ISSN Versión impresa 2218-6425 ISSN Versión Electrónica 1995-1043

Neotropical Helminthology, 2019, 13(2), jul-dic:227-233.

Neotropical Helminthology

ORIGINAL ARTICLE / ARTÍCULO ORIGINAL

A NEW SPECIES OF *NEOECHINORHYNCHUS* STILES & HASSALL, 1905 (EOACANTHOCEPHALA: NEOECHINORHYNCHIDAE) PARASITE *PELLONA CASTELNAEANA* VALLENCIENNES, 1847 (CLUPEIFORMES: PRISTIGASTERIDAE) OF THE BRAZILIAN AMAZON

UNA NUEVA ESPECIE DEL *NEOECHINORHYNCHUS* STILES & HASSALL, 1905 (EOACANTHOCEPHALA: NEOECHINORHYNCHIDAE) PARÁSITO DEL *PELLONA CASTELNAEANA* VALLENCIENNES, 1847 (CLUPEIFORMES: PRISTIGASTERIDAE) DE LA AMAZONÍA BRASILEÑA

Amanda K. S. de Souza[1,*] & José Celso de O. Malta[1]

[1]Instituto Nacional de Pesquisas da Amazônia – INPA, Laboratório de Parasitologia de Peixes, Manaus, Amazonas, Brasil
*Corresponding author: atjsouza15@gmail.com

ABSTRACT

This work describes a new species of the genus *Neoechinorhynchus* Stiles & Hassall, 1905, a parasite found in *Pellona castelnaeana* Vallenciennes, 1847 collected in the Catalan lakes complex of the Brazilian Amazon. This species differs from the other ones on account of bearing anterior and posterior testes, long cement gland and long lemniscus approaching the posterior testis. The size of its trunk, hooks and male reproductive system, distinguishes it from other species of the genus, which have been described in Brazil.

Keywords: Fish parasite – Taxonomy – Acanthocephala – Catalão – Brazilian Amazonia

RESUMEN

Este trabajo describe una nueva especie del género *Neoechinorhynchus* Stiles & Hassall, 1905, un parásito encontrado en *Pellona castelnaeana* Vallenciennes, 1847 colectadas en el complejo de lagos Catalán de la Amazonía Brasileña. Esta especie se diferencia de las demás por presentar testículos anterior y posterior y glándula de cemento larga, lemniscos largos acercándose al testículo posterior. El tamaño de su tronco, ganchos y sistema reproductivo masculino lo distingue de las demás especies del género descritas para Brasil.

Palabras clave: Acanthocephala – Amazonía brasileña – Catalão – Parásitos de peces – taxonomía

INTRODUCTION

In Brazil, only nine species have been described in Brazil so far. Members of the family Pristigasteridae are distributed worldwide, with approximately 9 genera and 38 species of fish marine and coastal, five occur in the Amazon Basin; for example, *Pristigaster cayana* Cuvier, 1829, *Pristigaster whiteheadi* Menezes, de & Pinna, 2000, *Ilisha amazonica* (Miranda Ribeiro, 1920), *Pellona flavipinnis* (Valenciennes, 1836) and *Pellona castelnaeana* Vallenciennes, 1847 (FAO, 1850).

Pellona castelnaeana, with common names of 'apapa', is endemic to the Amazon Basin. This species is considered piscivorous. *P. castelnaeana* is an important in controlling of prey species.

Out of the 109 species described as belonging to the genus *Neoechinorhynchus* Stiles & Hassall, 1905, seven are relegated to other genera, 14 are considered invalid, 11 belong to the subgenus *Hebesoma*, 48 belong to the subgenus *Neoechinorhynchus* and 29 are retained as valid but cannot be assigned to any one subgenus (Amin, 2002). Thirty-two (36%) of the recognized species occur in North American hosts (particularly freshwater fish), but this proportion may be due to sampling efforts because the fauna of fish in the neotropics remains poorly known (Amin, 2002).

The present study describes a new species of *Neoechinorhynchus* (*Neoechinorhynchus*) a parasite of *P. castelnaeana*, collected from a floodplain lake in the Amazon, and distinguishes it from other related species that have been reported previously.

