



***Amapacanthus amazonicus* n. g., n. sp. (Acanthocephala: Diplosentidae: Allorhadinorhynchinae) from *Arius passany* and *Anableps microleps* (Pisces) at Maraca Island off northern Brazil**

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Abstract

Amapacanthus amazonicus n. g., n. sp. is described from the intestine of *Arius passany* (Valenciennes) and *Anableps microleps* Müller. The most important diagnostic features are: a small globular proboscis armed with 6 diagonal rows of 3 stout hooks; middle hooks conspicuously stouter and larger than anterior ones; terminal hooks as long as middle hooks but straighter and more slender; a double-walled proboscis receptacle; a trunk bearing spines anteriorly; and two tubular cement glands in the males. *Amapacanthus* n. g. is differentiated from *Allorhadinorhynchus*, *Golvanorhynchus* and *Slendrorhynchus*, the other genera of the Allorhadinorhynchinae, by the presence of a globular proboscis armed with a small number (18) of hooks. A key to the species of the Allorhadinorhynchinae is presented.

Introduction

In 1994 a survey of fish parasites took place on the Atlantic coast of the Amazonian State of Amapá (“Diversitas Neotropica” mission: Universidade Santa Úrsula, Brazil and Muzeul di Istoria Naturala “Grigore Antipa”, Romania). Several mature specimens of an acanthocephalan were collected from the intestine of *Arius passany* (Valenciennes) (Pisces: Ariidae), commonly called “pirarara” or “bagre”; additional immature specimens were also found in *Anableps microleps* Müller (Pisces: Anablepidae), commonly called “four eyes” or “tralhoto”. These worms are described below as a new genus and species of the subfamily Allorhadinorhynchinae.

Materials and methods

Fish hosts were captured in the mud around Maraca Island off the coast of Brazil (2°0'N, 50°24'W), a locality with a high range of tides close to the estuarine region of the Amapá River. They were examined for

parasites immediately after capture. The worms recovered were fixed and stored in 70% alcohol, stained in Mayer's paracarmine and Ehrlich's haematoxylin, dehydrated in ethanol, cleared in methyl salicylate and mounted in Canada balsam.

All measurements are in millimetres. Trunk length excludes the proboscis and neck. Width measurements refer to the maximum width. The proboscis length is exclusive of the neck, and hooks were measured only in lateral view. The length of the reproductive system in males is the distance from the anterior margin of the testis to the posterior end of the trunk. Illustrations were made with the aid of a camera lucida.

Type-specimens are deposited in the Helminthological Collection of the Institute of Oswaldo Cruz (CHIOC), in the Colección Nacional de Helminths, Instituto de Biología, Universidad Nacional Autónoma de México (CNHE) and in the British Museum (Natural History) Collections at The Natural History Museum, London (BMNH).

Family Diplosetidae Tubangui & Masilungan, 1937
Subfamily Allorhadinorhynchinae Golvan, 1969

***Amapacanthus* n. g.**

Diagnosis

Allorhadinorhynchinae. Trunk short, cylindrical, armed with small triangular spines anteriorly extending back to same level on dorsal and ventral sides in both sexes. Main longitudinal lacunar canals lateral; hypodermal nuclei small, oval to elliptical, numerous. Mature female larger than male. Maximum width at level of anterior third of trunk in both sexes. Proboscis globular, with 3 rings of 6 hooks each; middle hooks stoutest, largest and strongly curved; proximal hooks straight, slender and sharper than others. Hook roots simple, directed anteriorly and with posterior manubrium. Proboscis receptacle double-walled, with ganglion at its base. Lemnisci filiform, delicate, with numerous fragmented nuclei, unequal, longer than proboscis receptacle, in juveniles may reach to middle of trunk. Male genitalia occupying posterior 2/3 of trunk; testes tandem, contiguous, pre-equatorial; cement glands 2, tubular. Uterus short. Genital pore subterminal in both sexes. Eggs fusiform, with polar prolongations of fertilisation membrane. Parasitic in Neotropical brackish water teleosts.

Type-species: Amapacanthus amazonicus n. sp.

Etymology: The generic name is in reference to Amapá State and the specific designation to Amazônia, Brazil.

***Amapacanthus amazonicus* n. sp.**

Type-host: Arius passany (Valenciennes) (Pisces: Ariidae).

Other host: Anableps microlepis Müller (Pisces: Anablepidae).

