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Research Note

***Botaurus pinnatus* (Wager, 1829) (Ave: Ardeidae) in Brazil as a new host of *Clinostomum heluans* Braun 1901 (Digenea: Clinostomidae)**M. R. WERNECK^{1*}, N. BACCO-MANNINA², P. C. SANTOS-COSTA²¹North Fluminense State University – Darcy Ribeiro (UENF), Campos dos Goytacazes, Rio de Janeiro State, 28013-602, Brazil,²E-mail: maxrwerneck@gmail.com; ²Research Institute of Cananeia (IPeC), Rua Tristão lobo, 199, centro, Cananéia, São Paulo State, 11990-000, Brazil

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Accepted April 25, 2017**Summary**

This paper reports the occurrence of *Clinostomum heluans* Braun 1901 (Digenea: Clinostomidae) in a specimen of *Botaurus pinnatus* (Wager, 1829) (Ave: Ardeidae) found in southeastern Brazil. Although this parasite has been reported in other birds in Brazil, Cuba, the Czech Republic and Venezuela, this is the first report of *B. pinnatus* as a host for this parasite.

Keywords: Ardeidae; *Botaurus pinnatus*; Brazil; Clinostomidae; *Clinostomum heluans*; Trematoda

Introduction

Botaurus pinnatus (Wager, 1829) is commonly known as the socó-boi in Brazil and Pinnated Bittern in English-speaking countries. This waterbird has broad distribution in Latin America and parts of the Caribbean. It is currently listed as “Least Concern” by the International Union for Conservation of Nature (BirdLife International, 2012) in Brazil and the status of this resident species is unknown by the Waterbirds Estimated Population – WPE (2006) (CBRO, 2014).

Little is known regarding the helminth fauna in *B. pinnatus*, but there are reports of parasites in individuals found in Mexico (Ortega-Olivares *et al.*, 2008; 2014), the USA (see Santos *et al.*, 2007) and Brazil (Vicente *et al.*, 1995; Fernandes *et al.*, 2015). However, there are no reports of the genus *Clinostomum* parasitizing this host. Thus, the present paper reports the first occurrence of *Clinostomum heluans* Braun 1899 (Digenea: Clinostomidae) in a specimen of *B. pinnatus* found in Brazil.

Material and Methods

In April 2016, a *B. pinnatus*, male, weight 0.49 kg was found alive in the municipality of Ilha Comprida (24°43'21.792" and 47°32'29.508") state of São Paulo, Brazil, and sent to a rehabilitation center. The clinical exam revealed little pectoral muscle mass and mild dehydration. Cachexia was suspected based on pectoral amyotrophy and associated hypothermia. The bird was set for treatment, received support medication (i.e., hydration, vitamin supplementation, anti-inflammatory agents and antibiotic both orally and injected) and was kept in a heated environment.

The bird died after ten days and necropsy was performed. Four specimens of *C. heluans* were found near the oral cavity and were transferred still alive in 70 % alcohol solution, stained with chlorhydric carmine and clarified with eugenol. The morphological analysis was performed with the aid of an image analysis program (ImageJ, National Institutes of Health). The helminths were deposited in the Helminthological Collection of the Biosciences Institute

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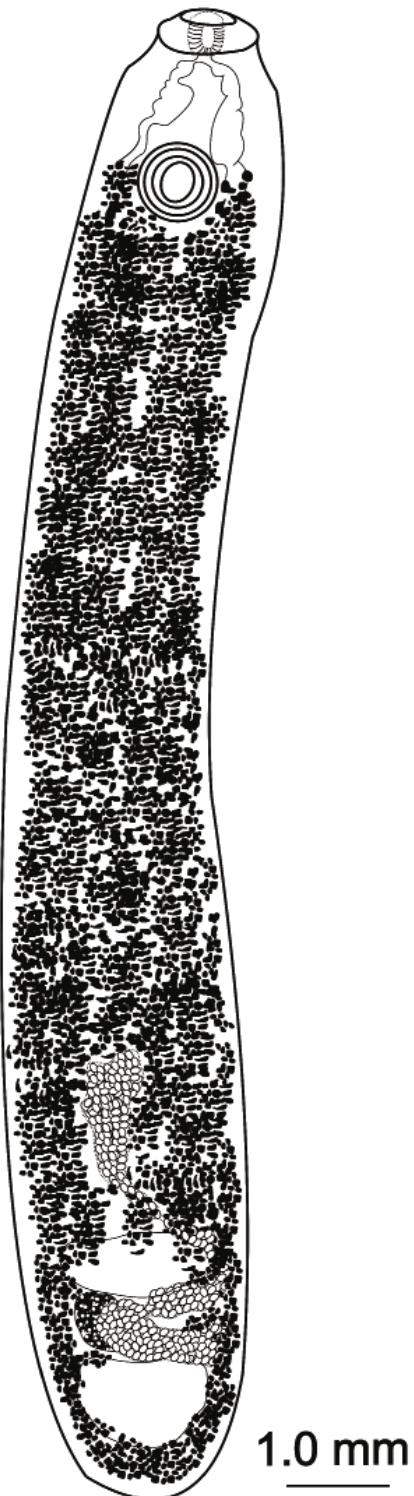


