

## RESEARCH NOTE/ NOTA CIENTÍFICA

### METACESTODES OF *PARVITAENIA MACROPEOS* (CYCLOPHYLLIDEA, GRYPORHYNCHIDAE) IN *AUSTRALOHEROS FACETUS* (PISCES, CICHLIDAE) IN BRAZIL

### METACESTODOS DE *PARVITAENIA MACROPEOS* (CYCLOPHYLLIDEA, GRYPORHYNCHIDAE) EN *AUSTRALOHEROS FACETUS* (PISCES, CICHLIDAE) EN BRASIL

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#### Abstract

During studies of helminth parasites of *Australoheros facetus* (Jenyns, 1842) collected in the Pampulha dam, Belo Horizonte, Minas Gerais, Brazil, in June and July 2011, it was verified the natural infection of these fishes by larval cestodes. From 20 specimens of *A. facetus* analyzed, 13 (65%) presented metacestodes in the intestine, with the mean intensity 2.69 (1-7) and mean abundance 1.8 (0-7). After morphological characterization, the parasites were identified as *Parvitaenia macropeos* (Wedl, 1855). This is the first report of metacestodes of *Parvitaenia* in Brazil and *P. macropeos* in South America. *Australoheros facetus* is a new host known for *P. macropeos*.

**Keywords:** Cestodes, fishes, metacestodes, parasites, *Parvitaenia*.

#### Resumen

Durante los estudios de helmintos parásitos de *Australoheros facetus* (Jenyns, 1842) recogidos en la laguna de Pampulha, Belo Horizonte, Minas Gerais, Brasil, en junio y julio de 2011, se observó la infección natural de los peces por cestodos larvarios. De los 20 especímenes de *A. facetus* analizados, 13 (65%) tenían metacestodos en el intestino. La intensidad media de infección observada fue de 2,69 (1-7), y la abundancia media de infección 1,8 (0-7). Después de la caracterización morfológica, los parásitos fueron identificados como *Parvitaenia macropeos* (Wedl, 1855). Este es el primer registro de metacestodos de *Parvitaenia* para Brasil y *P. macropeos* para América del Sur. *Australoheros facetus* es un nuevo huésped conocido para *P. macropeos*.

**Palabras clave:** Cestodos, metacestodos, parásitos, *Parvitaenia*, peces.

#### INTRODUCTION

Among the avian cestodes, a large number of species belong to family Gryporhynchidae, parasites of fish-eating birds. These tapeworms present a cosmopolitan distribution, and despite the high richness of species, studies related to larval

forms (metacestodes) in fish are relatively scarce (Scholz *et al.*, 2004).

The involvement of fish in the life cycle of these parasites is little known in Brazil. Metacestodes of

only three gryporhynchid species have been recorded in the country: *Valipora campylancristrota* (Wedl, 1855) found in *Prochilodus lineatus* (Valenciennes, 1836), *Hoplosternum littorale* (Hancock, 1828) and *Pimelodus maculatus* Lacépède, 1803 in the State of Paraná (Rego *et al.*, 1999; Takemoto *et al.*, 2009), *Valipora* sp. reported in *Prochilodus argenteus* Spix & Agassiz, 1829 in the State of Minas Gerais (Monteiro *et al.*, 2009), and *Glossocercus auritus* (Rudolphi, 1819) recently registered in *Poecilia reticulata* Peters, 1859 also in the State of Minas Gerais (Pinto & Melo, 2011). In the present study, metacestodes of *Parvitaenia macropeos* (Wedl, 1855) are reported for the first time in *Australoheros facetus* (Jenyns, 1842) in Brazil.

## MATERIAL AND METHODS

The study was conducted at Pampulha dam (43°59'35''W; 19°50'50''S), Belo Horizonte, Minas Gerais, Brazil, in June and July, 2011. The fishes were collected with a nylon hand net and transported alive to laboratory where they were measured and then killed by decapitation. The viscera were removed and transferred to Petri dishes containing saline (0.85% NaCl) and examined for parasites under stereomicroscope. Metacestodes recovered were flattened under soft pressure, killed in hot water at 70°C, fixed in formalin, stained with acetic alum carmine, dehydrated in an ascending ethanol series, cleared in beechwood creosote and mounted in Canada balsam. For studies of rostellar hooks, the scolex of some parasite specimens were squashed and mounted in wet preparation containing Amann's lactophenol. Morphometric analysis was performed from images obtained in ICC50 Leica digital camera attached to a microscope and by the software Leica Application Suite (LAZ EZ) version 2.0.