Type-locality: Maraca Island, Amapá State, Brazil (2°0'N, 50°24'W).

Site: Mature acanthocephalans in the intestine of *A. passany*; immature specimens encysted in liver of *A. microlepis*

Type-material: Holotype CHIOC 34-199 a; allotype CHIOC 34.199 b; paratypes CNHE 3769-3770 and BMNH 1999.2.19.1-2 CHIOC 34.199 c-j; vouchers CHIOC 34.200, CHIOC 34.201 a-j (juv.).

Infection: *A. passany* – one fish with 1 male and 1 female and one fish with 1 fragmented male and 12

females, all adults; *A. microlepis* – three of four fish examined were parasitised, respectively, by 6, 24 and 12 immature specimens.

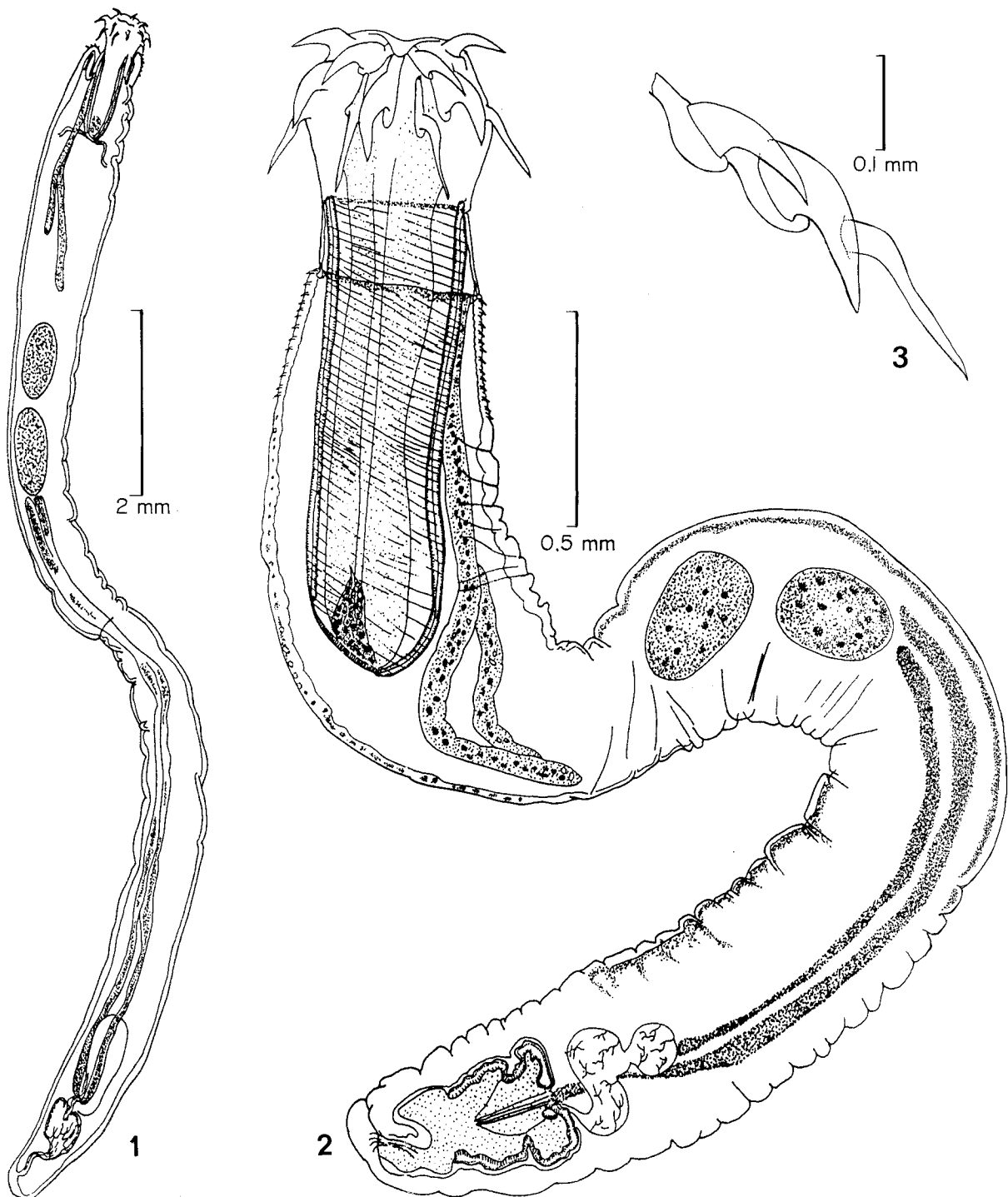
Description (Figures 1–6)

