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HIPPOCREPIS FUELLEBORNI (DIGENEA, NOTOCOTYLIDAE) PARASITIZING *MYOCASTOR COYPUS* (RODENTIA, MYOCASTORIDAE) IN SOUTHERN BRAZIL

HIPPOCREPIS FUELLEBORNI (DIGENEA, NOTOCOTYLIDAE) PARASITANDO *MYOCASTOR COYPUS* (RODENTIA, MYOCASTORIDAE) NO SUL DO BRASIL

Ana Gabriela da S. Rocha[1,2]; Moisés Gallas[1] & Eliane F. da Silveira[1]

[1]Departamento de Biologia, Museu de Ciências Naturais, Universidade Luterana do Brasil. 92425-900, Canoas, Rio Grande do Sul, Brasil
[2]Bolsista PROICT/ULBRA.
anagabrieladasilvarocha@yahoo.com.br

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Abstract

The coypu (*Myocastor coypus* Molina, 1782) has been reported as the definitive host of *Hippocrepis fuelleborni* in Argentina and Uruguay; and *Hippocrepis myocastoris* Babero, Cabello & Kinoed, 1979 in Chile. Specimens of *M. coypus* (n = 4) from the State of Rio Grande do Sul, in Brazil, were received from donations and necropsied in the laboratory. Digeneans were identified as *H. fuelleborni* due to the presence of ventral papillae, oblique testes and eggs with no polar filaments. The prevalence of *H. fuelleborni* was 25%, with a mean intensity of infection of 12 helminths/ host. The infection of *M. coypus* by *H. fuelleborni* probably occurred as a result of the ingestion of aquatic plants with metacercariae. This is the first report of *H. fuelleborni* parasitizing *M. coypus* in the State of Rio Grande do Sul, Brazil.

Keywords: coypu - digeneans - *Hippocrepis* - Neotropic Region - taxonomy.

Resumo

Para o ratão-do-banhado (*Myocastor coypus* Molina,1782) foram registradas *Hippocrepis fuelleborni* Travassos & Vogelsang, 1930 na Argentina e Uruguai; e *Hippocrepis myocastoris* Babero, Cabello & Kinoed, 1979 no Chile. Espécimes de *M. coypus* (n = 4) provenientes do Estado do Rio Grande do Sul, Brasil, foram doados e necropsiados em laboratório. Digenéticos foram identificados como *H. fuelleborni* por apresentarem papilas ventrais, testículos em diagonal e ovos sem filamentos polares. A prevalência de *H. fuelleborni* foi 25%, com intensidade média de infecção de 12 helmintos/ hospedeiro. Provavelmente a infecção de *H. fuelleborni* em *M. coypus* ocorreu com a ingestão de vegetação aquática com metacercárias. Este é o primeiro registro de *H. fuelleborni* parasitando *M. coypus* no Estado do Rio Grande do Sul, Brasil.

Palavras-chave: digenéticos - *Hippocrepis* - ratão-do-banhado - Região Neotropical - taxonomia.

INTRODUCTION

The genus *Hippocrepis* was proposed by Travassos (1922) to accommodate the species *Monostomum hippocrepis* Diesing, 1850. To date, three species have been described in this genus: *Hippocrepis hippocrepis* (Diesing, 1850) Travassos, 1922; *Hippocrepis fuelleborni* Travassos & Vogelsang, 1930 and *Hippocrepis myocastoris* Babero, Cabello & Kinoed, 1979.

The *Hippocrepis* species are helminth parasites of rodents that occur in South America: *H. hippocrepis* has been reported in the capybara, *Hydrochaeris hidrochaeris* Linnaeus, 1766 (Travassos, 1922; Boero & Boehringer, 1967; Kohn & Pereira, 1970; Lombardero & Moriena, 1973; Rodriguez *et al*., 1975; Tabes, 1980; Mones & Martínez, 1982; Hoffmann *et al*., 1986; Costa & Catto, 1994; Casas *et al*., 1995; Sutton *et al*., 1997; Bonuti *et al*., 2002; Salas & Herrera, 2004; Sinkoc *et al.*, 2009), whereas *H. fuelleborni* and *H. myocastoris* have been reported in the coypu, *Myocastor coypus* Molina, 1782 (Travassos & Vogelsang, 1930; Boero & Boehringer, 1967; Kohn & Pereira, 1970; Ostrowski de Núñez, 1976; Babero *et al*., 1979; Flores *et al*., 2007).