MATERIAL AND METHODS

The fish were collected from the Catalão Lake, a fluvial-lacustrine system at the confluence of the Negro and Solimões rivers (03°10`04" S, 59°54`45"W). The fish were necropsied in the field and their bodies were fixed, labeled and analyzed in the Laboratory of Fish Parasitology at the National Research Institute of Amazonia (INPA). Specimens of the phylum Acanthocephala were collected and processed using Carmin alcoholic regressive staining techniques (Amato *et al*., 1991) cleared in immersion oil and mounted in Canada balsam. Drawings were made with the aid of a lightfield Olympus BH-2 microscope. All measurements are presented in micrometer (µm) unless otherwise indicated and expressed as the range, followed by the mean and standard deviation between brackets.

Ethic Aspects:
To collect this material, a license from the ethics and animal use committee CEUA - INPA 036/2016 was used.

RESULTS

Systematic section
Neoechinorhynchus (Neoechinorhynchus) pellonis sp. n.
Description based on 10 males, 1 mature and gravid female mounted *in toto:*

General. Neoechinorhynchidae, Neoechinorhynchinae with characters of the genus and subgenus *Neoechinorhynchus*.

Trunk aspinose, fusiform curved ventrally, six giant nuclei present in the body wall (5 dorsal and 1 ventral). Prosboscis short, globular, slightly longer than wide. Proboscide with three circles with six hooks each. Proboscide receptacle long, simple, single-walled sac. Lemnisci elongate, unequal. Testes elongate, contiguous, postequatorial. Cement-gland syncytial, cement reservoir elongate, and saefftigen's pouch present. Genital pore terminal in males and subterminal in females. Eggs elliptical and elongate, with concentric shell with no fertilization membrane polar prolongation.

Male: **(**Based on five male specimens) (Figure 1 – 2). Trunk 9860-3740 (6100 ± 2700) X 800 - 600 (500 ± 200). Hypodermis 320 – 810. Neck 1000 (1000) X 70 - 100 (80 ± 10). Proboscis 300-100 (200 ± 90) X 200-70 (100 ± 50). Longer lemniscus 1530-600 (900 ± 300) X 60-30 (50 ± 10). Length of proboscis hooks in anterior circle 100 (100), in middle circle 30 (30) in posterior circle 20 (20). Neck 100 (100) x 80 – 100 (80±10). Proboscis receptacle 500-600 (580±40) X 70-90 (80 ± 660).

Testes cylindrical: anterior testis 500 - 2200 (1070 ± 660) X 100 (100). Posterior testis 600-2040 (1140±600) X 100-300 (140 ±90). Cement gland 700-2890 (1350 ± 890) X 80 - 100 (90±10). Saefftigen's pouch 200-500 (300±130) X 100-200 (140 ±24). Seminal vesicle 170-300 (200±50) X 70 - 130 (90 ±23). Male reproductive system occupies 54-74% of body length.