Based on 14 mature (2 males, one of them incomplete, and 12 females) and 24 immature specimens (18 males and 6 females). Trunk short, cylindrical, spined anteriorly. Mature female larger than male. Maximum width at level of anterior 1/3 of trunk in both sexes. Anterior 1/12 of trunk covered with small triangular, slender spines imbedded in cuticular folds, reaching back to same level on dorsal and ventral sides. Body wall containing many small round to ovoid nuclei. Proboscis small, globular (Figure 2) with 3 rings of 6 hooks each; hooks of each ring alternate and have conspicuous size and shape differences; middle hooks stout, heavily curved and larger than distal ones; proximal hooks as long but less stout, less curved, sharper and straighter than middle ones. Roots not clearly visible, directed anteriorly. Neck robust, trapezoidal, well differentiated. Proboscis receptacle double-walled, with ganglion situated at posterior end. Lemnisci filiform, longer than proboscis receptacle, slender, somewhat delicate, unequal in length.

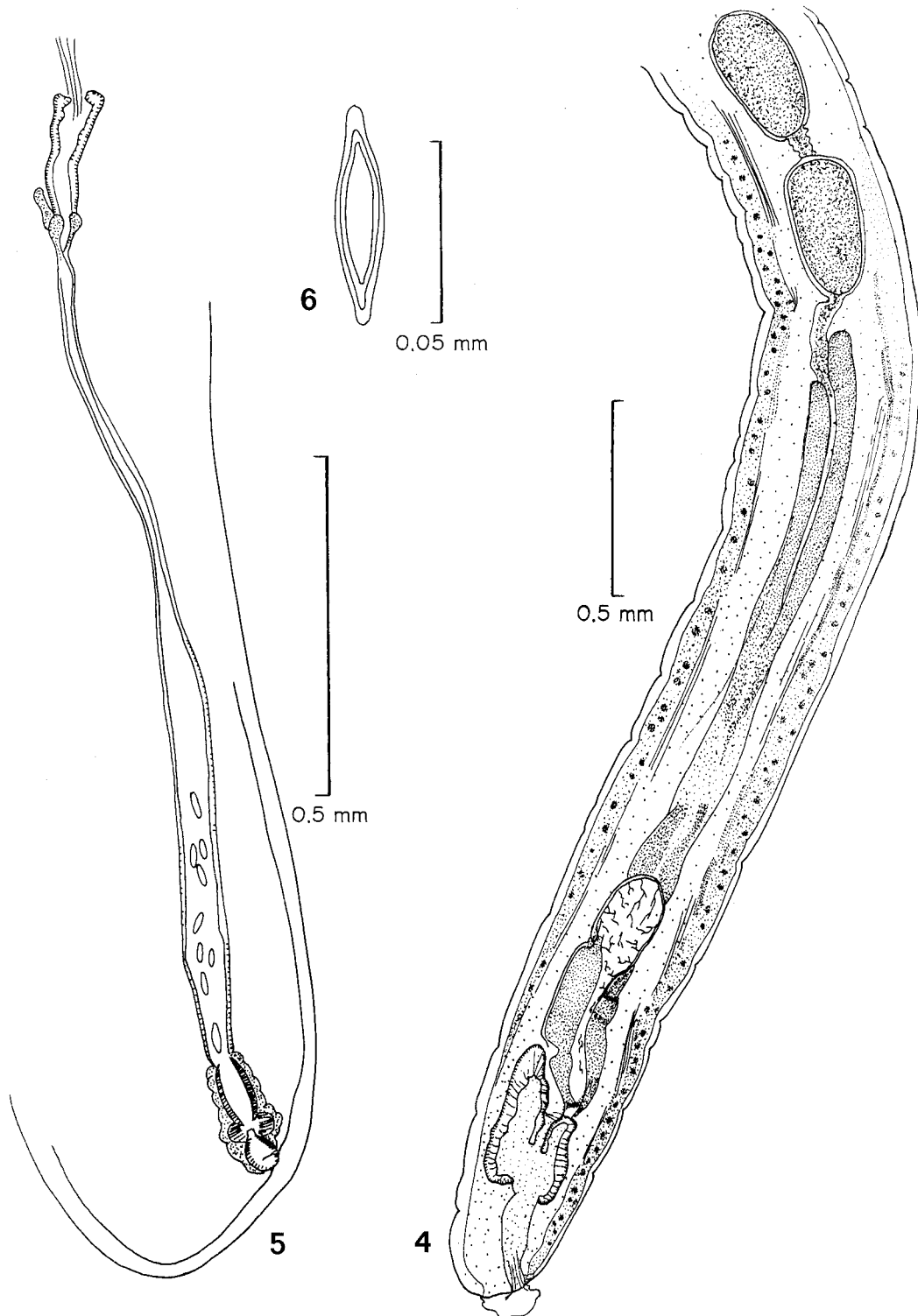
Measurements of mature specimens from A. passany

