

RESEARCH NOTE

Digenetic trematodes of the Brazilian flathead, *Percophis brasiliensis* Quoy et Gaimard, 1825 (Percophidae, Perciformes), from Argentinean and Uruguayan waters

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Abstract

Based on the examination of 234 specimens of the Brazilian flathead, *Percophis brasiliensis* (Percophidae), caught in the Argentinean and Uruguayan Seas, the list of digenean species parasitizing *P. brasiliensis* is increased from 6 to 9, including the specific identification of two species previously reported at the generic level. The three new digenean records for *P. brasiliensis* are: *Elytrophalloides oatesi*, *Parahemiurus merus* and *Aponurus laguncula*, while that *Ectenurus virgulus* and *Lecithocladium cristatum* were identified to specific level. These reports showed the highest diversity of digeneans registered in fishes from the study region. The diversity of the digenean fauna of *P. brasiliensis* could be a consequence of the generalist food habits of this fish.

Keywords

Digenea, *Ectenurus virgulus*, *Elytrophalloides oatesi*, *Lecithocladium cristatum*, *Parahemiurus merus*, *Aponurus laguncula*, Brazilian flathead, *Percophis brasiliensis*, Argentina, Uruguay

The Brazilian flathead, *Percophis brasiliensis* Quoy et Gaimard, 1825 (Percophidae, Perciformes) is a benthic fish that inhabits sandy bottoms and feeds mainly on demersal fishes. Its distribution is restricted to South American Atlantic waters, from Rio de Janeiro, Brazil (23°S) to North of Santa Cruz Province in Argentina (47°S) and it is the unique representative of this genus (Cousseau and Perrotta 2004, Froese and Pauly 2009).

Previous records of parasites from Brazilian flatheads include *Trifur tortuosus* Wilson, 1917 (Copepoda), prawn larvae of the genus *Gnathia* (Isopoda), *Cardicola ambrosioi* Braicovich, Etchegoin, Timi et Sardella, 2006 (Digenea) and *Moravecchia argentinensis* Braicovich, Moravec et Timi, 2007 (Nematoda) from Argentinean waters (Wilson 1917; Rohde et al. 1995; Braicovich et al. 2006, 2007); whereas the cestodes *Nybelinia* sp. and *Grillotia* sp., and the nematodes *Anisakis* sp., *Contracaecum* sp., *Hysterothylacium* sp., *Raphidascaris* sp.

and *Terranova* sp. have been reported in Brazilian waters (Luque and Poulin 2004). In a recent paper, aimed at discriminating Brazilian flathead populations in the Argentinean and Uruguayan Seas, Braicovich and Timi (2008) reported a list of 23 parasite species in a sample of 177 fish, including 6 digenean species, *Proserhynchus* sp., *C. ambrosioi*, *Derogenes varicus* (Müller, 1784) Looss, 1901, *Ectenurus* sp., *Lecithochirium microstomum* Chandler, 1935 and *Lecithocladium* sp.

The aim of the present article is to extend the list of digeneans harboured by *P. brasiliensis* in the Argentinean and Uruguayan Seas and to determine at specific level some species previously reported at generic level.

An additional sample of 234 specimens of *P. brasiliensis* was examined for digeneans, totalizing 411 hosts. Fish were caught during a research cruise of Dr. E. Holmberg 08/05 (Instituto Nacional de Investigación y Desarrollo Pesquero, INIDEP) and by commercial fleet operating at the ports of Mar

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del Plata and San Antonio Oeste, which covered the South West Atlantic coastal shelf from 34°30'S to 42°S, between October 2005 and March 2006. Fish were either kept fresh or deep frozen in plastic bags at -18°C until examination. After defrosting each fish was measured for total length (cm) and dissected out and examined under stereoscopic microscope. Live parasites were fixed under slight cover glass in 5% formalin, stored in 70% alcohol, stained with Mayer's acid carmine and mounted in Canada balsam. Drawings were made with the aid of a drawing tube. The comments are provided only for those species previously unknown in the study zone. The material studied was deposited in the Helminthological Collection of the Museo de la Plata (CHMLP), La Plata, Argentina. Prevalence and mean intensity of infection were calculated according Bush *et al.* (1997) for the whole sample, including 177 flatheads previously examined by Braicovich and Timi (2008).

***Ectenurus virgulus* Linton, 1910 (Fig. 1)**

Site of infection: Stomach.

Voucher specimens: CHMLP, Collection No. 5959.

Prevalence of infection: 0.97%.

Mean intensity of infection: 1.75 (1–2).

Comments: The specimens collected from *P. brasiliensis* were identified as *E. virgulus*, according to Bray (1990a), mainly by the presence of a long sinus-sac reaching the middle region of the ventral sucker.

