

First report of adult specimens of *Sphincterodiplostomum musculosum* (Digenea, Diplostomidae)

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Abstract

Sphincterodiplostomum musculosum Dubois, 1936 (Diplostomidae, Diplostominae) was originally described on the basis of specimens collected from the intestine of agami heron, *Agamia agami* (Gmelin) (Ardeidae), in Mato Grosso, Brazil. The original description of this species was brief because it was based on a few immature specimens. The purpose of this paper is to describe the detailed morphological study of several adult specimens of *S. musculosum* obtained from the intestine of the great egret, *Ardea alba* L. (Ardeidae), from Argentina which revealed new characters. This represents a new host record and a new record in birds in Argentina.

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1. Introduction

The family Diplostomidae Poirier, 1886 comprises parasites of birds and mammals. Niewiadomska [1] accepted that the 41 genera belonging to this family are grouped into subfamilies according to host specificity; 11 genera reported in mammals are included in the subfamily Alariinae Hall and Wigdor, 1918 and the rest are parasites of birds included in the subfamilies Diplostominae Poirier, 1886, Crassiphialinae Sudarikov, 1960 and Codonocephalinae Sudarikov, 1959.

In Argentina, adult members of nine species of the family Diplostomidae have been reported parasitizing birds: *Hystero-morpha triloba* (Rudolphi, 1819) Lutz, 1931, *Austrodiplostomum mordax* Szidat and Nani, 1951, *Dolichorchis bonariensis* Ostrowski de Núñez, 1970 and *Posthodiplostomum obesum* (Lutz, 1928) Dubois, 1977 (syn. *Neodiplostomum* sp. of Ostrowski de Núñez [2]) from *Phalacrocorax brasilianus* (Phalacrocoracidae) [2–5], *Posthodiplostomum nanum* Dubois, 1937 from *Plegadis chihi* (Threskiornithidae) [6], *Diplostomum minutum* Szidat, 1964 from *Larus dominicanus* and *L. maculipennis* (Laridae) [7], *P. mignum* Boero,

Led and Brandetti, 1972 from *Ardea cocoi* (Ardeidae) [8], *Tylodelphys adulta* Lunaschi and Drago, 2004 from *Podiceps major* (Podicepedidae) [9] and *Neodiplostomum travassosi* Dubois, 1937 from *Polyborus plancus* (Falconidae) and *P. brasilianus* (Phalacrocoracidae) [10].

The parasite fauna of the great egret, *Ardea alba* L., in Argentina is poorly known; at present the records of digeneans in this bird are represented by *Ribeiroia ondatrae* (Price, 1931) Price, 1942 (Cathaemasiidae), *Apharingostrigea brasiliensis* Szidat, 1929 (Strigeidae), *Posthodiplostomum nanum* Dubois, 1937 (Diplostomidae) and *Ascocotyle (Phagicola) angrense* Travassos, 1916 (Heterophyidae) [8,11].

The aim of this paper is to describe mature specimens of *Sphincterodiplostomum musculosum* Dubois, 1936 recovered from the small intestine of the great egret from Formosa Province, Argentina and to present new data on the morphology and the morphometric features of this species.

2. Materials and methods

The host was captured with a shotgun during April 2003 in Clorinda (Formosa, Argentina) with the authorization of the collection for scientific research purposes by the Dirección de Fauna y Parques (Ministerio de la Producción) of Formosa Province and dissected in the field. The digenean specimens

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were fixed in hot formalin, flattened and stained with a 1:6 96° ethanol dilution of Mayer's hydrochloric carmine, dehydrated and mounted in Canada balsam. In order to facilitate handling and observation, the specimens were mounted between two microscope cover glasses.

Measurements are given in micrometers (μm) unless otherwise stated, as the range followed by mean in parentheses. Drawings were made with the aid of a drawing tube.

The material studied was deposited in the Helminthological Collection of La Plata Natural Sciences Museum (LPNSM), La Plata, Argentina.

