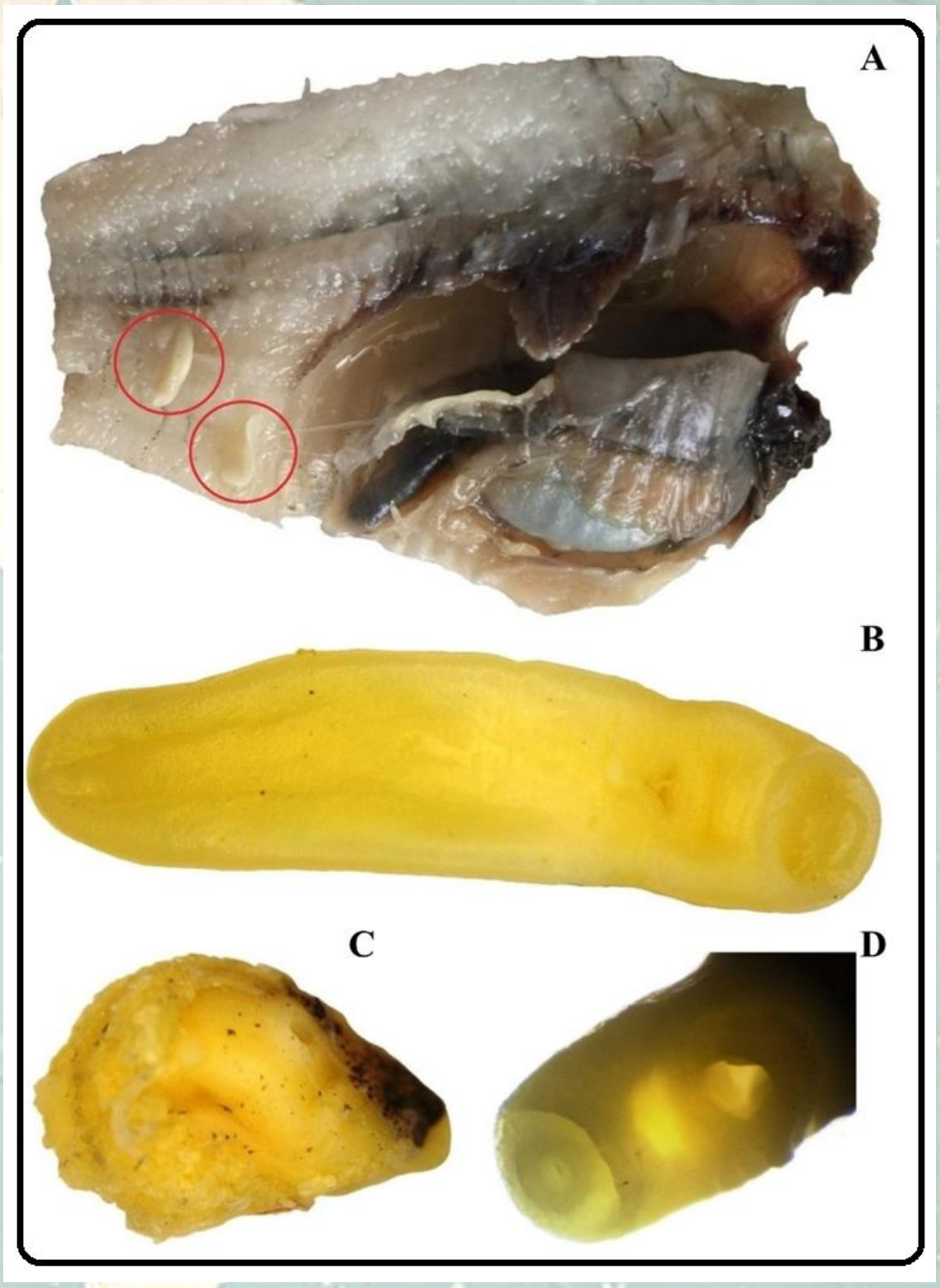

Figure 1. Larvae of *Clinostomum* sp. A) *Clinostomum* sp. in caudal skeletal muscle of *Piaractus brachypomus*. B) Metacercaria of *Clinostomum* sp. C) Cysts of *Clinostomum* sp. D) Small oral sucker and ventral sucker of *Clinostomum* sp. This figure is in color in the electronic version.

The parasitism occurred in skeletal muscle of the fish, unlike the one reported in the state of Pará, where they found metacercariae parasitizing the intestine of *P. brachypomus* [7], reinforcing the researchers and health authorities' attention, as it is becoming common to use fish in the Amazon region in the production of sashimi, and that may parasitize humans.

The man became accidental host of this helminth after ingestion of raw fish, and his first report occurred in Japan in 1930 [8]. Currently, there have been cases found in Korea [9] and Israel [10], having the same symptoms of discomfort and sore throat, since the parasite binds to the mucosal membrane of it, producing the Halzoun syndrome [3,10].

In 1999, the first occurrence of *Clinostomum* sp. in human eyes was described, it was found in a person in Thailand, after complaining of pain in the frontal sinus region, where the ophthalmological examination revealed a white spot at the bottom of the lid, when removed, it allowed the identification of the helminth [11].