Dubois (1962) *apud* Kohn & Pereira (1970) proposed that *H. fuelleborni* was a synonym of *H. hippocrepis*, considering that the species does not presented valid diagnostic characters. Kohn & Pereira (1970) redescribed *H. hippocrepis* and *H. fuelleborni* as valid taxa. However, the redescription of the later species was based in the original description, due the condition of the specimen obtained by the authors.

The life cycle of *Hippocrepis* is known only for *H. fuelleborni*, for which planorbid snails (*Biomphalaria peregrina* Orbigny, 1835) are considered to be intermediate hosts (Ostrowski de Núñez, 1976). The definitive hosts are aquatic animals which ingest waterside plants hosting metacercariae. In the present study *H. fuelleborni* is reported in *M. coypus* from the State of Rio Grande do Sul, Brazil.

MATERIAL AND METHODS

Four specimens of *M. coypus* were obtained in Rio Grande do Sul, RS, Brazil, between 2008 and 2010. All four animals were victims of roadkill, and were donated to the "Laboratório de Zoologia dos Invertebrados" do "Museu de Ciências Naturais da ULBRA" (MCNU) in Canoas, Brazil. The collection and transportation of the specimens was conducted according to normative ruling no. 154 of March 1st, 2007, chapter VI, article 26. The digeneans found were fixed in A.F.A., stained with Delafield's hematoxylin, and mounted in Canada balsam (Amato & Amato, 2010). Measurements are given in micrometers (µm) unless otherwise indicated. Means, standard deviations, and the number of specimens are shown in this order in parentheses after the range of values. Ecological terms were used according to Bush *et al.* (1997). Drawings were made using a drawing tube attached to a microscope. A representative specimen of the host was deposited in the "Coleção de Mamíferos" do "Museu de Ciências Natuais da ULBRA" (MCNU), Canoas, Brazil, while a voucher specimen of the trematode was deposited in the "Coleção Helmintológica do Instituto Oswaldo Cruz" (CHIOC), Rio de Janeiro, Brazil.

RESULTS

Hippocrepis fuelleborni Travassos & Vogelsang, 1930
Figs 1–5.

Description based on 10 specimens mounted *in toto*. Digenea, Notocotylidae. Body elongated, 4.74-8.05 mm (6.09, 1.07, n = 10) long, 0.64-1.22 mm (1.00, 0.19, n = 10) wide (Figs 1 and 2). Oral sucker subterminal, 299-529 (426.78, 68.14, n = 9) long, 276-460 (393.55, 58, n = 9) wide with two lateral projections 92.2-230.5 (149.57, 40.39, n = 9) wide, on each side (Figs 1 and 2). Pharynx absent, esophagus 165.96-230.5 (189.01, 24.56, n = 6) long, 27.66-55.32 (39.59, 9.52, n = 6) wide, with small diverticula, opening through a cecum. Cecum fused posteriorly, between the testes (Fig. 1). Ventral sucker absent. Ventral papillae present from the genital pore to posterior extremity, arranged irregulary in longitudinal rows with a diameter of 36.88-92.2 (58.08, 17.41, n = 20) (Fig. 2). Genital pore postbifurcal 0.60-1.04 mm (0.85,

0.12, n = 9) from anterior extremity (Figs 1 and 2). Male reproductive system with cirrus-sac elongated, 0.968-1.95 mm (1.42, 0.30, n = 10) long, 0.16-0.29 mm (0.21, 0.04, n = 10) wide; cirrus with small spines, 0.90-1.40 mm (1.13, 0.21, n = 6) long (Figs 1 and 3). Internal seminal vesicle 295.04-645.4 (441.82, 104.7, n = 9) long, 101.42-184.4 (132.6, 27.65, n = 9) wide. External seminal vesicle beginning at the terminal portion of the cirrus-sac and forming one or two coils ventrally (Figs 1 and 3). Testes lobed, oblique, 460-805 (595.7, 112.91, n = 10) long, 368-644 (480.7, 89.04, n = 10) wide, with a variety of shapes (Figs 1, 2 and 5). Female reproductive system consisting of metraterm well developed, parallel to the cirrus-sac, 461-922 (699.2, 124.21, n = 10) long, 92-161 (124.73, 23.28, n = 10) wide (Figs 1 and 3). Uterus with 17 to 24 transverse coils (Fig. 1). Ovary pretesticular, 253-460 (315.1, 60.41, n = 10) long, 299-506 (407.1, 75.15, n = 10) wide (Fig. 1). Mehlis' gland pre-ovarian, 115-207 (156.4, 26.11, n = 10) long, 184-437 (278.3, 69.8, n = 10) wide; vitelline follicles in two longitudinal rows (Fig. 1). Eggs oval, with no polar filaments, 18.44-28.32 (23.08, 2.97, n = 20) long, 9.22-11.8 (9.86, 1.02, n = 20) wide (Fig. 4).