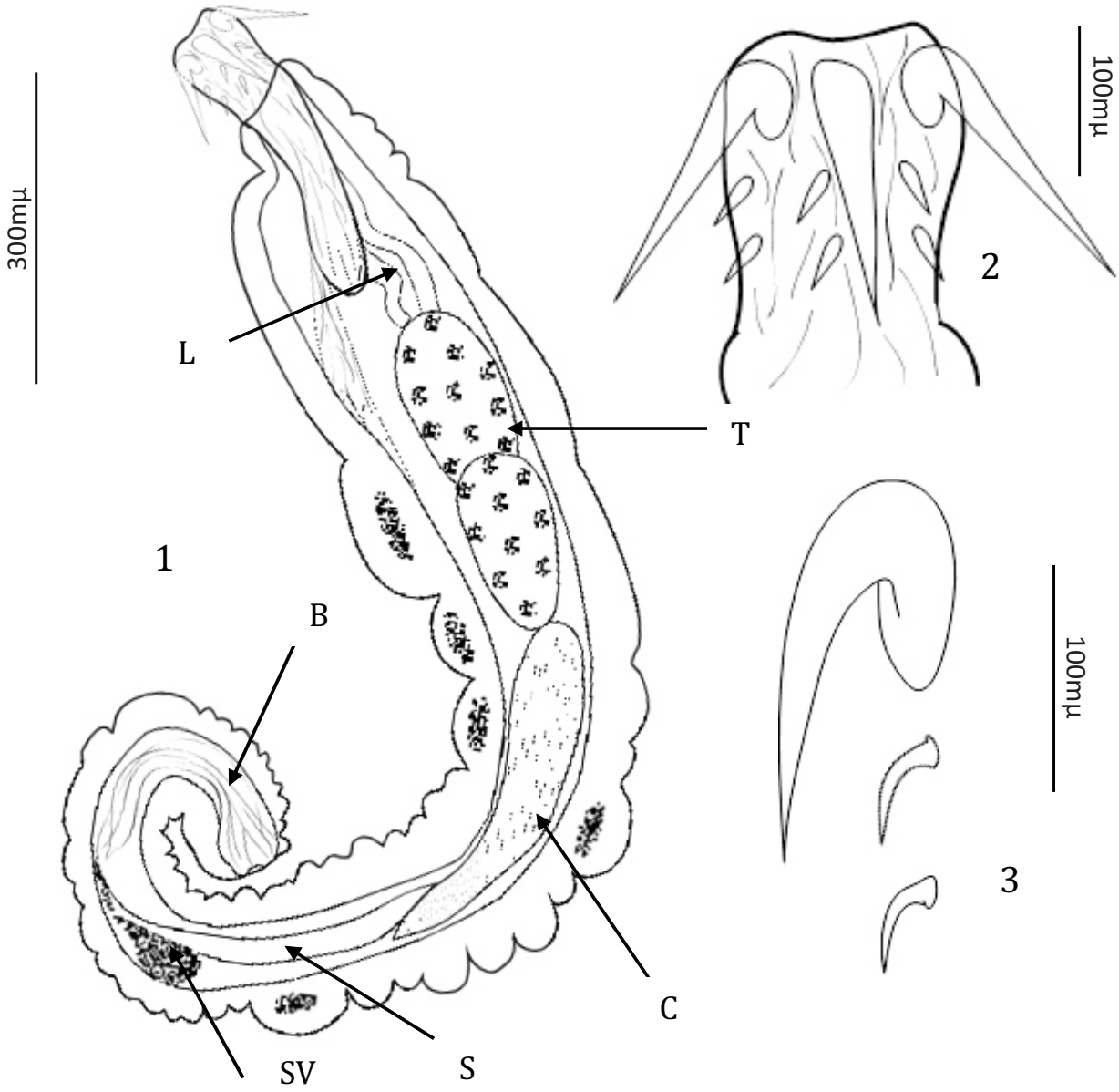
Female (based on 01 pregnant specimen)(Figure 3). Trunk 10200x510. Hypodermis 1000. Proboscis hooks in the anterior circle 100; the middle circle 30, the posterior circle 20. Neck 70x50. Proboscis receptacle 850x100. Longer leminiscus 560x50, shorter leminiscus 450x50. Utero 70x50. Genital pore sub-terminal. Reproductive system 1020x100, occupying 14% of trunk length. Female larger than male, mature elliptic eggs 40x10 with polar prolongation in fertilization membrane.

Comparison between *Neoechinorhyncus pellonis* n. sp. and other species of Neoechinorhyncus (Table 1).

