Sanguinicola platyrhynchi n. sp. (DIGENEA: SANGUINICOLIDAE) PARASITE OF VISCERAL CAVITY OF *Hemisorubim platyrhynchos* (VALENCIENNES, 1840) (PISCES: PIMELODIDAE) FROM THE FLOODPLAIN OF THE UPPER PARANÁ RIVER, BRAZIL

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ABSTRACT

A new species is of the genus *Sanguinicola* Plehn, 1905 described, *Sanguinicola platyrhynchi* n. sp., digenetic parasite of visceral cavity of *Hemisorubim platyrhynchos* (Valenciennes, 1840) from the floodplain of the upper Paraná River, Brazil. The species has been thus included because of the presence of separate dorsal genital pores, while differing from other species of the same genus mainly in digestive apparatus features, genital pore position, and infection site. Emendation of generic diagnosis is included.

Key words: *Sanguinicola*, *Sanguinicola platyrhynchi* n. sp., visceral cavity, *Hemisorubim platyrhynchos*, Baía River.

RESUMO

Sanguinicola platyrhynchi n. sp. (Digenea: Sanguinicolidae), parasita da cavidade visceral de _Hemisorubim platyrhynchos_ (Valenciennes, 1840) (Pisces: Pimelodidae) da planície de inundação do alto rio Paraná, Brasil

É descrita uma nova espécie do gênero *Sanguinicola* Plehn, 1905, *Sanguinicola platyrhynchi* n. sp., digenético parasita da cavidade visceral de *Hemisorubim platyrhynchos* (Valenciennes, 1840), da planície de inundação do alto rio Paraná, Brasil. A nova espécie foi incluída neste gênero por possuir poros genitais separados e dorsais e diferir de outras espécies do mesmo gênero, principalmente pelas características do sistema digestório, da posição dos poros genitais e do local de infecção. É realizada uma emenda da diagnose genérica.

Palavras-chave: *Sanguinicola, Sanguinicola platyrhynchi* n. sp., cavidade visceral, *Hemisorubim platyrhynchos*, rio Baía.

INTRODUCTION

The host *Hemisorubim platyrhynchos* is a fish of the Pimelodidae family, widely distributed in the great rivers of South America, from the Orinoco to the basin of the Plata (Burgess, 1989).

Sanguinicola platyrhynchi n. sp. is a digenetic parasite of visceral cavity of *H. platyrhynchos* from the floodplain of the upper Paraná River, Brazil. Species of this genus are commonly found in the vascular system of marine and freshwater fishes and are amply distributed

world-wide (Yamaguti, 1958; Thatcher, 1993). In the South America Thatcher (1993) mentioned the occurrence of a species, *S. argentinensis*, a parasite of freshwater fishes in Argentina. Based on digestive apparatus features and infection site, an emendment of generic diagnosis is made.

MATERIAL AND METHODS

Specimens of *Hemisorubim platyrhynchos* were caught in the Baía River, on the floodplain of the upper Paraná River, State of Mato Grosso do Sul. Digenetics were removed and fixed in 5% formalin, stained in Hematoxilin or Langeron's Chloridric Carmine, and mounted in Canada balsam (Eiras *et al.*, 2000). Specimens destined for scanning electron micrographs (SEM) were fixed in 3% glutaraldehyde, buffered with 0.2M sodium cacodylate to pH 7.4 at approximately 7ºC, dehydrated in ethanol, dried by using the critical point technique, covered with gold, and examined with a Phillips SEM 505 electron microscope. The drawing was done with a drawing tube in a Nikon Alphaphot-2 microscope. Measurements (average and range appear inside brackets) are in millimeters. Term prevalence, mean intensity, and mean abundance of infection are used in accordance with Bush *et al*. (1997). Holotype and paratypes were deposited in the Helminthological Collection of Oswaldo Cruz Institute (CHIOC) under numbers 34360, 34361 a-b.

RESULTS

Family Sanguinicolidae Graff, 1907
Subfamily Sanguinicolinae Yamaguti, 1958
Sanguinicola Plehn, 1905
emended from Yamaguti, 1971

Generic diagnosis: Body is lanceolate, tegument with or without fine marginal striations and with or without denticulations, except for the extremities, from which the anterior may protrude in form of a proboscis. It sometimes presents a small muscular structure under the mouth. Esophagus is long, may present a fusiform swelling. Intestine is divided in 4 to 6 branches. Tests in two rows in median field between ovary and intestinal ceca. Cirrus pouch is present. Male genital pore is dorsal, median, submedian, or near posterior extremity. Ovary is divided into symmetrical lobes in the posterior half of body. Uterus is poorly developed, containing only one egg at a time, opening besides or anterior to male pore. Eggs with lateral projection, contain miracidia. Vitellaria are lateral to esophagus, intestine, and tests, and sometimes lateral and posterior to ovary; vitelline duct joins oviduct just before ootype is formed. It parasitic in the vascular system or visceral cavity of freshwater fishes.