Taxonomic summary:
Host: *Myocastor coypus*.
Host specimen deposited: MCNU 2536.
Site of infection: intestine.
Locality: Porto Alegre, State of Rio Grande do Sul, Brazil.
Prevalence: 25%.
Mean intensity of infection: 12 helminths/ host.
Mean abundance of infection: 3 helminths/ host.
Voucher specimen deposited: CHIOC 37806.

The genus *Hippocrepis* includes tree species: *H. hippocrepis*, *H. fuelleborni* and *H. myocastoris*. *H. fuelleborni* can be distinguished from *H. myocastoris* by the presence of ventral papillae, oblique testes and eggs lacking polar filaments (Flores *et al*., 2007). The specimens collected from *M. coypus* in this study presented characters consistent with the diagnosis of *H. fuelleborni*.

The specimens measured in the present study presented relatively small cirrus (1.13 mm) in comparison with the single specimen (2.9 mm) measured by Travassos & Vogelsang (1930) and Kohn & Pereira (1970). Boero & Boehringer (1967) presented only length and width measurements for the whole specimens, which were similar to the values recorded in the present study. The values recorded in the present study were higher than those reported by Ostrowski de Núnez (1976) for adults obtained by experimental infection, which may have affected their size.

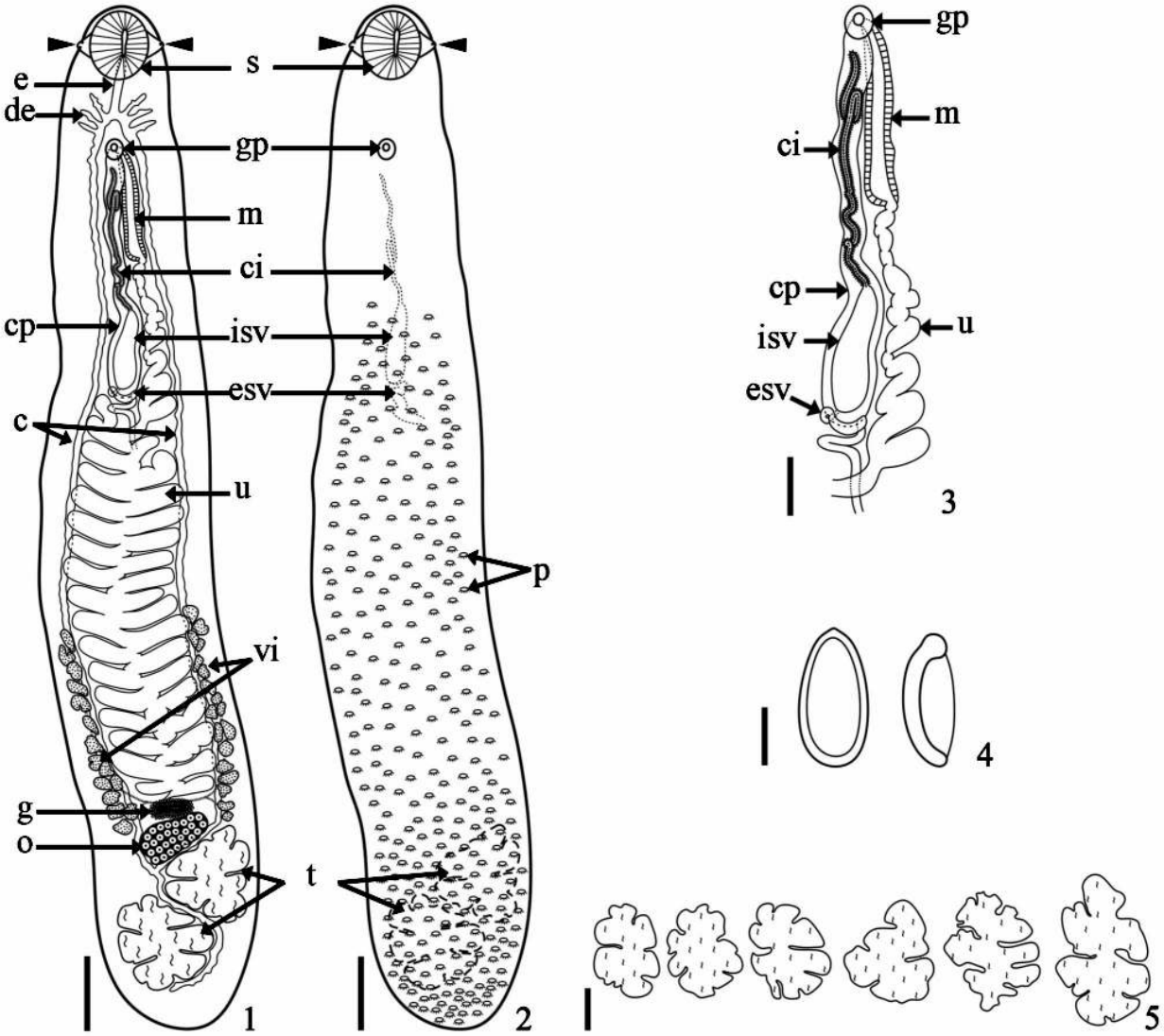
DISCUSSION

In their original description of the species *H. fuelleborni*, Travassos & Vogelsang (1930) referred to the presence of cirrus armed with spines. This character was not mentioned in the review of Kohn & Pereira (1970). Specimens with cirrus armed with small, thin spines were observed by Ostrowski de Núñez (1976). In the present study, cirrus were observed with spines in localized areas (proximal and distal extremities). The spines are probably present along the full length of the cirrus, but may not have been visible do to tissue chromophilia.

The diagrams of *H. fuelleborni* presented by Boero & Boehringer (1967) contain two errors – the absence of lateral projections in the oral sucker and the cecum separated and terminated on reaching the testes. Kohn & Pereira (1970) subsequently added details of the distal extremity of the cirrus and the eggs, but they did not mention these errors. In the present study, we provide a detailed description and diagramation of the lateral projections of the oral sucker and the morphology of the cecum.