Szidat (1961) reported the presence of *E. virgula* Linton, 1910, (*E. virgulus* according with Manter (1947)), parasitizing *Urophycis brasiliensis* (Kaup, 1858) along the Argentinean coasts. Metacercariae belonging to this species were also found by Daponte *et al.* (2008) on the chaetognath *Sagitta friederici* Ritter-Zahony, 1911.

Three other species of *Ectenurus* have been reported from South American Atlantic waters: *Ectenurus lepidus* Looss, 1907, *Ectenurus rodriguezi* Cristófaró et Guimarães, 1974, and *Ectenurus yamagutii* Nahhas et Powell, 1971 (Travassos *et al.* 1967, Nahhas and Powell 1971, Cristófaró and Guimarães 1974, Fernandes *et al.* 1985).

Ectenurus lepidus found in *Oligoplites saurus* (Bloch et Schneider, 1801) from Brazilian coasts by Travassos *et al.* (1967), was later included in *E. virgulus* by Gibson and Bray (1986). The species described as *E. rodriguezi* by Cristófaró and Guimarães (1974) from *Gymnothorax vicinus* (Castelnau, 1855), was considered by Gibson and Bray (1986) as a synonym of *Lecithocladium havanensis* (Vigueras, 1958) from Cuba. *Ectenurus yamagutii* was described based on specimens collected from *Caranx crysos* (Mitchill, 1815), *Caranx hippos* (Linnaeus, 1766) and *Lagodon rhomboides* (Linnaeus, 1766) from the Gulf of México (Nahhas and Powell 1971). These authors differentiated *E. yamagutii* from *E. virgulus* by having a short sinus sac not reaching to the posterior margin of the acetabulum. This species is distinguished from other species (not mentioned in the original description) by having a short vitelline lobes. However, this is not an exclusive characteris-

tic from this species; therefore it should probably be considered as synonym of *E. virgulus*.

***Elytrophalloides oatesi* (Leiper et Atkinson, 1914) Szidat et Graefe, 1967 (Fig. 2)**

Site of infection: Stomach.

Voucher specimens: CHMLP, Collection No. 5960.

Prevalence of infection: 0.97%.

Mean intensity of infection: 8.25 (1–18).

Comments: The studied specimens agreed with the description of *E. oatesi* given by Gibson (1976).

Szidat (1955) erected *Elytrophalloides merlucii* based on specimens collected from *Merluccius hubbsi* Marini, 1933 in Argentinean waters. Later, Szidat and Graefe (1967) and Prudhoe and Bray (1973) considered *E. merlucii* as a synonym of *E. oatesi*. The presence of *E. oatesi* in Argentinean waters was also reported for *Dissostichus eleginoides* Smitt, 1898, *Eleginops maclovinus* (Cuvier, 1830), *Xystreureys rasile* (Jordan, 1891), *Patagonotothen ramsayi* (Regan, 1913), *Merluccius australis* (Hutton, 1872) and *M. hubbsi* (Szidat 1950, 1961; Gaevskaya *et al.* 1990; MacKenzie and Longshaw 1995; Sardella and Timi 1996, 2004; Brickle *et al.* 2005, 2006; Brickle and MacKenzie 2007; González *et al.* 2007). Suriano and Sutton (1981) stated that the presence of cuticular annular plications on the soma is a variable morphological condition and argued that, for this reason, *Elytrophalloides* and *Elytrophallus* should be considered as synonyms, and placed the species described by Szidat (1955) in the genus *Elytrophallus*. These authors based their arguments on material collected from *M. hubbsi*, *M. australis*, *Antimora rostrata* (Günther, 1878), *Macruronus magellanicus* Lönnberg, 1907 and *Salilota australis* Günther, 1878. However, the discrimination of *Elytrophallus* from *Elytrophalloides* by lacking tegumental plications was later validated by Bray (1990a, b) and Gibson (2002).

***Lecithocladium cristatum* (Rudolphi, 1819) Looss, 1907 (Fig. 3)**

Site of infection: Stomach.

