

Gobioides broussonnetii (Gobiidae): a new host for *Pterobothrium crassicolle* (Trypanorhyncha) on Marajó Island, northern Brazil

Gobioides broussonnetii (Gobiidae): um novo hospedeiro para *Pterobothrium crassicolle* (Trypanorhyncha) na Ilha do Marajó, Brasil

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Abstract

In the present study, the cestoid *Pterobothrium crassicolle* Diesing, 1850 (Trypanorhyncha), was observed parasitizing specimens of the violet goby (*Gobioides broussonnetii* Lacepède, 1800) collected from the estuary of the Paracuarí River on Marajó Island in the north of the Brazilian state of Pará, between January 2009 and December 2010. Tissue samples were analyzed, which led to identification of blastocysts containing plerocercoid larvae. These larvae were processed for scanning electron microscopy. Sixty *G. broussonnetii* specimens were dissected, and *P. crassicolle* was found in 48 (80%) of them. The violet goby, *G. broussonnetii*, is a new host for *P. crassicolle*.

Keywords: Violet goby, plerocercus, Pterobothriidea.

Resumo

No presente estudo, o cestóide *Pterobothrium crassicolle* Diesing, 1850 (Trypanorhyncha) é descrito parasitando espécimes do Peixe-dragão (*Gobioides broussonnetii* Lacepède, 1800), coletados no estuário do rio Paracuarí na Ilha de Marajó no Norte do Estado do Pará, entre janeiro de 2009 e dezembro de 2010. Amostras de tecidos foram analisadas e blastocistos contendo larvas plerocercóides foram identificados. Estas larvas foram processadas para microscopia eletrônica de varredura. Sessenta espécimes de *G. broussonnetii* foram analisados, e *P. crassicolle* foi encontrado em 48 indivíduos (80%). Este é o primeiro registro de *P. crassicolle* parasitando o Peixe-dragão, *G. broussonnetii*.

Palavras-chave: Peixe-dragão, plerocercos, Pterobothriidea.

Introduction

The waters of the Amazon estuary are inhabited by both marine and freshwater fish species, which constitute an important economic resource for the region (BARTHEM, 1985). The violet goby or dragon fish, *Gobioides broussonnetii* Lacepède, 1800, is the largest member of the Gobiidae and forms an important link in the food chain of this estuary. It prefers muddy bays and freshwater estuaries,

but is also found at sea on muddy bottoms, widely distributed around the southern USA, Central America, the Caribbean islands and northeastern South America (BRAGANÇA, 2005).

Trypanorhyncha is characterized by the presence of a bothridium-like scolex, with reversible tentacles, with a larval, plerocercus or plerocercoid, or post-larval stage, which can be found in teleost fish, crustaceans and, occasionally, reptiles. The adults are found in the gastrointestinal tracts of elasmobranch fish (CAMPBELL; BEVERIDGE, 1994).

While these parasites are well known from studies in southern Brazil (PALM, 1997), few data are available on their occurrence

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in this country's northern (Amazon) region. The present study identifies *G. broussonnetii* as a host of *Pterobothrium crassicolle* in the region of Marajó Island, in the estuary of the Amazon River in northern Brazil.

Materials and Methods

Violet goby (*G. broussonnetii*) specimens (n = 60) were collected monthly between January 2009 and December 2010 in the area of the estuary of the Paracauari River in the municipality of Salvaterra, which is located on Marajó Island, in the north of the Brazilian state of Pará (0° 58' S and 49° 34' W) (MMA/SISBIO authorization no. 27119-1). The specimens were kept in an oxygenated aquarium filled with water from the capture site, and were subsequently transported in aerated plastic bags to the Edilson Matos Research Laboratory at the Federal University of Pará (FUPA) in the mainland city of Belém. The specimens were anesthetized with MS 222 (Sandoz Laboratories) for measurement of biometric parameters and subsequent dissection.

Tissues from host samples were analyzed using a stereomicroscope, which led to identification of blastocysts containing plerocercus larvae. These larvae were processed following the procedures recommended by Eiras (1994). The taxonomic classification of the trypanorhynch helminths was based on the studies of Rego et al. (1974), Campbell and Beveridge (1994) and Palm (1997). The prevalence of the parasites and the mean intensity of infection were calculated in accordance with Bush et al. (1997).