Based on the life cycle of *H. fuelleborni* described by Ostrowski de Núñez (1976), the infection found in the present study may be related to the ingestion of aquatic vegetation with metacercariae by *M. coypus*. The small sample obtained in the present study prohibits a reliable ecological analysis of infection patterns in *M. coypus*. Given this, a larger number of *H. fuelleborni* specimens from a more ample sample of *M. coypus* would be necessary for a systematic evaluation of the levels of parasitism in the host population.

Previous reports of *H. fuelleborni* were derived from specimens collected in Uruguay (Travassos & Vogelsang, 1930), Argentina (Boero &



Figures 1–5 Incomplete diagrams of *Hippocrepis fuelleborni*. (1) Entire specimen showing oral sucker (s), lateral projection (black arrowheads), esophagus (e), diverticula (de), cecum (c), genital pore (gp), cirrus (ci), cirrus pouch (cp), internal seminal vesicle (isv), external seminal vesicle (esv), metraterm (m), uterus (u), Mehlis' gland (g), ovary (o), vitelline follicles (vi) and testes (t). Bar = 500 µm. (2): Distribution pattern of the ventral papillae (p). Bar = 500 µm. (3): Detail of copulatory organs. Bar = 300 µm. (4): Ventral (left) and lateral (right) views of the eggs. Bar = 10 µm. (5): Variation in testes shape. Bar = 200 µm.

Boehringer, 1967; Ostrowski de Núñez, 1976), and Chile (Babero *et al*., 1979). Travassos *et al*. (1969) considered that *H. fuelleborni* would probably also occur in southern Brazil (Rio Grande do Sul) due to the distribution of *M. coypus* in this region, although this has only been confirmed in the present study, which provides the first record of *H. fuelleborni* from Rio Grande do Sul, Brazil.

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Correspondence author/ Autor para correspondencia:

Ana Gabriela da Silva Rocha
Departamento de Biologia, Museu de Ciências Naturais, Universidade Luterana do Brasil, 92425-900, Canoas, Rio Grande do Sul, Brasil.

E-mail/ correo electrónico:
anagabrieladasilvarocha@yahoo.com.br