The identification of the parasite was based on morphological description by different author (Baer & Bona, 1960; Bona, 1994; Scholz & Salgado-Maldonado, 2001; Scholz *et al.*, 2004). The specimens studied were deposited in the collection of the Laboratory of Taxonomy and Biology of Invertebrates (DPIC), at Department of Parasitology, Federal University of Minas Gerais (access number 6217 a-h). Ecological terms used are in accordance with Bush *et al.* (1997).

## RESULTS

Of a sample of 20 specimens of *A. facetus* measuring 5.3 (4.0-7.3) cm of total length examined, 13 (65%) were infected by metacestodes. It was verified a mean intensity of infection of 2.69 (1-7) parasites and a mean abundance of 1.8 (0-7). Metacestodes (Fig. 1) were found adhered to the intestinal wall of fishes, and were characterized by presenting elongated body (n= 15) measuring 486 (341-648) µm long x 191 (148-218) µm wide. When alive, they have the body filled with dark granules and calcareous corpuscles. The scolex is invaginated, 177 (137-218) µm long x 167 (109-205) µm wide, and presents four spherical suckers measuring 53 (43-63) µm in diameter and a muscular rostellum 73 (51-86) µm long x 56 (46-74) µm wide armed with 20 hooks arranged in two crowns of 10 hooks each. Distal hook (n= 48) is straight, measuring 45 (41-48) µm, and presents a distally curved blade measuring 24 (21-25) µm, handle 20 (18-24) µm, and blade/handle ratio of 1.18 (1.03-1.30). Proximal hook (n= 45) measuring 28 (27-30) µm, with blade of 13 (12-14) µm, handle of 16 (14-18) µm, and blade/handle ratio of 0.81 (0.70-0.94).

Morphological analysis enabled the identification of *P. macropeos*. The measures of rostellar hooks of metacestodes of *Parvitaenia* spp. known and that obtained in the present study are showed for comparison in the Table 1.

## DISCUSSION

The cestodes belonging to the genus *Parvitaenia* Burt, 1940 are intestinal parasites of ardeids, presenting currently over 15 species described (Baer & Bona, 1960; Bona, 1994). The larval stages are known only for three species: *P. macropeos*; *Parvitaenia cochlearii* Coil, 1955; *Parvitaenia samfyia* Mettrick, 1967 (Scholz & Salgado-Maldonado, 2001; Scholz *et al.*, 2008). The metacestodes of *P. macropeos* differ from *P. cochlearii* by smaller size of rostellar hooks (Scholz & Salgado-Maldonado, 2001), and from *P. samfyia* by the shape of the handle that present the distal portion less sharpened (Scholz *et al.*, 2008).

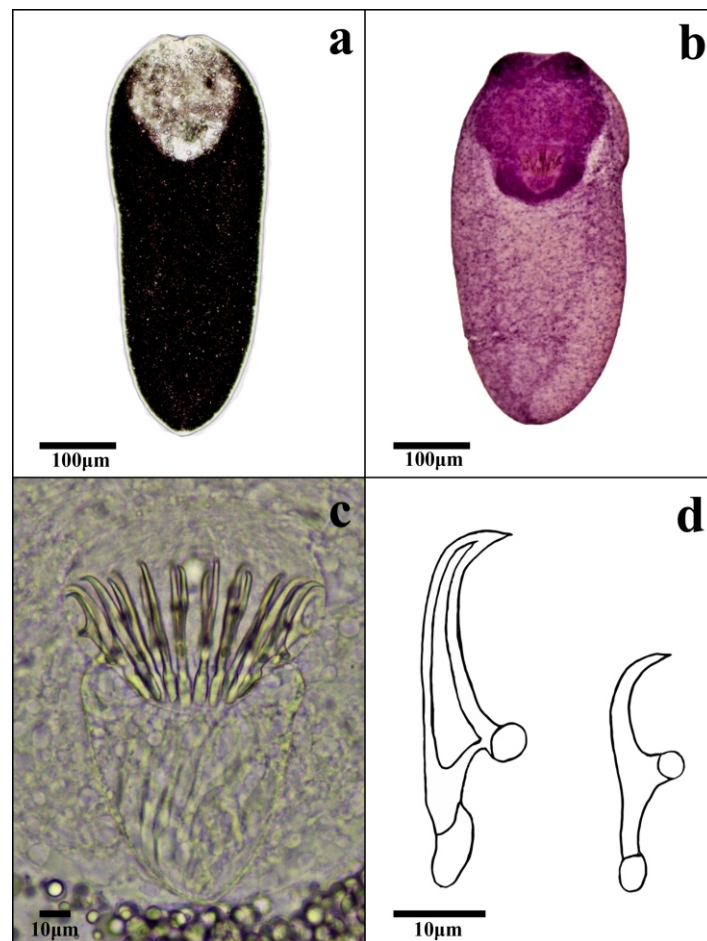
The morphological and biological characteristics of parasites reported in the present study are in agreement with those reported for *P. macropeos* by different authors (Baer & Bona, 1960; Scholz & Salgado-Maldonado, 2001). Two other species are

known to Brazil, *Parvitaenia macrophilica* Baer & Bona, 1960 and *Parvitaenia microphilica* Baer & Bona, 1960, both described from *Cochlearius cochlearius* (Linnaeus, 1766). However, the comparison of these species with *P. macropeos* is not possible, considering that the scolex and rostellum therefore the hooks of these species are unknown (Baer & Bona, 1960).