3. Results and discussion

3.1. *S. musculosum* Dubois, 1936

[Plate 1(1–3)]

3.1.1. Description

Body distinctly bipartite, division into fore- and hindbody accentuated, 0.919–1.329 mm (1.079) in total length. Forebody spatulate 0.551–0.870 \times 0.754–1.115 mm (0.706 \times 0.913), longer than hindbody. Tegument smooth. Oral sucker subterminal, 92–108 \times 63–106 (99 \times 85), always smaller than ventral sucker 97–145 \times 82–159 (108 \times 125) and pseudosuckers 101–150 \times 116–169 (122 \times 136). Ventral sucker located 314–464 (395) from anterior end. Suckers width ratio 0.50–0.88 (0.71). Ratio of oral sucker length to pseudosuckers length 0.55–1.2 (0.86). Ratio of forebody length to pseudosuckers length 5.3–7.7 (6.2). Holdfast organ lobulate, 143–314 \times 217–580 (239 \times 406), located immediately posterior to the ventral sucker with compact proteolytic gland at base. Ratio of forebody length to holdfast organ length 2.1–5.4 (3.2). Ratio of body length to holdfast organ length 3.0–9.3 (4.9). Hindbody ovoid, 338–555 \times 406–561 (441 \times 494), with deep

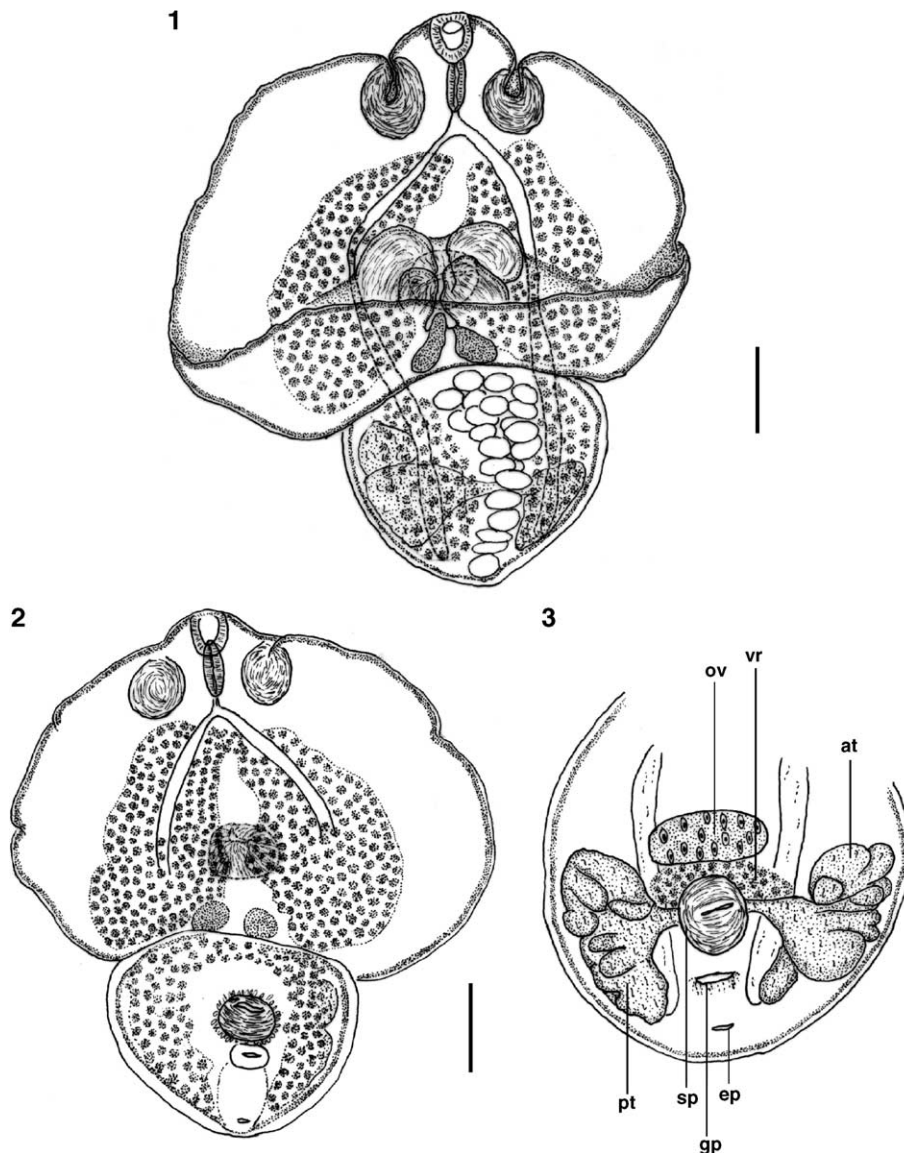


Plate 1. *Sphincterodiplostomum musculosum* Dubois, 1936 from *Ardea alba*. (1) Entire worm, ventral view. Scale-bar: 200 μm . (2) Entire worm, dorsal view. Scale-bar: 200 μm . (3) Enlarged dorsal view of genitalia. Scale-bar: 200 μm . Abbreviations: at — anterior testis; ep — excretory pore; gp — genital pore; ov — ovary; pt — posterior testis; sp — sphincter; vr — vitelline reservoir.