Type species: *Sanguinicola inermis* Plehn, 1905, in heart and gills of *Cyprinus carpio,* Europe.

Other species: *Sanguinicola argentinensis* Szidat, 1951 of *Prochilodus platensis* from Argentina; *S. armatus* Plehn*,* 1905 of *Tinca tinca* from Germany; *S. chalmersi* Odhner, 1924 of *Alchenoglanis occidentalis*, *Synodontes schall* from Sudan; *S. cristafer* (Erickson & Wallace, 1959) of *Notropis heterolepis*; *S. dentatus* (Paperna, 1964) Smith 1972 of *Clarias lazera* from Israel; *S. huronis* Fischthal, 1949 of *Huro salmoides*, *Micropterus d. dolomieu* from Wisconsin; *S. incognita* Akhmerov, 1959 of *Ctenopharyngodon idella* from RSFSR; *S. intermedius* Ejsmont, 1926 of *Tinca* spp., *Carassius* spp., *Cyprinus* spp. from Europe; *S. lophophorus* Erickson & Wallace, 1959 of *Notropis hudsonius* from Minnesota; *S. magnus* Hu, Long & Lee, 1965 of *Ctenopharyngodon idellus* from China; *S. occidentalis* Van Cleave & Mueller, 1932 of *Stizostedion vitreum*, *Perca flavescens* from Wisconsin; *S. skrjabini* Akhmerov, 1960 of *Hypophthalmichthys molitrix* from Amur Basin; *S. volgensis* Rašin, 1929 of *Pelecus cultratus*, *Alburnus alburnus* from Czechoslovakia.

Remarks: The emended diagnosis characterizes the genus *Sanguinicola* with species having (1) tegument without marginal striations; (2) denticulations in the anterior extremity of the body; (3) a small muscular structure under the mouth; (4) six intestinal ceca; (5) been found in visceral cavity.

Sanguinicola platyrhynchi n. sp.
(Figs. 1 and 2)

Description: Description was based on 20 mounted specimens *in toto*; among these 5 specimens were measured. Body is elongated, slender, flattened dorso-ventrally, 2.93 (2.30-3.34) long and 0.54 (0.35-0.70) wide. Smooth tegument. Mouth apical and very small, surrounded by four rows of denticles, followed by a muscular organ 0.006 (0.009-0.01) long. Esophagus is narrow, 0.02 (0.01-0.03) wide and 0.75 (0.64-0.84) long, with

the terminal portion enlarged and surrounded by numerous cells. Six short and concentric intestinal ceca, with the first and second lateral handles measuring 0.07 (0.06-0.08) and the third, 0.11 (0.10-0.12). Single testicle, of irregular contour, prolonged longitudinally, extending from the posterior margin of the intestinal ceca until the ovarian region, 1.46 (1.37-1.53) long and 0.51 (0.50-0.53) wide. Vas deferens 0.86 (0.68-1.15) long, directed toward the posterior extremity of the body parallel and to the left of the uterus, bending to the right and again to the medial region of the body. Male genital pore is dorsal, and near the posterior extremity of the body. Ovary is immediately post-testicular, rarely conspicuous, composed of a few non agglomerated cells forming two lateral lobes that divide in to narrow lobes, 0.38 (0.35-0.40) and long 18 (0.17-0.20) wide; oviduct is narrow and thin, measuring 0.8; uterus is 0.67 (0.65-0.73) long with the distal region enlarged, and 0.13 (0.11-0.15) wide; prolonged and ascending seminal receptacle is 0.29 (0.27-0.33) long and located under the region where the uterus and vas deferens cross. Follicular vitellaria, with small follicles extending from the region of the esophagus to ovary level, projecting laterally. Female genital pore is dorsal and sub-medium. Eggs were not observed.

TAXONOMIC SUMMARY

Host type: *Hemisorubim platyrhynchos* (Pisces: Pimelodidae), common name: "jurupoca".

Locality type: Baía River on the floodplain of the upper Paraná River, Brazil.

Location: visceral cavity

Prevalence: 74.6%

Mean intensity: 4.2

Mean abundance: 3.1

Deposited material: Helminthological Collection of Oswaldo Cruz Institute (CHIOC) under numbers 34360, 34361 a-b.

Etymology: The epithet specific mentions the specific name of host.

DISCUSSION

For some time, disagreement existed about the appropriateness of the genus *Plehniella* Szidat, 1951 being described to include *P. coelomicola*, Szidat, 1951 (Sanguinicolidae), a parasite of visceral cavity of pimelodid fishes. Due to the existence of two pores observed by the author of this species, Yamaguti (1958) transferred it to the genus *Sanguinicola*. However, Lunaschi (1985) revalidated the genus *Plehniella* after observing the existence of a common genital pore in Argentinian specimens, and the species was transferred again to this genus.