*Parvitaenia macropeos* was described from adult parasites obtained from the small intestine of *Nycticorax nycticorax* (Linnaeus, 1758) from Hungary, and later recorded in the same host in Japan, Italy, Sri Lanka, Indonesia, Malaysia, Taiwan and Zambia (Wedl, 1855; Baer & Bona, 1960; Scholz *et al.*, 2004). Given the wide geographic distribution of *N. nycticorax* in Brazil

(Sick, 1997), it is possible that this ardeid is also the definitive host of *P. macropeos* in the country. In fact, specimens of *N. nycticorax* are often seen during studies in Pampulha dam.

The larval stages of *P. macropeos* were first described in *Cichlasoma istlanum* (Jordan & Snyder, 1899) from Mexico (Scholz & Salgado-Maldonado, 2001) and later in *Hemichromis letourneuxi* Sauvage, 1880 and *Oreochromis niloticus* (Linnaeus, 1758) from Senegal (Haasová, 2009). The finding of the parasite in a new host, *A. facetus*, suggests a host specificity of metacestodes of *P. macropeos* to cichlids. The present study is the first report of metacestode of *Parvitaenia* for the Brazil and of *P. macropeos* for South America, which expands the area of occurrence of this parasite.



**Figure 1.** *Parvitaenia macropeos* – Metacestodes found in *Australoheros facetus* from Pampulha dam, Belo Horizonte, Minas Gerais, Brazil. a) Larvae alive. b) Larvae stained. c) Detail of rostellum armed with hooks. d) Line drawing of distal (left) and proximal (right) hooks.

**Table 1.** Morphometric data of rostellar hooks of metacercariae of *Parvitaenia* spp., reported by different authors (in micrometers). ND: not done.

|                      | Present study                |  | <i>Parvitaenia macropeos</i>          |   | <i>Parvitaenia cochlearii</i>                       |                      | <i>Parvitaenia samfya</i> |                         |
|----------------------|------------------------------|--|---------------------------------------|---|---|----------------------|---------------------------|-------------------------|
| Host                 | <i>Australoheros facetus</i> |  | Scholz & Salgado<br>-Maldonado (2001) | Haasová (2009)  | Scholz & Salgado<br>-Maldonado (2001)               | Scholz et al. (2008) |                           |                         |
| Locality             | Brazil                       |  | Cichlasoma istlanum                   | Hemichromis letourneuxi<br><i>Oreochromis niloticus</i> | Gobiomorus maculatus<br><i>Dormitator latifrons</i> |                      |                           |                         |
| Site of infection    | Intestine                    |  | Mexico<br>Intestine                   | Senegal<br>Intestine                                    | Mexico<br>Liver                                     |                      |                           | Mozambique<br>Intestine |
| <b>Distal hook</b>   |                              |  |                                       |   |   |                      |                           |                         |
| Length               | 41-48                        |  | 43-46                                 | 40,5-46   | 49-56,5   |                      |                           | 44-47                   |
| Blade                | 21-25                        |  | 24,5-27                               | 25-26   | 26,5-33   |                      |                           | 22,5-27                 |
| Handle               | 18-24                        |  | 18,5-22                               | 17-18,5   | 23-26,5   |                      |                           | 22-26                   |
| Blade/Handle Ratio   | 1.03-1.30                    |  | 1.15-1.45                             | ND  | 1.09-1.36   |                      |                           | 0.88-1.13               |
| <b>Proximal hook</b> |                              |  |                                       |   |   |                      |                           |                         |
| Length               | 27-30                        |  | 26-30                                 | 26-29   | 32-37   |                      |                           | 26-28,5                 |
| Blade                | 12-14                        |  | 12-15                                 | 11-13   | 16,5-20   |                      |                           | 13-16                   |
| Handle               | 14-18                        |  | 15-17                                 | 14-15   | 17-18,5   |                      |                           | 14-17                   |
| Blade/Handle Ratio   | 0.70-0.94                    |  | 0.71-0.89                             | ND  | 0.96-1.36   |                      |                           | 0.79-1.10               |



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