

New host records of Brazilian pentastomid species

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Abstract

Pentastomida is a taxon of parasitic organisms infecting generally the respiratory system of vertebrates, mainly reptiles. Although this taxon is very important for understanding the phylogeny of the Metazoa, it has received little attention. In Brazil, there are few collections that include species of pentastomids, that is, only the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC), the Invertebrate Collection of the Zoology Laboratory of the Regional University of Cariri (LAZ-URCA) and the Helminthological Collection of the Botucatu Institute of Biosciences (CHIBB). The present study describes the species of pentastomids deposited in CHIBB. When found, the pentastomids were mounted on slides in Hoyer's medium and identified. Four species of pentastomids were recognised and three others were identified at the genus level, while four new hosts for the species of pentastomids were recorded.

Keywords: pentastomids, parasitism, tongue worms, Squamata fauna.

Novos registros de hospedeiros para espécies de pentastomídeos do Brasil

Resumo

Pentastomida é um táxon de organismos parasitas obrigatórios de sistema respiratório de vertebrados, principalmente répteis. Embora esse táxon seja muito importante para a compreensão da filogenia dos Metazoa, tem recebido pouca atenção. No Brasil, existem poucas coleções que abrigam espécies de pentastomídeos, quais sejam: a Coleção Helmintológica do Instituto Oswaldo Cruz (CHIOC), a Coleção de Invertebrados do Laboratório de Zoologia da Universidade Regional do Cariri (LAZ-URCA) e a Coleção Helmintológica do Laboratório de Parasitologia de Animais Silvestres (LAPAS). O presente trabalho descreve as espécies de pentastomídeos depositados na Coleção Helmintológica do LAPAS. O trato respiratório e as cavidades do corpo dos répteis foram removidos e analisados sob Microscópio Esteroscópico; quando encontrados os pentastomídeos, foram montados slides em meio Hoyer e identificados. Foram identificadas quatro espécies e outras três ficaram identificadas no nível de gênero, tendo sido registrados quatro novos hospedeiros para as espécies de pentastomídeos.

Palavras-chave: pentastomida, Parasitismo, vermes língua.

1. Introduction

The taxon Pentastomida comprises approximately 131 species distributed in seven families, namely Cephalobaenidae, Linguatulidae, Porocephalidae, Raillietiellidae, Reighardiidae, Sebekidae and Subtriquetridae (Almeida & Christoffersen, 1999), where they are preferentially pulmonary parasites of vertebrates, mainly reptiles (Almeida & Christoffersen, 2002).

Data regarding the ecology of pentastomids are important, but they are scarce, and in most cases these data were obtained from studies of zoological, animal house and snake house collections. In Brazil, the first works on these parasites were recorded in hosts from the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC), which is the principal reference collection in terms of the diversity of neotropical pentastomids (Motta, 1963a,b; Rego, 1981; 1983; 1984). Another collection, smaller and under construction in recent years, comprises the Zoology Laboratory of the Regional University of Cariri (LZ URCA) with a total of 67 specimens of the following species *Cephalobaena tetrapoda* (Heymons, 1922) (LZ URCA 43-44, 158-163), *Raillietiella furcocerca* (Diesing, 1835) (LZ URCA 164-170), *Raillietiella gigliolii* (Hett, 1924) (LZ URCA 99-101; 320-330), *Raillietiella mottae* (Almeida, Freire and Lopes, 2008) (LZ URCA 201-212; 351-353; 401-402), *Raillietiella* sp. (LZ URCA 157)

Porocephalus stilesi (Sambon, 1910) (LZ URCA 331-345) *Porocephalus* sp. (LZ URCA 346-350). The majority

of the specimens of this collection are from the Caatinga biome (Almeida et al., 2006a, b; Almeida et al., 2008a, b; Almeida et al., 2009a, b; Anjos et al., 2007; Anjos et al., 2008; Lopes et al., 2006).