Fig. 1. *Clinostomum heluans* Braun 1901 (Digenea: Clinostomidae) found in *Botaurus pinnatus* (Wager, 1829) (Ave: Ardeidae) from Brazil.
(Scale bar = 1.0 mm)

(CHIBB), São Paulo State University (UNESP), Botucatu, State of São Paulo, Brazil (CHIBB number 7847). The morphological (Fig. 1) and morphometric (Table 1) comparisons of the specimens were performed according to descriptions offered by Braun (1899; 1901), Travassos et al. (1969), Sitko (2012), Pinto et al. (2013) and Fernandes et al. (2015) (Table 1).

Results and Discussion

Description (Fig. 1; Table 1):

Parasite with posterior extremity rounded; oral collar small; oral sucker terminal, small and cylindrical; esophagus short, no pre-pharynx or pharynx; ceca small and running parallel to edge of body, completely obscured by vitellaria at many points and ending near posterior extremity of body; ventral sucker rounded, larger than oral sucker and positioned in anterior region of body after cecal bifurcation; vitellaria composed of small follicles initiating after ventral sucker, occupying both intracecal and extracecal regions; testes two in number, lobed and occupying posterior region of body, anterior testis larger than posterior, both slightly flattened, larger in width than length and separated by ovary; ovary rounded and occupying region between testicles at posterior extremity of body; uterus replete with eggs, occupying area immediately anterior to anterior testis and mainly intracecal; genital pore in posterior region of body near anterior region of anterior testis; eggs elliptical shape.

Previous records: Brazil – *Ardea cocoi*, *Butorides striata striata*, *Egretta caerulea* (= *Ardea caerulea*, *Florida caerulea*), *Nyctanassa violacea*, *Nyctanassa violacea cayennensis*, *Tigrisoma lineatum* and *Triglocephala* sp. (Fernandes et al., 2015); Venezuela – *Ardea alba egretta* (= *Casmerodius akbus egretta*) (Lutz, 1928; Caballero & Diaz-Ungria, 1958; Diaz-Ungria, 1967, 1973); Cuba – *Ardea herodias herodias* and *Casmerodia albus egretta* from Laguna de Ariguanabo (La Habana province); and Czech Republic – *Egretta alba* (Sitko, 2012).

Remarks

Braun (1899) described *C. heluans* based on specimens from the National Museum in the city of Rio de Janeiro that were collected from *Egretta coerulea* (= *Ardea caerulea*, *Florida caerulea*) and *Nycticorax gardeni*. However, the author offers no further information on the hosts or morphometric data on the parasites (Braun, 1899, 1901). Lutz (1934) describes the possible lifecycle of *C. heluans*, presenting morphological characteristics in different phase of the life cycle of this Digenean. However, an evaluation of the images (stamp 8, figure 6 and stamp 10, figures 2 – 5) offered by the author in comparison to reports of *C. heluans* suggests that Lutz was actually describing *Clinostomum marginatum*, as stated by Pinto et al. (2013).

In a large survey of trematodes in Brazil, Travassos et al. (1969) reported the occurrence of *C. heluans* in *Florida caerulea* (= *Ardea corulea*), *Ardea cocoi* and *Nyctanassa cayennensis*

Table 1. Morphometric data, in millimeters, of *Clinostomum helvans* Braun 1899 (Digenea: Clinostomidae) from aquatic avians.
Data are presented as range and measurements in millimeters (mm) or micrometers (μm) as indicated.