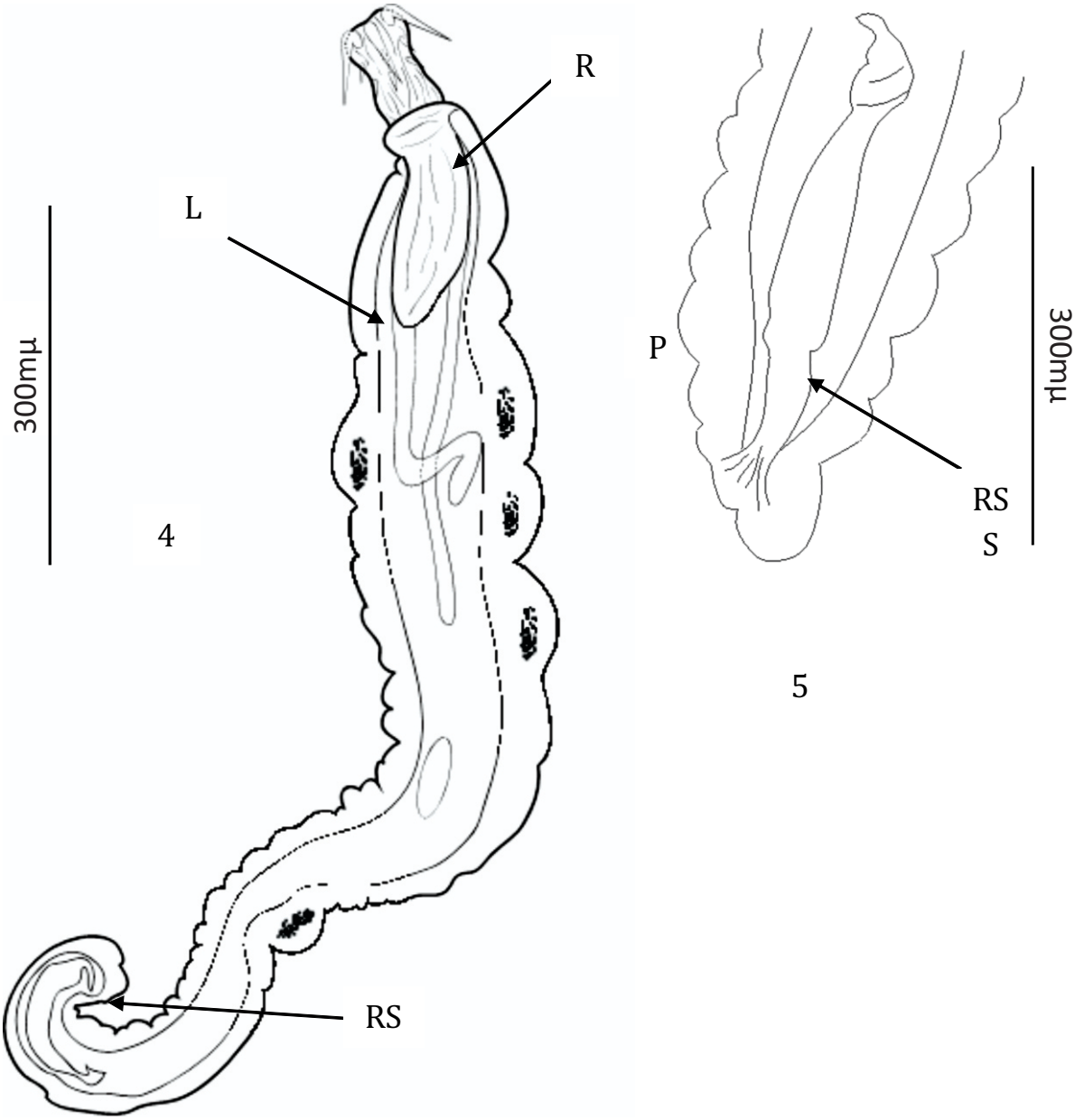
Type-material. Holotype: 1 ♂and 1♀/ Type host: *Pellona castelnaeana*.
Site of infestation: upper Intestine.
Type Locality at Catalão fluvial-lacustrine system, the confluence of the Negro and Solimões rivers near Manaus city.
Specimens deposited Holotype: Male - Inpa 019 Non-insect Invertebrate Collection INPA; Paratipes: Male - Inpa 020 Female - Inpa 021.
Etymology: Its name is derived from the host's name.
Prevalence: 38%

Table 01. Comparison between *Neoechinorhyncus pellonis* n. sp. and other species of Neoechinorhyncus. All measurements expressed in micrometers. AH – anterior hook, MH- middle hook and PH- posterior hook; TL – trunck length, CG – cement gland, IS – infection site.