The aim of the present work was to enrich our knowledge of the biology of pentastomids by analysing the specimens and their hosts deposited in the Helminthological Collection of the Botucatu Biosciences Institute (CHIBB), located in the Laboratory of the Parasitology of Wild Animals (LAPAS) of the *Universidade Estadual de São Paulo* (UNESP).

2. Material and Methods

The respiratory tracts and body cavities of the reptiles were removed and the presence of pentastomids determined by examination under a stereomicroscope. All pentastomids found were cleared in Hoyer’s medium and subsequently mounted on slides. Identifications were based on the dimensions of the hooks and copulatory spicules of the males that were measured using a microscope equipped with an ocular micrometer.

3. Results

Four species of pentastomids were found, namely *Sebekia oxycephala* (Sambon, 1922), *Porocephalus* sp., *Raillietiella freitasi* (Mota & Gomes, 1968) and *Raillietiella furcocerca* (Table 1), plus the morphospecies *Raillietiella* sp.1 and *Raillietiella* sp.2.

Table 1. Records of pentastomids deposited in the Helminthological Collection of the Botucatu Biosciences Institute (CHIBB).

Host	Parasite	Infection site	Locality	CHIBB*
Crocodylia				
<i>Caiman yacare</i>	<i>Sebekia oxycephala</i>	Lung	Corumbá, MS	2394
<i>C. yacare</i>	<i>S. oxycephala</i>	Stomach	Corumbá, MS	2395
<i>C. yacare</i>	<i>S. oxycephala</i>	Intestine	Corumbá, MS	2396
Squamata – snakes				
Boidae				
<i>Boa constrictor amarali</i>	<i>Porocephalus</i> sp.	Coelomic cavity	unknown	1108
Dipsadidae				
<i>Liophis poecilogyrus</i>	<i>Raillietiella</i> sp.2	Lung	Corumbá, MS	2099
Viperidae				
<i>Bothropoides mattogrossensis</i>	<i>Raillietiella</i> sp.1	Lung	Corumbá, MS	2116
<i>Crotalus durissus</i>	<i>Porocephalus</i> sp.	Lung	Corumbá, MS	1116, 1142, 1172
<i>C. durissus</i>	<i>Raillietiella furcocerca</i>	Stomach	Pirambóia, SP	1932
Squamata – lizards				
Scincidae				
<i>Trachylepis atlantica</i>	<i>Raillietiella freitasi</i>	Lung	Fernando de Noronha, PE	2928

*Numbers in the last column are the accession numbers of voucher species in CHIBB – Helminthological Collection of the Department of Parasitology, Institute of Biosciences, Universidade Estadual Paulista.

4. Discussion

We report here the first record of infection by pentastomids in the snake species *Bothropoides matogrossensis* (Amaral, 1925), *Thamnodynastes chaquensis* (Bergna & Alvarez, 1993) and *Liophis poecilogyrus* (Wied, 1825) and the crocodylian *Cayman yacare* (Daudin, 1802).

Sebekia oxycephala has already been reported as a parasite of the following vertebrates: fish species *Pseudoplatystoma fasciatum* (Linnaeus, 1766), *Pygocentrus piraya* (Müller & Troschel, 1848), *Synbranchus marmoratus* (Bloch, 1795), *Stenarchus albifrons* (Bloch & Schneider, 1801), *Potamotrygon motoro* (Müller & Henle, 1841), *Electrophorus electricus* (Linnaeus, 1766), *Salmo tamuco* (Kner, 1860), *Silurus pintado* (Natterer, 1836), *S. dourado*, *Silurus* sp., *Salmo* sp., and *Clupea* sp.; mammal *Pteronura braziliensis* (Gmelin, 1788); and reptiles; *Caiman sclerops* (Duméril & Bibron, 1836), *C. crocodilus* (Linnaeus, 1758), *Melanosuchus niger* (Spix, 1825), *Tupinambis teguixin* (Linnaeus, 1758), *Farancia abacura* (Holbrook, 1836), *Eunectes murinus* (Linnaeus, 1758), *Boa constrictor* (Linnaeus, 1758), *Crotalus horridus* (Linnaeus, 1758), *Ophis merremii* (Wagler, 1824), *Spilotes pullatus* (Laurenti, 1768), *Bothropoides jararaca* (Wied, 1824), *Dimades plicatilis* (Linnaeus, 1758), *Micrurus* sp., *Tropidonotus* sp., and *Coluber* sp. (Almeida & Christoffersen, 2002; Sambon, 1922; Rego, 1984). In the crocodylian *C. yacare*, the cycle of *S. oxycephala* was observed for the first time, where larvae of *S. oxycephala* were found in the stomach and intestine and adult parasites in the lung. *Sebekia oxycephala* utilizes fish as an intermediate host and completes its cycle in *C. yacare* when it eats infected fish. *Cayman yacare* is distributed geographically in the central part of South America, where it is found in the north of Argentina, southern Bolivia, Brazilian Pantanal and rivers of Paraguay. It feeds on aquatic invertebrates such as mollusks and crustaceans and vertebrates (fish and snakes) (Reptile Database, 2010).