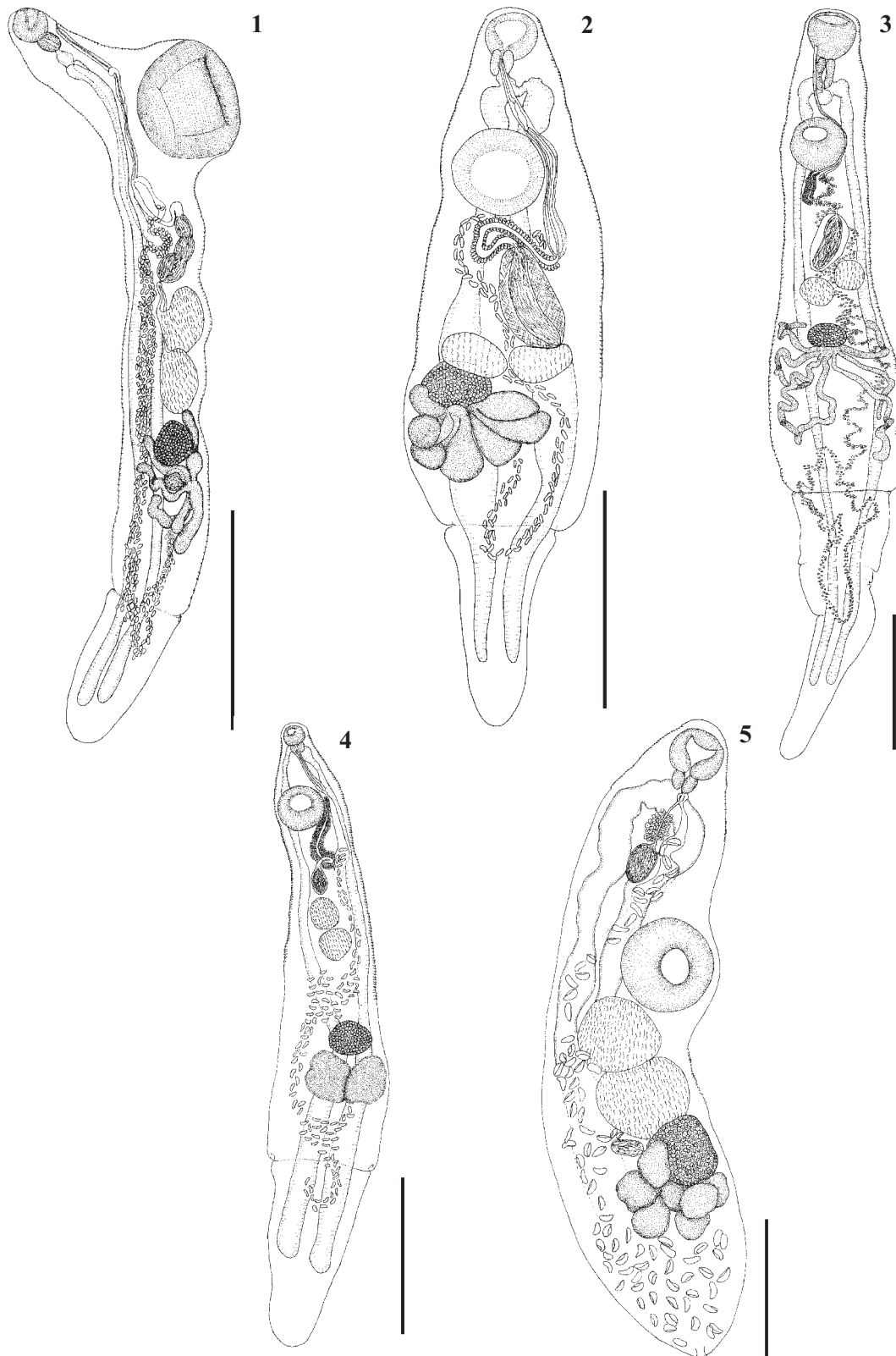
Voucher specimens: CHMLP, Collection No. 5961.

Prevalence of infection: 8.27%.

Mean intensity of infection: 6.68 (1–35).

Comments: Dawes (1947) stated that *L. cristatum* is a synonym of *Lecithocladium excisum* Rudolphi, 1819; however, Gibson (1976) considered *L. cristatum* as a valid species. *L. cristatum* can be distinguished from *L. excisum* by having an oral sucker that is less funnel-shaped, and of similar size to the ventral sucker, and a pronounced "Nacken-buckel" (which is absent in *L. excisum*), and by the absence of crinkling of the cuticular plications (Kräuselung) dorsal to pharynx; *L. cristatum* has also slightly smaller eggs (19–20 µm compared to 21–23 µm) (Gibson 1976).

Lecithocladium harpodontis Srivastava, 1942 reported from the South West Atlantic in *Scomber colias* Gmelin, 1789



Figs 1–5. Digeneans of *Percophis brasiliensis*. **1.** *Ectenurus virgulus*, ventral view. **2.** *Elytrophalloides oatesi*, ventral view. **3.** *Lecithocladium cristatum*, ventral view. **4.** *Parahemiurus merus*, ventral view. **5.** *Aponurus laguncula*, ventral view. Scale bars = 0.5 mm (Figs 1–4); 0.25 mm (Fig. 5)

by Travassos *et al.* (1969) resembles the specimens found in *P. brasiliensis* in the suckers width ratio (1:1.07–1.97 mm), the size of oral and ventral suckers and pharynx, and egg size (0.019–0.022 × 0.007–0.011 mm). The presence of a “Nackebuckel” was not mentioned by Travassos *et al.* (1969). Gibson and Bray (1986) pooled the Indo-Malaysian species into seven species according to body, suckers and eggs size, and considered *L. harpodontis* as a characteristic species for this region. Due to the fact that the description of *L. harpodontis* given by Travassos *et al.* (1969) is brief and not consistent with the morphological characteristics detailed by Gibson and Bray (1986) for this species, we suggest that the species found in Brazil should be considered as *L. cristatum*.