tubular invagination at level of posterior testis, equipped with sphincter, 82–101 × 82–121 (93 × 99). Ratio of hindbody length to forebody length 0.51–0.72 (0.63). Prepharynx absent; pharynx well developed, 111–140 × 43–68 (123 × 55); oesophagus short, 23–34 (27); intestinal caeca reach into post-testicular region. Ratio of pharynx length to oral sucker length 1.0–1.4 (1.3). Ratio of pharynx length to pseudosuckers length 0.9–1.2 (1).

Testes tandem; anterior testis 95–107 × 95–113 (103 × 103), asymmetrical, lobulated and located near the right margin of hindbody; posterior testis 113–145 × 386–396 (134 × 390), bilobed, extended transversally occupying whole width of hindbody, with ventral isthmus. Ovary median and pretesticular, 52–83 × 107–119 (68 × 113). Laurer's canal and Mehlis' gland not seen. Vitellarium follicular, distributed in two lateral fields extending from the portion close to level of the intestinal bifurcation to the posterior extremity of hindbody. At the anterior region of forebody and hindbody, both fields dorsally confluent. Vitelline reservoir immediately post-ovarian. Uterus ventral containing 1–16 (10) large eggs, 68–82 × 48–53 (75 × 49). Copulatory bursa with genital pore subterminal and posterior to tubular dorsal invagination. Excretory pore dorso-subterminal. Vesicle not seen.

3.1.2. Taxonomic summary

Host: *A. alba* L. (Ardeidae).

Site of infection: small intestine.

Locality: Clorinda (25°1660'S; 57°43'W), Formosa Province, Argentina.

Material depository: Helminthological Collection MLP 5404.

Intensity of infection: 18, from single host.

3.1.3. Remarks

The genus *Sphincterodiplostomum* Dubois, 1936 is a parasite of the intestine of neotropical birds. It is monoespecific and differs from other genera of the family Diplostomidae by the presence of a dorsal tubular invagination equipped with a sphincter, at the level of the posterior testis [12,13].

The original description of *S. musculosum* Dubois, 1936 was based on the morphology of five immature specimens collected from the intestine of agamia heron, *A. agami* (Gmelin) (Ardeidae), in Mato Grosso, Brazil by Natterer and described as *Diplostomum grande* Diesing, 1850 [14]. These specimens have been studied and redescribed by Dubois [12,13] and since then, no data concerning the findings of mature specimens of the species have been published. The original description is transcribed by Dubois [15], Travassos et al. [16] and Yamaguti [17].

The morphology of the present materials is similar to Dubois's [12,13] original description of immature specimens and, consequently, they are considered members of this species. The smaller size of the specimens found in the present study, in relation with those described by Dubois (body length, 1.80–2.90 mm; forebody, 1.20–2.10 × 1.26–1.41 mm; hindbody, 600–930 × 550–620), could be related to the contraction of the specimens here studied.

The great egrets are cosmopolitan inhabitants of marshes, ponds, mangroves, rivers and lake edges. They are carnivorous and have a broad diet, related to the available prey in their area, which mainly consists of aquatic animals, such as amphibians, reptiles, insects, crustaceans and fish [18]. The life cycle of *S. musculosum* includes metacercariae encysted in fishes and this larval stage has been reported from South American freshwater fishes, *Hoplias malabaricus* (Bloch) (Erythrinidae) and *Hemisorubim platyrhynchos* (Valenciennes) (Pimelodidae) [19,20]. The metacercariae found by Szidat [19] in the eye's orbit of *H. malabaricus* from Chaco Province, Argentina, differ from the specimens described in the present study by having a larger body size (forebody, 1.1–1.8 × 1.3–1.7 mm; hindbody, 800–900 × 500–600), probably caused by the cover-glass pressure prior to fixation of worms.

The presence of *S. musculosum* in *A. alba* represents a new host record and the first report of this parasite in Argentinean birds. Larval transmission of *S. musculosum* from freshwater fishes to *A. alba* in Argentina is also supposed.

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