Despite not having records of parasitism in humans by *Clinostomum* sp. in Brazil, this hypothesis can not be ruled out, as in the Amazon region is common for children to ingest small raw fish believing that they will learn how to swim [12], similar cases have occurred with the ingestion of fish infected by nematodes [13,14].

With the confirmation of the occurrence of *Clinostomum* sp. in the state of Acre, the geographic distribution of *Clinostomum* sp. extends to the country in about 1,200 km from the nearest record, Manaus, Amazonas [3].

In this way and due to the lack of knowledge about the occurrence of this kind of parasite in Acre and nearby, besides the fact that samples have been found in fish sold for human consumption, it is evident the need to expand the study of this genre, in addition to studies of its zoonotic potential.

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REFERENCES

[1]. PINTO, H.A. CAFFARA, M; FIORAVANTI, M.L; MELO, A.L. Experimental and molecular study of cercariae of *Clinostomum* sp. (Trematoda: Clinostomidae) from *Biomphalaria* spp. (Mollusca: Planorbidae) in Brazil. **Journal of Parasitology**. v.101, n.1, p.108-113, 2015.

[2]. PAVANELLI, G.C; EIRAS, J.C; YAMAGUCHI, U.M; TAKEMOTO R.M. **Zoonoses humanas transmissíveis por peixes no Brasil**. Maringá: UniCesumar, 2015, 145p.

[3]. THATCHER, V.E. Patologia de peixes da Amazônia Brasileira, 1. Aspectos gerais. **Acta Amazonica**, v.11, n.1, p. 125–140, 1981.

[4]. ZAGO, A.C; FRANCESCHINI, L; ZOCOLLER-SENO, M.C; VERÍSSIMO SILVEIRA, R; MAIA, A.A.D; IKEFUTI, C.V; SILVA. R. J. The helminth community of *Geophagus proximus* (Perciformes: Cichlidae) from a tributary of the Paraná River, Ilha Solteira Reservoir, São Paulo State, Brazil. **Journal of Helminthology,** v. 87, n. 2, p.203–211, 2013.

[5]. CARVALHO, R.P.S; TAKEMOTO, R.M; MELO, C.M; JERALDO, V.L.S; MADI, R.R. Structure of the parasite infracommunity of *Sciades proops* from the Japaratuba River Estuary, Sergipe, Brazil. **Brazilian Journal of Biology,** v. 75, n.4, p. 906-913, 2015.

[6]. ACOSTA, A.A; CAFFARA, M; FIORAVANTI, M.L; UTSUNOMIA, R; ZAGO, A.C; FRANCESCHINI, L; SILVA, R.J. Morphological and molecular characterization of *Clinostomum detruncatum* (Trematoda: Clinostomidae) metacercariae indecting *Synbranchus marmoratus*. **Journal of Parasitology**, v.102, n.1, p.151-156, 2016.

[7]. OLIVEIRA, M.S.B; TAVARES-DIAS, M. Communities of parasite metazoans in *Piaractus brachypomus* (Pisces, Serrasalmidae) in the lower Amazon River (Brazil). **Brazilian Journal of Veterinary Parasitology,** v. 25, n.2, p.151-157, 2016.

[8]. YAMASHITA, J. *Clinostomum complanatum*, a trematode parasite new to man. **Annotationes Zoologicae Japanenses**, v.17, n.3-4, p.563-566, 1938.

[9]. CHUNG, D.I.; MOON, C.H; KONG, H.H; CHOIN, D.W; LIM D.K. The first human case of *Clinostomum complanatum* (Trematoda: Clinostomidae) infection in Korea. **Korean Journal of Parasitology**, v. 33, n.3, p.219-223, 1995.

[10]. WITENBERG, G. What is the cause of the parasitic laryngo-pharyngitis in the Near East ("Halzoun")? **Acta Medica Orientalia (Jerusalem)**, v.3, n.6, p.191-192, 1944.

[11] TIEWCHALOERN, S; UDOMKIJDECHA, S; SUVOUTTHO, S; CHUNCHAMSRI, K; WAIKAGUL, J. *Clinostomum trematoda* from human eye. **Southeast Asian Journal of Tropical Medicine and Public Health**, v. 30, n.2, p. 382-384, 1999.

[12] MENEGUETTI, D.U.O; LARAY, M.P.O; CAMARGO, L.M.A. Primeiro relato de larvas de *Eustrongylides* sp. (Nematoda: Dioctophymatidae) em *Hoplias malabaricus* (Characiforme: Erythrinidae) no Estado de Rondônia, Amazônia Ocidental, Brasil. **Revista Pan-Amazônica de Saúde**, v. 4, n.3, p.55-58, 2013.

[13] EBERHARD, M.L; HURWITZ, H; SON, A.M; COLETTA, D. Intestinal perforation caused by larval *Eustrongylides* (Nematoda: Dioctoplymatoidae) in New Jersey. **American Journal of Tropical Medicine and Hygiene**, v. 40, n.6, p. 648-650, 1989.

[14] NARR, L.L; O'DONNELL, J.G; LIBSTER, B; ALESSI, P; ABRAHAM, D. Eustrongylidiasis: a parasitic infection acquired by eating live minnows. **Journal of the American Osteopathic Association**, v. 96, n.7, p.400-402, 1996.