Gibson (1976) reported *L. cristatum* from *Stromateus maculatus* Cuvier, 1833 from Malvinas Islands providing a re-description of the species. Later, Gaevskaya and Kovaleva (1978) considered *L. cristatum sensu* Gibson (1976) as a synonym of *Lecithocladium falklandicum* Kovaleva et Gaevskaya, 1978, described from the same host species in the same zone. However, Gibson and Bray (1986) doubted about the validity of *L. falklandicum*.

Amato (1983) described *Lecithocladium chaetodipteri* from *Chaetodipterus faber* (Broussonet, 1782) in Brazil. This author distinguished *L. chaetodipteri* from *L. harpodontis*, the only species previously reported from Brazil (Travassos *et al.* 1969), by the body size (3.23–4.9 mm compared to 1.59–2.09 mm) and its longer seminal vesicle and from the most similar, *Lecithocladium unibulbolabrum* Fischthal et Thomas, 1971 by the absence of a bulbous swelling on the oral sucker and the oral sucker-pharynx length ratio (1:1 compared to 3:2 from *L. unibulbolabrum*). However, Gibson and Bray (1986) stated that *L. unibulbolabrum* can be considered a synonym of *L. cristatum* because those specimens possessed a “Nackebuckle” and closely resembled *L. cristatum*. Hence, due to the similarities in morphology and size between *L. chaetodipteri* and *L. cristatum* from present study, we suggest that *L. chaetodipteri* is a synonym of *L. cristatum*.

The presence of *L. cristatum* in *P. brasiliensis* represents a new host record and the first report of this parasite from study area.

***Parahemiurus merus* (Linton, 1910) Manter, 1940 (Fig. 4)**

Site of infection: Stomach.

Voucher specimens: CHMLP, Collection No. 5962.

Prevalence of infection: 0.49%.

Mean intensity of infection: 1 (1–1).

Comments: The specimens collected from *P. brasiliensis* were identified as *P. merus* following the key to species of *Parahemiurus* Vaz et Pereira, 1930 by Bray (1990b). The material studied has a vitellarium formed two oval masses, pliations not reaching the posterior margin of the soma, and an oval pharynx, which is shorter than the sinus sac. This species has been previously reported in Argentina in *Engraulis anchoita* Hubbs et Marini, 1935 (Timi *et al.* 1999).

***Aponurus laguncula* Looss, 1907 (Fig. 5)**

Site of infection: Stomach.

Voucher specimens: CHMLP, Collection No. 5963.

Prevalence of infection: 0.97%.

Mean intensity of infection: 2.75 (1–7).

Comments: The specimens studied herein showed the morphological features detailed by Bray and MacKenzie (1990) in their description of *A. laguncula*, including the morphological characteristics of the eggs (thin-shelled, tanned and operculate) and egg-size range (32–42 × 16–21 µm). *Aponurus laguncula* is a cosmopolitan species parasitizing at least 60 teleost species of 27 families and eight orders (Bray and MacKenzie 1990). In the South West Atlantic, this species has been previously reported from *C. faber*, *Scomber japonicus* Houttuyn, 1780, *Trachurus lathami* Nichols, 1920 and *Umbrina coroides* (Cuvier, 1930) from Brazil by Fernandes *et al.* (1985). In Argentinean waters, the only record of *A. laguncula* is that by Szidat (1961) from *Paralichthys patagonicus* Jordan, 1889 from Patagonian waters. This author did not provide a detailed description and for this reason, the specific status of Szidat's specimens is doubtful.

Conclusions

In the present paper the list of digenean species parasitizing *P. brasiliensis* is increased from 6 to 9, including the identification at the specific level of worms previously reported by Braicovich and Timi (2008) as *Ectenurus* sp. and *Lecithocladium* sp. and new host records for *E. oatesi*, *P. merus* and *A. laguncula* from *P. brasiliensis*.

The digenean fauna of *P. brasiliensis* is composed by eight species at adults stage and one species belonging to the genus *Prosorhynchus* at larval stage (metacercaria), representing the highest diversity of digeneans registered in fishes from the study region. The inclusion of *P. brasiliensis* as the definitive host in the life cycles of 8 species of digeneans could be a consequence of the food preferences of this fish. Additionally, the ingestion of fish preys could produce post-cyclic transmission in some of digenean species of low specificity.

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