For scanning electron microscopy (SEM), the larvae were fixed in 5% glutaraldehyde buffered with sodium cacodylate (pH 7.2) for 12 hours at 4 °C, and then washed overnight in the same buffer solution and post-fixed in 2% OsO₄ buffered with the same solution for 3 hours at 4 °C. The samples were then dehydrated in an increasing series of ethanol concentrations. The larvae were dried to the critical point, metalized with a fine (20 nm) layer of gold, and photographed in a LEO 1459 VP SEM operated at 80 kV. The specimens were also photographed in a Hitachi TM 3000 Tabletop electron microscope (Hitachi TM 3000), for which they were prepared following the same procedure, except for the metalization, which was not carried out in this case. Representative specimens of the species found were deposited in the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC no. 37845 a-b), Rio de Janeiro, RJ, Brazil.

Results and Discussion

The 60 *G. broussonnetii* specimens analyzed in the present study had a mean total length of 21.7 ± 4.5 cm, and 48 (80.0%) were found to be parasitized by at least one blastocyst, with mean intensity of 1.04. Fifty blastocysts were collected and processed, and all were identified as *P. crassicolle*, and no infections by any other helminth species were recorded. All the specimens were found in the mesentery of the fish, and it seemed that these parasites did not show any preference regarding host gender.

Taxonomy:

Superfamily Oterobothrioidea Dollfus, 1942

Family Pterobothriidea Pintner, 1931

Pterobothrium crassicolle Diesing, 1850 (Figure 1a-f)

Principal morphological traits of *P. crassicolle* based on 30 plerocerci collected from *G. broussonnetii*: Plerocercus with blastocyst. Scolex elongated, acraspedote, subcylindrical and narrower than the pars bothridialis. Pars bothridialis with four piriform bothria on mobile pedicles with rounded edges (Figure 1a). Pars vaginalis is long, corresponding to more than half the length of the scolex. The tentacle sheath is initially relatively smooth, with elongated bulbs. Pars postbulbosa does not overlap the pars bothridialis. Distinctive basal armature and swelling present on bothridial and antibothridial faces of tentacle; macrohooks present on antibothridial face; asymmetrical basal swelling of tentacle present. Hook files 1 (1') widely separated, falciform; intercalary row(s) present proximally to each principal row; intercalary rows extend onto bothridial surface to merge with band of hooks occupying midline of bothridial surface of tentacle. Hooks in row 1 (1') widely spaced, falciform; hook rows interspersed with each principal hook row, the interspersed row extending along the bothridial surface bordered with the group of hooks, occupying the median line of the bothridial surface of the tentacle (Figure 1b-d). Metabasal and apical shielding formed by the principal rows of large hooks in an alternating half-spiral arrangement, heteromorphic and hollow. Small hooks interspersed between the principal rows on both the bothridial and antibothridial surfaces (Figure 1e, f).

The morphology of the *P. crassicolle* specimens collected in the present study was consistent with the descriptions provided for the species by São Clemente (1986a), Rego (1987) and Campbell and Beveridge (1996). The larvae of *P. crassicolle* are not host-specific (PORTO et al., 2009), and have been recorded in siluriform and other estuarine and marine fish species in Brazil (DIAS et al. 2011; PEREIRA Jr; BOEGER, 2005; PORTO et al., 2009; REGO, 1987; SÃO CLEMENTE, 1986a, b; SÃO CLEMENTE et al., 1997; TAKEMOTO et al., 1996).

A number of studies have recorded the presence of plerocerci of *P. crassicolle* in fish collected off the coast of Brazil. In the north of the Brazilian state of Pará, this species was recorded for the first time by Diesing (1850) (reference unexamined, apud Rego, 1987) in *Bagrus marinus*, and Rego (1987) provided a redescription of the species in *Brachyplatystoma flavicans*, *B. vaillantii* and *B. marinus*. The prevalence of infection recorded in *G. broussonnetii* was relatively high in comparison with previous studies in southern Brazil, while the intensity was comparatively low. São Clemente (1986a, b) recorded a prevalence of 11% and mean intensity of 1.52 in whitemouth croakers (*Micropogonias furnieri*) from Rio de Janeiro, for example, and Porto et al. (2009) recorded values of 26.7% and 2.25, respectively, for this species from the same region (Niterói). At the southern extremity of this country, in Rio Grande, Pereira Jr. and Boeger (2005) recorded a prevalence of 66.7% and a mean intensity of infection of 5.2 in some species of sciaenid fish. The present report is the first record of *P. crassicolle* infecting the violet goby, *G. broussonnetii*.