The parasite *R. furcocerca* is a typical parasite of snakes, with a Neotropical distribution. Besides *Crotalus durissus* (Linnaeus, 1758), this pentastomid species was recorded in various species of snakes: *Boa constrictor*, *Coluber lichtensteinii* (Raddi, 1820), *Drymarcon corais* (Boie, 1827), *Xenodon merremii* (Wagler, 1824) and *Lachesis* sp. (Motta, 1963; Rego, 1983). *Thamnodynastes chaquensis* which represents a new host for *R. furcocerca*, occurs in the provinces of the Chaco, where there are reports of this species in Argentina, Paraguay, Uruguay and Brazilian Pantanal. *T. chaquensis* is a nocturnal snake which is abundant in the Brazilian Pantanal, where it feeds mainly on amphibians and small rodents (Franco & Ferreira, 2002).

Raillietiella sp. 1 found in the lung of *B. matogrossensis* differs from *R. furcocerca* because the male of this species is larger than the female, but its identification at the species level was not possible due to the lack of a male in the host analysed. *B. matogrossensis* occurs in Brazil (Amazonas, Goiás, Mato Grosso do Sul, Rondônia, São Paulo and Tocantins), Bolivia, Paraguay and Argentina. The diet of

this snake consists of anuran amphibians, small mammals, lizards, snakes and centipedes (Monteiro et al., 2006).

The parasitism of *R. freitasi* in the lizard *Trachylepis atlantica* (= *Mabuya punctata*) (Schmidt 1945) has already been reported, and besides this lizard, *R. freitasi* also parasitizes the species *Tropidurus torquatus* (Wied, 1820) and *Rhinella schneideri* (= *Bufo paracnemis*) (Werner, 1894) (see Almeida & Christoffersen, 2002). *Trachylepis atlantica* is a lizard endemic to the Fernando de Noronha Archipelago; this species of omnivorous lizard, feeds mainly on plant material and insects, typically ants (Rocha et al., 2009).

The specimen *Raillietiella* sp.2 found in *Liophis poecilogyrus* (Wied-Neuwied, 1825) constituted the first report of infection by pentastomids in this species of snake. The identification of the parasite at the species level was not possible due to the lack of a male. The snake *L. poecilogyrus* is a species with wide geographic distribution, occurring from the eastern part of Guiana to southeastern Venezuela, advancing in a south-to-southeast direction down to Bolivia and Paraguay, also reaching the Pantanal and continuing down to the Argentinian Pampas and Chaco (Reptile Database, 2011); it feeds mainly on amphibians, particularly members of the families Bufonidae and Hylidae (Pinto & Fernandes, 2004).

Although important studies on pentastomids have been published in recent years, knowledge of these parasites in Brazil still needs to be substantially extended, since the majority of the species of Squamata and vertebrates in general that are definitive hosts of these parasites still lack studies aimed at learning about the fauna of associated pentastomids and their ecological and evolutionary relations with their vertebrate hosts.

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