

ORIGINAL ARTICLE / ARTÍCULO ORIGINAL

CALLITETRARHYNCHUS SPECIOSUS (LINTON, 1897) CARVAJAL & REGO, 1985
TRYPANORHYNCHA (CESTODA) PARASITIZING *PRIACANTHUS ARENATUS*
(CUVIER, 1829) (OSTEICHTHYES, PRIACANTHIDAE) FROM RIO DE JANEIRO
COAST, BRAZIL

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TRYPANORHYNCHA (CESTODA) PARASITANDO *PRIACANTHUS ARENATUS*
(CUVIER, 1829) (OSTEICHTHYES, PRIACANTHIDAE) DE LA COSTA DE RÍO DE
JANEIRO, BRASIL

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Neotropical Helminthology, 2016, 10(1), ene-jun: 33-40.

ABSTRACT

Thirty specimens of *Priacanthus arenatus* (Cuvier, 1829) were commercially obtained in the municipalities of Niterói and Rio de Janeiro, State of Rio de Janeiro, Brazil and examined for parasites from July to December 2013. The fish were necropsied to investigate the presence of cestodes larvae. Three fish were parasitized with trypanorhynchids identified as *Callitetrarhynchus speciosus* (Linton, 1897) Carvajal & Rego, 1985 based on morphological and morphometric characters. The parasite indices of prevalence, mean abundance, mean intensity and the infection sites are presented. Plerocerci were found in mesentery, intestine and ovary serosa. These parasites were studied because of their importance during fish sanitary inspection, if one considers the harm that the repulsive aspect of infected fish causes to consumers.

Keywords: Brazil - *Callitetrarhynchus speciosus* - Cestode - *Priacanthus arenatus* - seafood safety - Trypanorhyncha

RESUMEN

De julio a diciembre de 2013, fueron comprados 30 ejemplares de *Priacanthus arenatus* (Cuvier, 1829) comercializados en los municipios de Niterói y Rio de Janeiro, Estado de Rio de Janeiro, Brasil. A los peces se les practicó la autopsia y se filetearon para investigar la presencia de larvas de cestodos. Tres peces fueron parasitados con trypanorhyncha y fueron identificados como *Callitetrarhynchus speciosus* (Linton, 1897) Carvajal & Rego, 1985 basado en caracteres morfológicos y morfométricos. Los índices parasitarios de prevalencia, abundancia media, la intensidad media y los sitios de infección son presentados. Los plerocercos se encontraron en el mesenterio, y serosas del ovario y del intestino. Estos parásitos se estudiaron por su importancia para la inspección sanitaria de los peces, teniendo en cuenta el daño que el aspecto repulsivo de los peces infectados impulsa a los consumidores.

Palabras clave: Brasil - *Callitetrarhynchus speciosus* - Cestodo - *Priacanthus arenatus* - seguridad del pescado - Trypanorhyncha

INTRODUCTION

The *Priacanthus arenatus* (Cuvier, 1829), the Atlantic bigeye, has large eyes and reddish body, is a nocturnal teleostean species, lives on rocky bottoms at 10 to 200 meters depths, occurs in tropical and subtropical waters of the Atlantic Ocean, from Canada to Argentina. It feeds mainly on small fishes, crustaceans and polychaetes. Reaches an average length of 40 cm and has high commercial value meat (Figueiredo & Menezes, 1980).

In the State of Rio de Janeiro, this species was studied concerning to the parasitism by helminths by Pinto *et al.* (1988), De Fabio (2000), Tavares *et al.* (2001), Lima (2004) and Ferreira *et al.* (2006).

The Trypanorhyncha order consists of great diversity of species, all parasitizing marine fish and invertebrates. Adult worms live in the intestine of elasmobranchs fish (sharks and rays) while the larval forms are found in the coelomic cavity and muscles of teleost fish, crustaceans and molluscs cephalopods (Campbell & Beveridge, 1994). In the fish sanitary inspection, trypanorhynch cestodes, even not having zoonotic potential, acquire

importance by the disgusting appearance. According to the Brazilian Industrial and Sanitary Inspection of Animal Origin Products Regulation, in his item 4 of Article 445 are considered unsafe to eat the fish that have massive muscle infestation by parasites (Brasil, 1952). Reinforcing the importance of cestodes for fish inspection in many species of teleost is common to see up high rates of infection in the muscles (Dollfus, 1942; Amato *et al.*, 1990; Pereira Jr., 1993; São Clemente *et al.*, 1995, 1997).