Males. Trunk 12.546×0.785 ; trunk spines 0.010 long, surround trunk in narrow anterior field. Proboscis 0.260×0.338 . Anterior proboscis hooks 0.130 long by 0.026 wide at base; middle hooks 0.161×0.070 ; basal hooks 0.158×0.031 wide at base. Neck 0.312×0.325 . Proboscis receptacle 0.936×0.312 . Lemnisci 2.040×0.051 and 2.703×0.071 . Reproductive system (Figures 1 and 4) occupies posterior 3/4 of body length, 3.614–9.537. Testes oval, tandem, pre-equatorial; anterior testis $0.364\text{--}0.775 \times 0.0182\text{--}0.326$; posterior testis $0.351\text{--}0.887 \times 0.189\text{--}0.275$. Two cement glands, tubular, tongue-shaped, $2.260\text{--}6.630 \times 0.018\text{--}0.057$. Copulatory bursa opens subterminally.

Females. Trunk $11.880\text{--}21.063 \times 0.208\text{--}0.948$. Trunk spines 0.010–0.039 long, surround trunk in narrow anterior field of 0.260–0.741 in width. Proboscis $0.247\text{--}0.260 \times 0.416\text{--}0.507$. Anterior hooks 0.118–0.124 long by 0.036–0.046 wide at base; middle hooks $0.169\text{--}0.202 \times 0.052\text{--}0.078$ at base; basal hooks $0.182\text{--}0.195 \times 0.026\text{--}0.049$. Neck $0.336\text{--}0.572 \times 0.336\text{--}0.416$. Proboscis receptacle $0.918\text{--}1.071 \times$



Figures 1–3. *Amapacanthus amazonicus* n. g., n. sp. 1. Holotype male. 2. Immature male. 3. Hook row from immature male.



Figures 4-6. *Amapacanthus amazonicus* n. g., n. sp. 4. Reproductive system of paratype male. 5. Reproductive system of paratype female. 6. Egg in the uterus.

0.234–0.306. Lemnisci 1.690–2.397 × 0.052–0.071 and 2.550–2.856 × 0.059–0.071. Reproductive system 2.397–3.315. Gonopore subterminal (Figure 5). Eggs fusiform, with polar elongation of fertilisation membrane (Figure 6); dimensions of eggs inside uterus of single gravid female 0.057–0.065 × 0.010–0.015.

Measurements of immature specimens from

A. microleps

Male. Trunk 2.800–4.180 × 0.440–0.680. Trunk spines 0.018–0.026 long. Proboscis 0.195–0.234 × 0.351–0.455. Anterior hooks 0.132–0.158 × 0.039–0.065 at base; middle hooks 0.174–0.221 × 0.065–0.091; basal hooks 0.169–0.208 × 0.031–0.044. Neck 0.234–0.370 × 0.270–0.356. Proboscis receptacle 0.780–1.131 × 0.176–0.380. Lemnisci 1.350–1.924 × 0.050–0.065 and 1.508 × 0.052–0.057 wide. Reproductive system occupies posterior half of body, 1.165–2.550. Testes round to oval, in tandem, in middle 1/3 of body. Anterior testis 0.202–0.330 × 0.096–0.182. Posterior testis 0.182–0.300 × 0.143–0.234. Two tubular, tongue-shaped cement glands, 0.650–1.350 long. Copulatory bursa opens subterminally.