Host	Braun (1901)	Viguieras (1955)	Sitko (2012)	Pinto et al. (2013)	Present report
	<i>Egretta caerulea</i> and <i>Nycticorax gardeni</i>	<i>Ardea herodias herodias</i> and <i>Casmerodia albus egreita</i>	<i>Egretta alba</i>	<i>Butorides striata</i>	<i>Botaurus pinnatus</i>
Locality	Brazil	Cuba	Czech Republic	Brazil	Brazil
Site of infection	Oral cavity	Intestine	Oesophagus	Oral cavity	Oral cavity
Number of parasites	4	?	2	1	4 (2 measured)
Body length (mm)	10.0 – 12.0	9.9 – 22	18.500 – 20.600	14.4	14.0 – 15.8
Body width (mm)	2.0	2.0 – 4.0	3.089 – 3.203	2.4	1.4 – 1.8
Oral sucker length (μm)	360	0.660 – 0.590*	0.522 – 0.551	307	196 – 250
Oral sucker width (μm)	300		0.477 – 0.522	375	266 – 276
Ventral sucker length (μm)	620*	0.880*	0.820 – 0.894*	601	697 – 866
Ventral sucker width (μm)				464	690 – 853
Anterior testis length (μm)	-	0.650	0.522 – 0.685	68	371 – 526
Anterior testis width (μm)	-	1.500	1.147 – 1.416	320	826 – 1.139
Posterior testis length (μm)	-	0.800	0.641 – 0.685	143	527 – 647
Posterior testis width (μm)	-	1.600	1.085 – 1.356	197	936 – 1.002
Ovary length (μm)	-	0.600	0.641 – 0.671	68	349 – 523
Ovary width (μm)	-	0.400	0.402 – 0.671	354	276 – 485
Eggs length (μm)	110 – 140	110 – 125	0.139 – 0.145	115 – 128 (119 ± 8) [†]	114 – 133 (122.7 ± 5.2) [†] (n=15)
Eggs width (μm)	69 – 78	60 – 64	0.081 – 0.087	68 – 70 (70 ± 1) [†]	69 – 88 (76.3 ± 5.2) [†] (n=15)

Legend: * Diameter; † Range (mean± SD)

Table 2. Checklist of helminthes reported in *Botaurus pinnatus*.

Helminthes	Locality	References
Cestoda		
<i>Gyroporhynchidae</i>		
<i>Dendrouterina fuhrmanni</i> (Clerc, 1906)	México	Ortega-Olivares et al. (2008), (2014).
<i>Dendrouterina ardeae</i> (Rausch, 1955) Bona, 1975	México	Ortega-Olivares et al. (2014)
Nematoda		
<i>Diocophyidae</i>		
<i>Eustrongylides ignotus</i> Jäegerskiöld, 1909	Brazil	Vicente et al. (1995)
Trematoda		
<i>Diplostomidae</i>		
<i>Posthodiplostomum microsicya</i> Dubois, 1936	Brazil	Fernandes et al. (2015)
<i>Heterophyidae</i>		
<i>Ascocotyle (A.) tenuicollis</i> Price, 1935	Texas	Santos et al. (2007)
<i>Clinostomidae</i>		
<i>Clinostomum heluans</i> Braun 1899	Brazil	Present report

(= *Nyctanassa violacea*) and describe Mexico and Cuba as the geographic distribution for the helminth. Noronha et al. (2009) offer a list of helminths collected by the Brazilian parasitologist Adolpho Lutz and deposited in the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC) in the city of Rio de Janeiro, citing occurrences of *C. heluans* in *Tigrisoma* sp. (= *Butorides* sp.) and *Tigrisoma lineatum* (Bodaert, 1783) (= *Butorides striatus* L. 1758). More recently, Pinto et al. (2013) analyzed an individual of *Butorides striata* (Linnaeus, 1758) from the state of Minas Gerais, Brazil, and report the occurrence of a specimen of *C. heluans* collected from the oral cavity, making it the first record of this host for the parasite.

Outside Brazil, *C. heluans* has been found in *Ardea alba* in Venezuela (Lutz, 1928; Caballero & Diaz-Ungria, 1958; Diaz-Ungria, 1973) and the Czech Republic (Sitko, 2012) as well as in *Ardea herodias* *herodias* and *Casmerodia albus* *egretta* in the la Habana province in Cuba (Vigueiras 1955) and *A. herodias* in Mexico (Pérez'Ponce de León et al., 2007).

The specimens analyzed in the present study are smaller with regard to body width as well as the length and width of the oral sucker than the specimens described by Braun (1901), Vigueiras (1955), Sitko (2012) and Pinto et al. (2013), but this does not affect the identification of the species and seems merely to be a question of individual variation. Moreover, the specimens analyzed herein display morphological characteristics that are compatible with the species and have been cited by other authors (Braun, 1901; Vigueiras, 1955; Sitko, 2012; Pinto et al., 2013). Identification was based mainly on the position of the testes and ovary in the posterior region of the body as well as the position of the genital pore near the anterior testis.

The helminth fauna of *B. pinnatus* has been studied little, with only six helminthes reported thus far in hosts from USA, Mexico and Brazil (see Table 2). To date, only *Eustrongylides ignotus* Jäegerskiöld, 1909 (Nematoda: Diocophyidae) (Vicente et al., 1995), *Posthodiplostomum microsicya* Dubois, 1936 (Digenea: Diplostomidae) (Fernandes et al., 2015) and *C. heluans* (present report) have been reported in Brazil in this host.

This note reports the occurrence of *C. heluans* in an individual of *B. pinnatus* from the state of São Paulo, Brazil, thereby broadening knowledge on helminth fauna in this host.

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