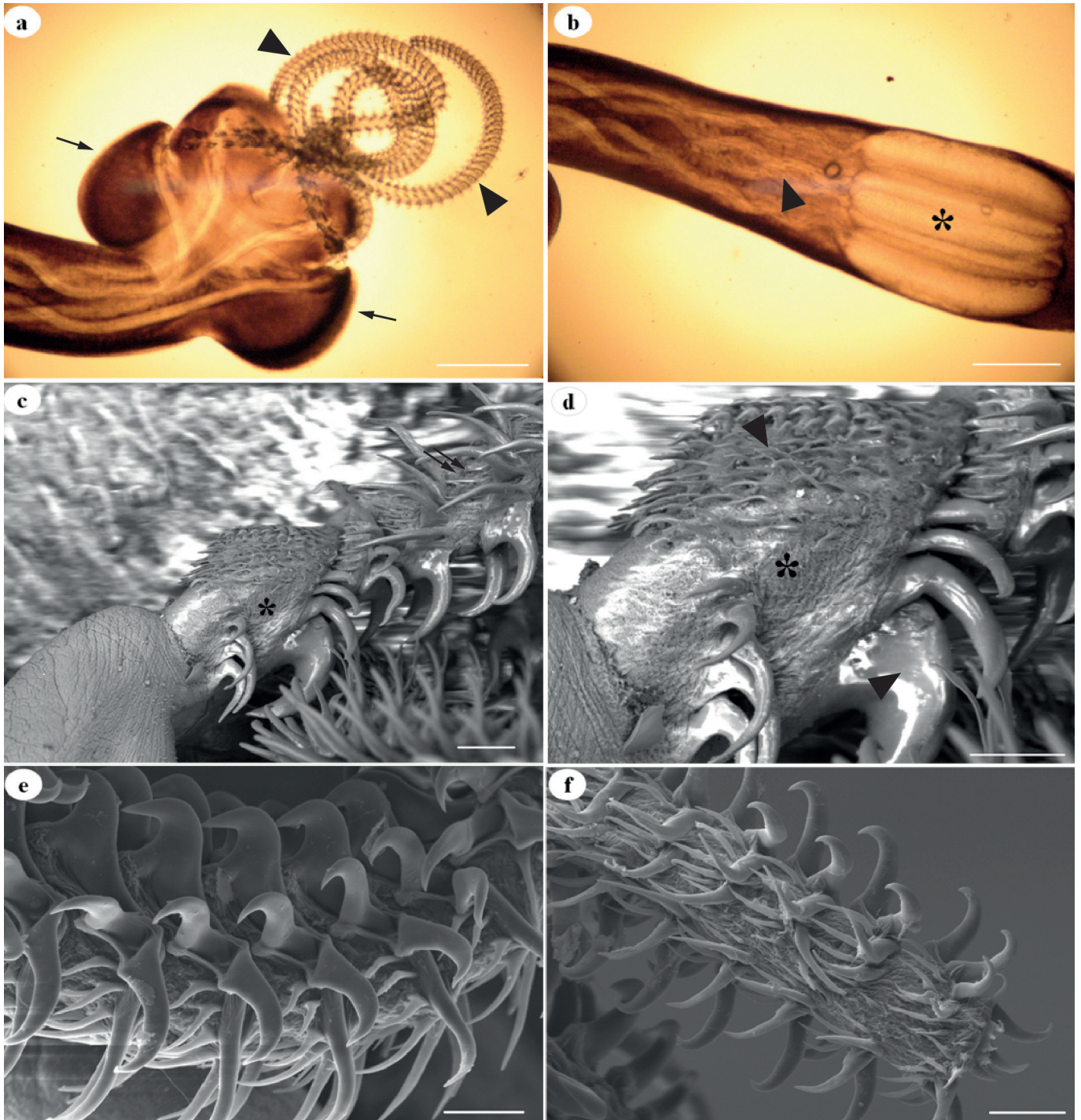


Figure 1. *Prerobothrium crassicolle*. (a) Optical microscopy showing the scolex with bothria (arrows) and tentacles (arrowheads). Scale bar: 500 μ m. (b) Scolex presenting pars bulbosa (*) and tentacle sheath (arrowhead). Scale bar: 500 μ m. (c) Tabletop electron microscopy, showing oncotaxis of the basal area of the tentacles (*) and the beginning of the metabasal area (double arrows). Scale bar: 40 μ m. (d) Oncotaxis of the basal region (*) with hooks characteristic of the species (arrowhead). Scale bar: 30 μ m. (e) SEM, showing oncotaxis of the metabasal region of the tentacles. Scale bar: 25 μ m. (f) Oncotaxis of the apical region of the tentacles. Scale bar: 25 μ m.

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