Species / Host	AH, MH, PH	TL (trunk)	cG	IS	Distribution
N. (N.) pellonis/ P. castelnaeana					
Male	100, 30,20	6100	1350	Intestine	Amazonas
Female	100, 30, 20	10200			
N. (N.) veropesoi/ Plagiosciom					
squamosissimus	67.9, 22,2, 12	2800	203,6	Small intestine	Pará - Guajará Bay
Male	87,1, 25,5, 13,8	5870			
Female					
N. (N.) pterodoridis/ Pterodoras. granulosus					
Male	143, 45, 10	2250	336	Intestine	Amazonas
Female	139, 39, 12	2700			
N. (N.) pimelodi/ Pimelodus maculatus					
Male	105, 36, 23	1450	162	Anterior	Mato Grosso – São
Female	129, 47, 29	2440		intestine	Francisco River
N. (N.) buttenerae/ Colossoma					
macropomum	135, 100, 30	22000	5000	Intestine	Amazonas
Male	No date	30000			
Female					



Figures 1-3. 1 – Male of *Neoechinorhynchus (Neoechinorhynchus) pellonis* sp. n.: T – testes, C – cement gland, L – lemniscus, S – Saefftingens, SV – spermatic vesicle, B - bursa; 2 – Proboscis; 3 - proboscis hooks.



Figures 4 and 5. 4 – Female of *N. (N) pellonis* sp. n.: L - lemniscus, R – proboscis receptacle; 5 – P posterior region, RS – reproductive systems.

DISCUSSION

In Brazil, nine new species of *Neoechinorhynchus* (*Neoechinorhynchus*) have been registered: *N. (N.) buttnerae* Golvan, 1956*; N. (N.) curemai* Noronha, 1973; *N. (N.) macronucleatus* Machado Filho, 1954; *N. (N.) paraguayensis* Machado Filho, 1959; *N. (N.) pimelodi* Brasil-Sato & Pavanelli; 1998; *N. (N.) pterodoridis* Thatcher, 1981 and *N.(N.) veropesoi* Melo *et al*. 2013 (Brasil-Sato & Pavanelli, 1998; Martins *et al.*, 2000; Amin, 2002; Thatcher, 2006; Santos *et al.*, 2008).

Neoechinorhynchus (N.) buttnerae; N. (N.) pterodoridis; and *N. (N.) curemai* have been registered in the Amazon region (Salgado-Maldonado, 1978; Noronha, 1984; Thatcher, 2006, Santos *et al*., 2008). More recently *N. (N.) veropesoi* (Melo, 2013). This species was compared with the species occurring in the Amazon region.

Neoechinorhynchus (N.) pellonis sp. n. shows most similarity to *N. (N.) veropesoi* collected in the estuary of the Guamá River and the neighbouring Guajará Bay in areas adjacent to the city of Belém in the state of Pará (Melo *et al*., 2013). The proboscis and lemnisci of *N.* (*N.*) *pellonis* sp. n. are larger than those of *N.* (*N.*) *veropesoi*. The male reproductive system of the *N. (N.) pellonis* occupies 54 - 74% of its cavity, beyond the equatorial zone.

Hooks (anterior, medium and posterior) of *N. (N.) pellonis* sp. n. are bigger than those of *N. (N.) veropesoi*. They are smaller than those of *N. (N.) piterodoridis and N. (N.) pimelodis*. The shape of the testicles differs from that of the four compared species, since in *N. (N.) pellonis* sp. n. the testicles are cylindrical-shaped and smaller sized different from those of *Neoechinorhynchus (N.) buttnerae, N. (N.) pterodoridis*, *N. (N.) pimelodis and N. (N.) veropesoi*. Approaching the of buttnerae format that the longest species have.

The cement gland of *N. (N.) pellonis* sp. n. is smaller than that of *N. (N.) pterodoridis* and *N.(N.) veropesoi* and larger than that of *N.(N.) pimelodis*. The cement gland is more elongated than wide. Its shape showed to be circular when compared to that of the other species.

The morphological study shows similarities between the anatomy of *N. (N.) pimellodis* sp. n., *N. (N.)* veropesoi, *N. (N.) pterodoridis* and *N. (N.) pimelodis* as well as significant differences between their main organs.

Neoechinorhynchus buttnerae has the longest trunk when compared to the other species belonging to the genus *Neoechinorhyncus*, which have been registered for Brazil. All other specimens recorded to date have a trunk length much smaller than that of *N. buttnerae*. In *N. pellonis* it is possible to observe that both male and female have the longest trunk, especially the *N. pellonis* female, which presents the longest trunk among the females, following that of buttnerae.