In spite of specimens analyzed in this paper presenting six intestinal ceca, a characteristic of the genus *Plehniella*, a detailed study of the genitals disclosed separate and dorsal genital pores (Figs. 2a, 2b, 2c), characteristic of the genus *Sanguinicola*. The male genital pore of *Sanguinicola platyrhynchi* n. sp. is hidden by an expanded tegument (Fig. 2c). Confirmation of the existence of these pores was possible using the SEM, which allowed us to also observe a great mucus concentration in the posterior region of the body, suggesting the existence of glandular cells in this region (Fig. 2c).

Sanguinicola dentata, parasite of *Clarias lazera*, is the species which most resembles *S. platyrhynchi*. However, these species differ by the number of intestinal ceca, number and position of the denticulations around the mouth, and site of infection. Six intestinal ceca were observed in *S. platyrhynchi*, while the other species of the genus have four or five. This quickly led us to believe that the species described in this work belonged to the genus *Plehniella*. The SEM also revealed the presence of four rows of denticles around the buccal region (Fig. 2d), which would have been difficult with optic microscopy. These denticles were also observed in *S. dentata*, but located on each side of the mouth and with only four denticles. Species of the genus *Sanguinicola* are parasites mainly in the vascular system of freshwater and marine fishes and, more rarely, in the intestine as are *Sanguinicola dentata.* Therefore, this is the first record of this genus in the visceral cavity of fishes.

Sanguinicola platyrhynchi differs from the *S. argentinensis*, the only South American species, mainly in body dimensions, dilatation position at esophagus, intestinal ceca number, and infection site. *S. argentinensis* is a parasite of the heart and blood vessels of freshwater fishes in Argentina.

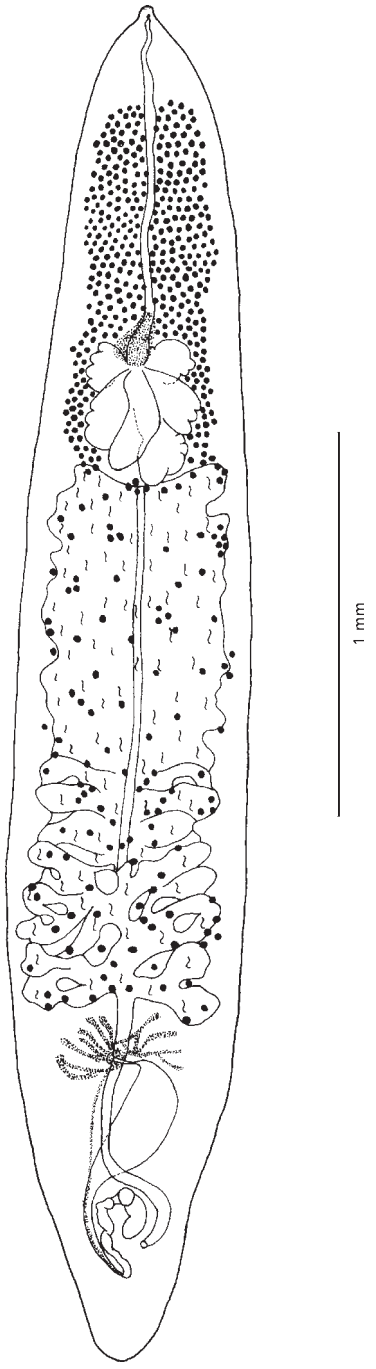

Fig. 1 — Ventral view of internal organs of *Sanguinicola platyrhynchi* n. sp. parasite of *Hemisorubim platyrhynchos*.

Fig. 2 — Scanning electron micrographs (SEM) of *Sanguinicola platyrhynchi* n. sp. parasite of *Hemisorubim platyrhynchos*. a) Dorsal view (scale bar: 1 mm); b) ventral view (scale bar:1 mm); c) posterior end of body (scale bar: 0.1 mm); d) mouth (scale bar: 0.1 mm). Arrows indicate genital pores.

In spite of the absence of pharynx and oral sucker as features of the Sanguinicolidae, Kirk & Lewis (1993) observed a small muscular organ adjacent to the mouth of *S. inermis*, resembling that observed in our specimens of *S. platyrhynchi.* These authors suggested that it was a poorly developed oral sucker, and so excluded from descriptions, and likely present in a great number of sanguinicolid species such as *S. platyrhynchi*. Thatcher (1993) also presented measures of a muscular organ in *S. argentinensis* Szidat (1951). However, the author calles this organ a pharynx. McMichael-Phillips *et al.* (1994) showed the presence of this muscular complex well-developed in cercariae of *S. inermis*. These authors agreed with Kirk & Lewis (1993) who stated that this muscular element can be an oral sucker, but emphasized the need for further ultrastructural studies on other species of the family. Lunaschi (1985) treated these organs as "muscular structures which form the lumen of the mouth" in *P. coelomicola*.

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