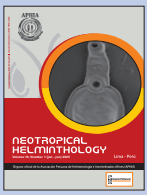
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ORIGINAL ARTICLE / ARTÍCULO ORIGINAL

HELMINTHS OF TWO SPECIES OF *BACHIA, B. DORBIGNYI* (DUMÉRIL & BIBRON, 1839) AND *B. BRESSLAUI* (AMARAL, 1935) (SAURIA: REPTILIA)

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ABSTRACT

Bachia is a widespread genus of lizard, endemic to the Neotropical region. Despite this huge distribution, little is known about aspects of their ecology, such as diet and parasitism. Herein, we present data on helminth infection of two species of the genus, *B. dorbignyi* (Duméril & Bibron, 1839) and *B. bresslaui* (Amaral, 1935). Thirty-one specimens were analyzed, two helminths were found to *B. dorbignyi,* cystacanths of *Centrorhynchus* sp., and the nematode *Oswaldocruzia* sp. For *B. bresslaui*, one helminth was found, the cestode *Oochoristica* sp. Our study provides the first record of parasites infecting *B. dorbignyi* and *B. bresslaui*.

Keywords: Acanthocephala – Cestoda – Gymnophthalmidae – Lizards – Nematoda – parasites

RESUMO

Bachia é um gênero de lagartos amplamente distribuído, endêmico da região Neotropical. Apesar dessa ampla distribuição, pouco se sabe acerca de aspectos da sua ecologia, como padrões de dieta e parasitismo. Aqui apresentamos dados de infecção por helmintos de duas espécies do gênero, *B. dorbignyi* (Duméril & Bibron, 1839), e *B. bresslaui* (Amaral, 1935). Trinta

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e um espécimes foram analisados, dois helmintos foram encontrados para *B. dorbignyi*, cistacantos de *Centrorhynchus* sp. e o nematódeo *Oswaldocruzia* sp. Para *B. bresslaui* um helminto foi encontrado, o cestódeo *Oochoristica* sp. Nosso estudo apresenta o primeiro registro de parasitas infectando *B. dorbignyi* e *B. bresslaui*.

Palavras-chave: Acanthocephala – Cestoda – Gymnophthalmidae – lagartos – nematódeos – parasitas

RESUMEN

Bachia es un género de lagarto ampliamente distribuido, endémico de la región Neotropical. A pesar de esa amplia distribución, poco se conoce al respeto de aspectos de su ecología, como patrones de dieta y parasitismo. Acá presentamos datos de infecciones por helmintos de dos especies del género *B. dorbignyi* (Duméril & Bibron, 1839) y *B. bresslaui* (Amaral, 1935). Treinta y uno especímenes fueron analizados, dos helmintos fueron encontrados para *B. dorbignyi*, cistacantos de *Centrirhynchus* sp. y el nematodo *Oswaldocruzia* sp. Para *B. bresslaui* un helminto fue encontrado, el cestodo *Oochoristica* sp. Nuestra investigación presenta el primer registro de parásitos que infectan *B. dorbignyi* y *B. bresslaui*.

Palabras-clave: Acanthocephala - Cestoda - Gymnophthalmidae – lagartos - nematodos – parásitos

INTRODUCTION

Bachia is a genus of small lizards, belonging to the family Gymnophthalmidae, endemic to Neotropical region, distinguished from others gymnophthalmids by the fossorial habits, reduced eyes and absence of external ear (Murphy *et al.*, 2019; Uetz *et al.*, 2021). Currently, 31 species are known with wide distribution in South America (Castrillon & Strussman, 1998). Despite this huge distribution, studies on ecology, such as diet and parasitism, are still scarce for the genus (Colli *et al.*, 1998; Ávila & da Silva, 2011).

Parasitological studies are essential to better understanding ecology, natural history, life cycle, and evolution of parasites and hosts, as well as the host-parasite interaction itself (de Albuquerque *et al.*, 2012; Neta & Ávila, 2018). Although studies on helminths of gymnophthalmids lizards have increased in the past years (Oliveira *et al.*, 2017; Neta & Ávila, 2018; Ribeiro *et al.*, 2018; Ferreira *et al.*, 2020) the knowledge of parasitological aspects remains underestimate, especially in *Bachia*. To date, helminths have been recorded only for *B. scolecoides (*Vanzolini, 1961) (Ávila & Silva, 2011). Herein, we present parasitism data for two species of *Bachia, B. dorbignyi* (Duméril & Bibron, 1839) and *B. bresslaui* (Amaral, 1935), increasing the knowledge about the host-parasite interactions for the genus.