Some trypanorhynch species such as *Gymnorhynchus gigas* (Cuvier, 1817) Rudolphi, 1819 larvae have antigenic components able to cause anaphylactic episodes (Rodero & Cuellar, 1999). Vázquez-López *et al.* (2002) showed that proteins of *G. gigas* may alter the motility and the intestinal transit. Mattos *et al.* (2013) demonstrated by inoculation that the gross extracts of *Pterobothrium heteracanthum* Diesing, 1850 molecules are capable of inducing the production of specific IgE and IgG, thus inducing an allergic reaction in murine models.

The *Callitetrarhynchus speciosus* (Linton, 1897) Carvajal & Rego, 1985 was reported in several teleost fish worldwide (Bates, 1990;

Palm, 2004; Abdou & Palm, 2008; Al-Zubaidy & Mhaisen, 2014; Beveridge *et al.*, 2014; Palm & Bray, 2014). The last records of this species in Brazil were made by Lima (2004), Dias *et al.* (2009, 2010, 2011).

The aim of this study was to determine the species of trypanorhynch parasitizing *P. arenatus*, their parasitary indices and infection sites, and to discuss about zoonotic importance.

MATERIALS AND METHODS

From July to December 2013, thirty *P. arenatus* specimens were acquired with 20-63 (38.3 ± 13.05) cm total length and 400-3,600 (1,210 ± 751) g weight from the fish markets in the municipalities of Niterói and Rio de Janeiro, State of Rio de Janeiro, Brazil. The fish were transported in isothermal box to the Laboratory of Inspection and fish Technology of the Veterinary Medicine School of Fluminense Federal University, where they were necropsied and filleted. The fish species was identified according to Figueiredo & Menezes (1980). Collected plerocerci of Trypanorhyncha were opened, with the aid of sharp needles, under the stereomicroscope to release the larvae, that were put in the refrigerator for at least 24h to permit the relaxing of scolices and tentacular extroversions. Further, the larvae were fixed in cold AFA, stained with Langeron's carmine, clarified in beechwood creosote, and preserved either as whole mounts on Canada balsam according to Knoff & Gomes (2012).

The classification of Trypanorhyncha was based on Palm (2004). The parasitic indices on the prevalence, mean intensity and mean abundance were calculated according to Bush *et al.* (1997). Representative specimens were deposited in the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC).

RESULTS

The analysis of 30 specimens of *P. arenatus* necropsied presented three infected fish with one specimen of 2.5 to 3 cm length trypanorhynch plerocerci each one, taxonomic identified as beneath.