Females. Trunk 3.774–4.900 × 0.734–0.810. Trunk spines 0.015–0.020 long. Proboscis 0.208–0.260 × 0.442–0.468. Anterior hooks 0.156–0.169 × 0.046–0.057; middle hooks 0.184–0.221 × 0.041–0.078; basal hooks 0.197–0.226 × 0.028–0.033. Neck 0.306–0.442 × 0.408–0.449. Proboscis receptacle 0.948–1.144 × 0.390–0.459. Lemnisci 1.560–2.249 × 0.039–0.057 and 1.664 × 0.065. Reproductive system 1.157–1.482. Gonopore subterminal.

Discussion

The new genus clearly fits the concept of the Palaeacanthocephala, as presented by Amin (1982), in view of the lateral position of the main longitudinal lacunar canals, the presence of numerous fragmented nuclei in the lemnisci and hypodermis, and a double-walled proboscis receptacle. It is assigned to the family Diplosentidae Tubangui & Masilungan, 1937 because of its short trunk, globular proboscis with hooks arranged in circles of alternating rows, proboscis retractor muscles piercing the posterior end of the receptacle, two contiguous testes, two tubular cement glands and eggs with a polar prolongation of the

middle shell. The trunk armed with spines places it in the subfamily Allorhadinorhynchinae Golvan, 1969 (see Amin, 1982, 1985).

Within the Allorhadinorhynchinae, *Amapacanthus* n. g. is justified on the basis of its globular proboscis armed with 18 stout hooks arranged in 3 rings of 6 hooks each and with conspicuous size and shape differences between the hooks of each circle. The subfamily Allorhadinorhynchinae includes three genera: *Allorhadinorhynchus* Yamaguti, 1959, *Golvanorhynchus* Noronha, Fabio & Pinto, 1978 and *Slendrorhynchus* Amin & Sey, 1996. *Allorhadinorhynchus* has a subcylindrical to claviform proboscis armed with 12 longitudinal rows of 9–11 hooks, the ganglion in the middle of the proboscis receptacle and lemnisci shorter than the receptacle. The proboscis of *Golvanorhynchus* is long, cylindrical and armed with 23–24 longitudinal rows of 13–14 hooks, and males have six cement glands. *Slendrorhynchus* has a claviform proboscis armed with 11 longitudinal rows of 5 hooks, which diminish in size posteriorly, and a long, slender trunk with spines distributed in two fields separated by a spine free zone; the spines in anterior rows may be vestigial, whereas those of the posterior more extensive field are better developed. Consequently, *Amapacanthus* n. g. is uniquely characterised, among other features, by a globular proboscis armed with a small number (18) of hooks; furthermore, no other allorhadinorhynchine exhibits size and shape differences between the hooks of each row on the proboscis. A key to the genera of the Allorhadinorhynchinae, which includes the new genus, is presented below.

Amapacanthus amazonicus n. sp. is similar to *Allorhadinorhynchus segmentatus* Yamaguti, 1959 in the size of males (1.8–2.1 mm), females (2.6–3.05 mm) and eggs (0.056 × 0.013) and by the presence of two cement glands. It differs, however, in the proboscis armature, which has 12 rows of 9–11 hooks. Moreover, a regular pseudosegmentation of the trunk and an unusually long vaginal funnel followed by a single sphincter are important distinguishing characters of *A. segmentatus*. *Golvanorhynchus golvani* Noronha, de Fabio & Pinto, 1978 is much larger, reaching 10.66 mm, and the proboscis is 1.642–1.929 in length, claviform and armed with 23–24 longitudinal rows of 13–14 hooks; in addition, the males have six cement glands. *Slendrorhynchus breviclaviproboscis* Amin & Sey, 1996 is the only other allorhadinorhynchine with a small proboscis armed with few hooks; however, its proboscis is very small relative to the trunk, which is long and slen-

der, the proboscis is armed with 11 longitudinal rows of five hooks which measure 0.061–0.081 in males and 0.070–0.091 in females, and it has four cement glands. Furthermore, the most characteristic feature of the latter species is the pattern and distribution of trunk spines.

*Key to the genera of the subfamily
Allorhadinorhynchinae*

- 1 Proboscis long, cylindrical to claviform, with similar hooks 2
- Proboscis short, globular; hooks few, those of different rows varying in shape and size
. *Amapacanthus* n. g.
- 2 Males with two or four cement glands 3
- Males with six cement glands
. *Golvanorhynchus*
- 3 Trunk spines distributed in two fields separated by a spine-free zone; males with four cement glands
. *Slendrorhynchus*
- Trunk spines distributed otherwise; males with two cement glands *Allorhadinorhynchus*

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