MATERIAL AND METHODS

Hosts were housed at Coleção Zoológica de Vertebrados da Universidade Federal de Mato Grosso and the Coleção Herpetológica Arlindo de Figueiredo Béda (CHAFD), Aquidauana, Mato Grosso do Sul, Brazil. Specimens of *B. dorbignyi* were collected in transition zones Cerrado-Amazon Biomes at Araputanga municipality (15°08' S 58°54' W), Mato Grosso State, from June 2005 to April 2007 by hand in both the faunal rescue programs and herpetofaunal monitoring program of the Ombreras Hydroelectric Power Plant (PCH Ombreras). Specimens of *B. bresslaui* were collected at Dois Irmãos do Buriti municipality (20° 41' S; 55° 16' W), Mato Grosso do Sul state from September 2003 to October 2004 in pitfall traps with drift fences installed in Brazilian Cerrado.

Lizards were euthanized, fixed with 10% formalin and conserved in 70% ethanol. The snout-vent length (SVL) of each individual was measured with an aid of a digital caliper to the nearest mm. Hosts were necropsied and their body cavity, lungs, and digestive tract were analyzed under a stereoscopic microscope for the presence of helminths. Helminths encountered were placed in vials of 70% ethanol for later identification. For species identification, nematodes were cleared using lactophenol, mounted on temporary slides, and analyzed under a light microscope. Cestodes and Acanthocephala were stained with alcoholic chloride carmine solution, and cleared with eugenol. Following identification, voucher helminths were deposited in the Coleção Helmintológica

do Instituto de Biociências da Unesp de Botucatu (CHIBB 2378, 3338, 3348).

Ethic Aspects: This study was approved by the Animal Ethics Committee of the Universidade Federal do Ceará (CEUA-UFC, process #CEUA 6314010321.

RESULTS

Twenty-seven specimens of *B. dorbignyi* (63.5 ± 7.1 mm SVL; being nine females and 18 males) were examined and two helminths were found: Cystacanths of unidentified centrorhynchid (n=1) and the nematode *Oswaldocruzia* sp. (n=2). Overall prevalence was 7.4%, and the individual prevalence for both helminths was 3.7%. The cystacanth were found in the body cavity of an adult female of *B. dorbgnyi*, whereas the two females of *Oswaldocruzia* sp. were found in the large intestine of an adult male.

For *B. bresslaui*, four specimens (76 ± 2.9 mm SVL; being one female and three males) were examined. One helminth was found infecting the small intestine of an adult female of *B. bresslaui*, the cestode *Oochoristica* sp. (n=1).

DISCUSSION

Our study provides the first records of helminths to *B. dorbignyi* and *B. bresslaui*. To the best of our knowledge, only Ávila *et. al* (2011), studied another *Bachia*, which presented the occurrence of *Physaloptera sp.* and *Paradistomum parvissimum* Travassos, 1918 for *B. scolecoides*, none of these nematodes were found for our species.

The majority of gymnophthalmids have smaller body sizes (42.21 ± 8.8 mm SVL; Mesquita *et al.* 2016), which may constrain the helminth richness (Neta & Ávila, 2018; Ribeiro *et al.,* 2018; Teixeira *et al.*, 2018; Ferreira *et al.,* 2020), as host body size play an important role in parasitism (Ávila & Silva, 2013). Phylogenetic relationships, when phylogenetically close taxa share similarities in the use of niche, may also influence body shape and behavior and thus the acquisition of parasites (Brito *et al.,* 2014; Neta & Ávila, 2018). Our results corroborate these patterns with low overall prevalence for both species.

Fossorial habits require adaptations that might restrict differentiation patterns, in which the environment imposes strong pressure on morphology, causing convergent evolution and conservative morphology in different groups (Albert *et al.*, 2007; Perez & Borges-Martins, 2019). The same pattern was found to parasite communities, since several studies pointed low helminth richness to other fossorial groups, such as mammals (Lutermann & Bennett, 2012; Yáñez-Meza *et al.*, 2019; Rodrigues *et al.*, 2020), amphibians (Van Sluys *et al.*, 2006; Teles *et al.*, 2015; Alcantara *et al.*, 2018) and reptiles (Filogonio *et al.*, 2013; Vieira *et al.*, 2019; Lacerda *et al.*, 2023). The same was found for gymnophythalmids (Neta & Ávila, 2018; Ferreira *et al.*, 2020; Lacerda *et al.*, 2023). Hence, fossoriality may limit parasite exposure in the subterranean habitat. Although this hypothesis is currently speculative it deserves further attention in subsequent studies.

Our findings agree with the pattern of low helminth richness found and increased the knowledge of parasitism to the genus *Bachia.*

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Validation: RWA
Visualization: VHHS, RWA, RJS
Writing – original draft: VHHS, RWA
Writing – review & editing: VHHS, RWA, RJS

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