Lacistorhynchoidea Guiart, 1927

Lacistorhynchidae Guiart, 1927

Lacistorhynchinae Guiart, 1927

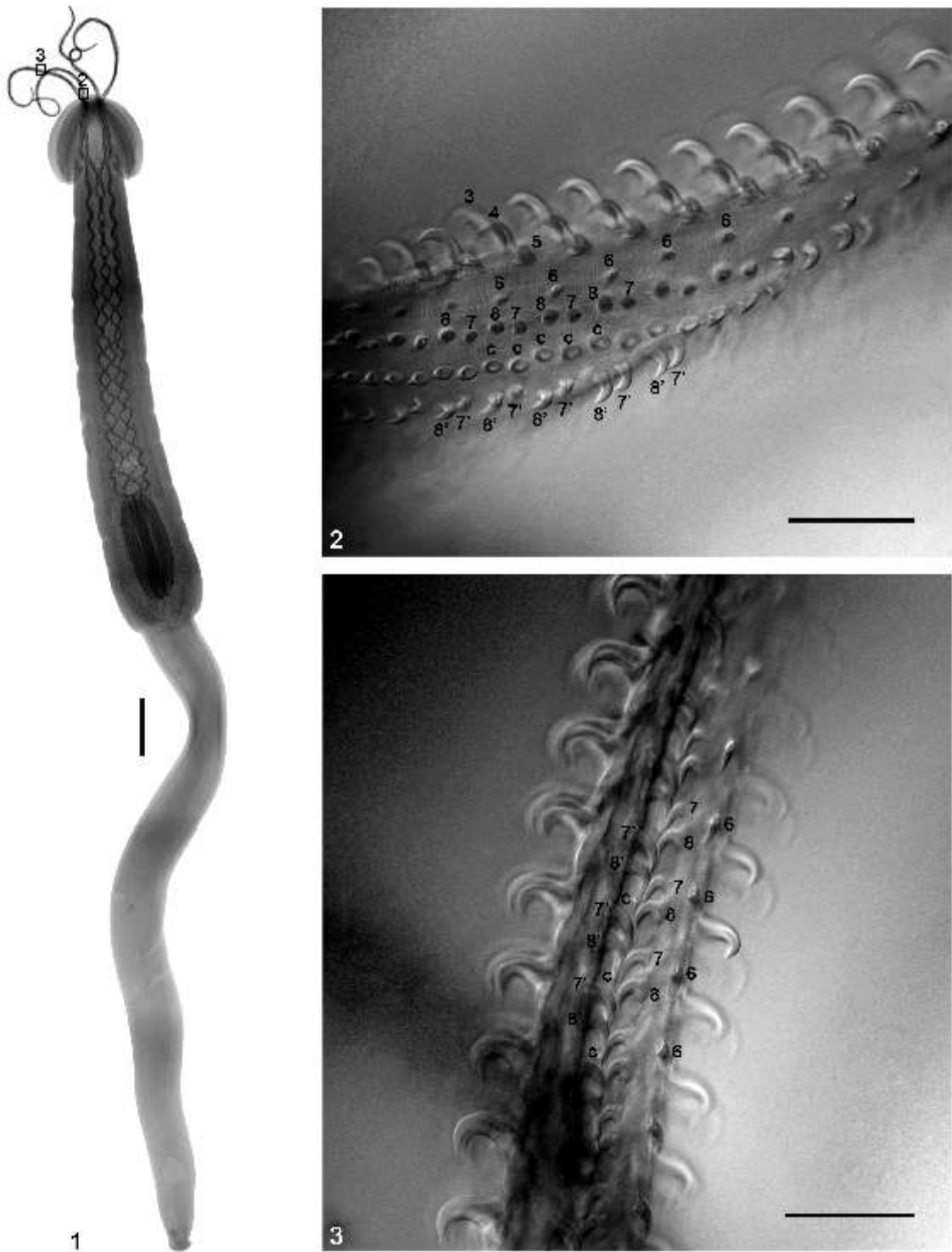
Callitetrarhynchus Pintner, 1931

Callitetrarhynchus speciosus (Linton, 1897)

Carvajal & Rego, 1985 (Figs. 1-3).

Description of main features: based on three plerocerci collected of *P. arenatus*. Plerocerci with blastocist present tail extension. Scolex elongated, thin and acraspedote. Two pateliform bothria with weakly notched posterior margins. Pars vaginalis long, tentacle sheaths regularly sinuous, enlarged anteriorly, less sinuous on the pars botrialis region. Bulbs elongated. Retractor muscles originate in anterior 1/3 of bulbs. Pars postbulbosa present, small. Metabasal armature poeciloacanthous atypical, heteromorphous; hooks hollow, in ascending half spirals of 8 principal hooks, beginning on internal surface. The hooks 1(1') are large and uncinata, the hooks 2(2') are uncinata and long, the hooks 3(3') are falciform, large and has large bases, the hooks 4(4') and 5(5') are falciform, the hooks 6(6') are spiniform and be located near from external surface, the satellite hooks 7(7') and 8(8') are of same size and slender uncinata shape. A simple chainette is present.

The parasitic indices of prevalence, mean abundance and mean intensity of infection by *C. speciosus* larvae, as well as the infection sites and the deposit number at CHIOC are depicted in Table 1 and the morphological and morphometric data of *C. speciosus* larvae collected in *P. arenatus* are presented in Table 2.



Figures 1-3. *Callitetrarhynchus speciosus* plerocercus from *Priacanthus arenatus*. **Fig. 1.** Entire plerocercus, lateral view. Squares 2 and 3 indicate the area where the figures were obtained. Scale bar of fig. 1 = 1000 μ m. **Fig. 2.** Detail of the external face hooks arrangement of the basal armature tentacle, showing the 3, 4, 5, 6, 7 (7') 8 (8') hooks and chainette (c). **Fig. 3.** Detail of external face hooks arrangement of the metabasal armature tentacle, showing the 6, 7 (7'), 8 (8') hooks and chainette (c). Scale bars of figs. 2 and 3 = 50 μ m.

Table 1. Parasitary indices of prevalence (P), mean intensity (MI) and mean abundance (MA), infection sites (IS), and number of deposit in the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC) of the *Callitetrarhynchus speciosus* larvae from *Priacanthus arenatus* off the coast of State of Rio de Janeiro, Brazil.

	P (%)	MA	MI	IS	CHIOC
<i>Callitetrarhynchus speciosus</i>	10	0.1	1	M, IS, OS	37994, 37995, 37996

M= mesentery; IS= intestine serosa; OS= ovary serosa.