Of the species that occur in the Amazon, this new species described here is most similar with. Of the other species, n pellonis is most closely similar to N. veropesoi. The new species, however, has: 1) a markedly longer trunk, with male reproductive system occupying most of the trunk cavity; 2) a much thicker hypodermis; 3) a markedly longer proboscis; 4) proboscis hooks longer and equal-lengthed between male and female; 5) a cement gland larger than the testis.

BIBLIOGRAPHIC REFERENCES

Amato, JFR, Boeger, WA & Amato, SB. 1991. *Protocolos para laboratório-coleta e processamento de parasitas do pescado.* Rio de Janeiro, Brasil. Imprensa Universitária, Universidade Federal do Rio de Janeiro. 81 pp.

Amin, OM. 2002. *Revision of* Neoechinorhynchus *Stiles & Hassal, 1905 (Acanthocephala: Neoechinorhynchidae) with keys to 88 species in two subgenera.* Systematic parasitology, vol. 53, pp. 1-18.

Brasil-Sato, MC & Pavanelli. GC. 1998. Neoechinorhynchus pimelodi *sp.n. (Eoacanthocephala, Neoechinorhynchidae) parasitizing* Pimelodus maculatus *Lacépede, "mandi-amarelo" (Siluroidei, Pimelodidae) from the basin of the São Francisco river, Três Marias, Minas Gerais, Brazil.* Revista brasileira de Zoologia, vol. 15, pp. 1003-

1011.

FAO (Food and Agriculture Organization). 1985. *Clupeoid fishes of the world (suborder Clupeoidei) an annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, shads anchovies and wolf-herrings*. Rome. Italy. FAO Fisheries Synopsis No. 125, vol. 7, Part 1.

Martins, ML, Fujimoto, RY, Andrade, PM & Tavares-Dias, M. 2000. *Recent studies on Neoechinorhynchus curemai Noronha, 1973 (Acanthocephala: Neoechinorhynchidae),* In Prochilodus Lineatus *Valenciennes, 1836, From Volta Grande reservoir, MG, Brazil.* Revista Brasileira de Biologia, vol. 60, pp. 673-682.

Melo, FTV, Costa, PAFB, Giese, EG, Gardner, SL & Santos, JN. 2013. *A description of* Neoechinorhynchus *(*Neoechinorhynchus*)* veropesoi *n. sp. (Acanthocephala: Neoechinorhynchidae) from the intestine of the silver croaker fish* Plagioscion squamosissimus *(Heckel, 1840) (Osteichthyes: Sciaenidae) off the east coast of Brazil.* Journal of Helminthology, vol. 89, pp. 34-41.

Noronha, D. 1984. *Remarks on* Neoechinorhynchus curemai *Noronha, 1973 (Eoacanthocephala: Neoechinorhynchidae).* Memórias do Instituto Oswaldo Cruz, vol. 79, pp. 271.

Salgado-Maldonado, G. 1978. *Acantocéfalos de peces IV. Descripción de dos especies nuevas de* Neoechinorhynchus *Hamann, 1892 (Acanthocephala: Neoechinorhynchidae) y algunas consideraciones sobre este gênero.* Annais do Instituto de Biologia da Universidade Nacional Autônoma do México, vol. 49, pp. 35-48.

Santos, CP, Gibson, DI, Tavares, LER & Luque, JL. 2008. *Checklist of Acanthocephala associated with the fishes of Brazil.* Zootaxa, vol. 1983, pp.1-22.

Thatcher, VE. 1981. Neoechinorhynchus pterodoridis *n. sp. (Acanthocephala: Neoechinorhynchidae) do baeu liso* (Pterodoras granulosus) *da Amazônia Brasileira.* Acta Amazônica, vol. 11, pp. 445-448.

Thatcher, VE. 2006. *Amazon fish parasites. 2ª* Ed., Sofia, Moscow. Editora Aquatic Biodiversity in Latin America 508 pp.

Received August 29, 2019.
Accepted november 10, 2019.