Table 2. Morphological and morphometric data of the *Callitetrarhynchus speciosus* plerocerci from *Priacanthus arenatus* off the coast of State of Rio de Janeiro, Brazil.

<i>Callitetrarhynchus speciosus</i>	
Scolex (L)	11.175 – 12.200 (11.758)
Scolex (W)	2.025 – 2.350 (2.191)
Appendix (L)	10.750 – 14.975 (12.416)
Appendix (W)	1.275 – 1.475 (1.358)
Pars bothrials (L)	2.025 – 2.125 (2.066)
Pars bothrials (W)	2.075 – 2.25 (2.166)
Pars vaginalis (L)	8.625 – 9.200 (9.008)
Pars vaginalis (W)	1.675 – 2.300 (1.958)
Pars bulbosa (L)	2.100 – 2.375 (2.250)
Pars bulbosa (W)	0.975 – 1.375 (1.166)
Pars post-bulbosa (L)	0.300 – 0.570 (0.440)
Bulbs (L)	1.970 – 2.370 (2.170)
Bulbs (W)	0.250 – 0.320 (0.290)
Tentacles (L)	0.940 – 3.840 (2.578)
Tentacles (DB)	0.060- 0.100 (0.080)
Tentacles (MBD)	0.060 – 0.090 (0.060)

L = length; W = width; BD = basal diameter; MBD = metabasal diameter.
Measurements are presented in millimeters.

DISCUSSION

The collected specimens of *C. speciosus* of the present study are in accordance with the morphological and morphometric data of species redescription did by Carvarjal & Rego (1985). It was observed that the present study specimens showed a small pars post-bulbosa, measuring 440 (300-570) μm , as observed by Carvajal & Rego (1985) which reported it with 200 (160-340) μm length (pages 162 and 163). Palm (2004) related it as absent, but has

presented the range "...ppb absent (160-340)..." (page 347). Al-Zubaidy & Mhaisen (2014) reported the presence of ppb measuring 250 (150-280). In the specimens collected from *Cynoscion guatucupa* (Cuvier, 1830) off coast of the State of Rio Grande do Sul, deposited in the CHIOC under the numbers: 33905, 33906, 33907, was possible to observe the absence of pars post-bulbosa; such as Lima (2004) related that absence in collected plerocerci of *P. arenatus*, *Epinephelus morio* (Valenciennes, 1828), *E. guaza* Linnaeus, 1758, *E. flavolimbatus* Poey, 1865 and *E.*

niveatus (Valenciennes, 1828). This fact shows that the pars post-bulbosa can presents a little length or even be absent in *C. speciosus*, like an intraspecific variation.

Lima (2004) reported *C. speciosus* in *P. arenatus* with prevalence of 12.5%, near to the result of this study. Differently for the present study he had reported that all the fish harboring *C. speciosus* presented concomitant infection with *C. gracilis* Pintner, 1931. Differently, Pinto *et al.* (1988), De Fabio (2000), Tavares *et al.* (2001) and Ferreira *et al.* (2006) which studied helminth infection for the same host have not found trypanorhynch.

In other fishes from the coast of State of Rio de Janeiro, the same parasite was found with lower prevalence, P = 2% in *Balistes capriscus* Gmelin, 1789; P = 6% in *Aluterus monoceros* (Linnaeus, 1758), and P = 6% in *Scomberomorus cavalla* (Cuvier, 1829) (Dias *et al.*, 2009, 2010, 2011). In the present study larvae were collected in the mesentery and intestine and ovarian serosas, differently Lima (2004) which previously reported this species parasitizing *P. arenatus* found it only in the mesentery; and in other teleostean hosts collected from the State of Rio de Janeiro, *C. speciosus* were found in the mesentery (Dias *et al.*, 2009, 2010, 2011), and in the liver (Dias *et al.*, 2010). Therefore, suggesting that future seasonal studies need to be make aiming to establish the parasitic indices of this host and the role of *P. arenatus* as one of the intermediate hosts of *C. speciosus*.

This study was limited to research due some papers had no complete information about parasitary indices and sites of infection.

In the present study the prevalence and mean intensity of *C. speciosus* in *P. arenatus* were low and was not found infecting the musculature, however this trypanorhynch species gave a repugnant aspect to the fish, considering the large size of the blastocyst. We

suggest that studies be done to set up his allergenic potential.

ACKNOWLEDGMENTS

The authors would like to thank Heloisa Maria Nogueira Diniz (Serviço de Produção e Tratamento de Imagens do IOC) for processing the plate of figures; the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) for partial financial supports.

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Received February 26, 2016.
Accepted March 25, 2016.