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Occurrence of Helminths in Lizards (Reptilia: Squamata) at Lower Móa River Forest, Cruzeiro do Sul, Acre, Brazil

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ABSTRACT: Eleven of 113 (10%) lizards representing 6 of the 17 species (*Anolis fuscoauratus*, *Anolis trachyderma*, *Plica umbra*, *Kentropyx pelviceps*, *Arthrosaura reticulata*, and *Mabuya nigropunctata*) collected in the lower Móa River forest, in the Amazon rainforest in the Brazilian state of Acre, were infected with helminths in the gastrointestinal tracts. The nematodes recovered from lizards were *Physaloptera lutzi*, *Physaloptera retusa*, and *Physalopteroides venancioi*. Three new host records and two new locality records are reported.

KEY WORDS: Parasitism, Squamata, Neotropical, Nematoda, Sauria, South America.

Knowledge of endoparasites infecting wild animals is important for understanding more about the ecology, natural history, life cycle, and evolution of both parasites and hosts (Silva et al., 2008). Parasitism is one of the most important selective forces in the evolution of species and the structuring of ecological communities (Novaes-e-Silva and Araújo, 2008). Recently, new species of parasites in lizards have been described (Fontes et al., 2003) and the number of ecological studies on parasites of reptiles has increased in the few years (Burse and Goldberg, 2002; Rocha and Vrcibradic, 2003b; Carvalho and Araújo, 2004; Goldberg et al., 2006a; Ávila et al., 2010).

Few studies have examined the endoparasite fauna of lizards in the Amazon (Burse and Goldberg, 2004a; Bursey et al., 2005; Goldberg et al., 2006a, 2009) and, in the Acre state, the only publications available are the studies of Goldberg et al. (2006a, b, 2009). In this study we report the helminth infection in 6 lizard species in Cruzeiro do Sul, Acre, Brazilian Amazon.

MATERIALS AND METHODS

Lizards were collected from May 2008 to September 2009 in the lower Móa River forest (07°37'14.7"S; 72°48'09.9"W; Fig. 1), Cruzeiro do Sul, Acre, Brazil. Lizards were captured by hand or by pitfall traps, euthanized, fixed in 10% formalin, and preserved in 70% ethanol. Measurements of snout–vent length (SVL) were obtained from each lizard with the use of a caliper. Specimens collected during this study are housed in the herpetological collection of Universidade Federal do Acre,

Campus Floresta (UFACF), in Cruzeiro do Sul. Lizard identification was based on Ávila-Pires (1995).

The body cavity of each lizard was opened by a longitudinal incision from throat to vent, the gastrointestinal tract was slit longitudinally, and stomach and intestinal contents were removed and examined for parasites under a stereomicroscope. Helminths found in the gastrointestinal tract were placed in vials of 70% ethanol for later identification. For identification, nematodes were cleared in phenol and analyzed in a computerized system for image analysis (Qwin Lite 3.1, Leica Microsystems, Wetzlar, Germany). Voucher helminth specimens were deposited in the Coleção Helmintológica do Instituto de Biociências da Unesp de Botucatu (CHIBB), in São Paulo State.

RESULTS

A total of 113 individuals lizards representing 17 species was collected in the lower Móa River forest. Of these, helminths were found in 11 lizards belonging to 6 species: *Anolis fuscoauratus* ($N = 1$, SVL = 48 mm), *Anolis trachyderma* ($N = 1$, SVL = 55 mm), *Plica umbra* ($N = 3$, SVL = 60.8 ± 10.4 mm), *Kentropyx pelviceps* ($N = 4$, SVL = 100.6 ± 10.2 mm), *Arthrosaura reticulata* ($N = 1$, SVL = 52 mm), and *Mabuya nigropunctata* ($N = 1$, SVL = 95 mm). A total of 64 nematodes representing 3 species was recovered from the lizard hosts. Results by lizard host species can be found as follows.

Family Polychrotidae *Anolis fuscoauratus* D'Orbigny 1837

One male specimen collected in February 2009 (UFACF 1797).

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Figure 1. Location of Mõa River forest study area, Acre State, Brazil.

***Physaloptera retusa* Rudolphi, 1819
(CHIBB 5052)**

Prevalence: One individual was infected with 1 nematode.

Temporal distribution: February 2009.

Site of infection: Stomach.

Type host and locality: *Tupinambis teguixin*, Brazil.

Previous reports in this host: Goldberg et al., 2006a.

Locality records: In the Brazilian states of Bahia, Esp rito Santo, Goi s, Mato Grosso do Sul, Mato Grosso, Par , Rio de Janeiro, and S o Paulo; Paraguay; Bol via; Argentina; Peru; Surinam; Uruguay; Bol via; Guyana; Venezuela; Colombia.

Remarks: Four species of *Physaloptera* have been recognized in South America (*Physaloptera liophis*, *Physaloptera obtusissima*, *Physaloptera lutzi*, and *Physaloptera retusa*), and identification is based on male caudal morphology and spicule length (see Vicente et al., 1993). Acre State is a new locality record for *P. retusa*.

***Anolis trachyderma*
Cope 1876**

One female collected in February 2009 (UFACF 1792).

***Physaloptera retusa* Rudolphi,
1819 (CHIBB 5056)**

Prevalence: One individual was infected with 1 nematode and 5 maggots of fly.

Temporal distribution: February 2009.

Site of infection: Stomach.

Remarks: See remarks under *A. fuscoauratus*. *Anolis trachyderma* represents a new host record for *P. retusa*.

**Family Tropicuridae
Plica umbra
Linnaeus, 1758**

Three specimens (2 adult males and 1 adult female) were collected in September 2008 and May and November 2009 (UFACF 973, 962, 1869).

***Physaloptera retusa* Rudolphi, 1819 (CHIBB 5049, 5053 and 5055)**

Prevalence and intensity of infection: Three of the 9 specimens was infected with 35 nematodes. One lizard contained 24 nematodes and the other two 7 and 4, respectively.

Temporal distribution: September 2008, May and November 2009.

Site of infection: Stomach and intestine.

Previous reports in this host: Bursey et al., 2005.

Remarks: See remarks under *A. fuscoauratus*.

Family Teiidae
Kentropyx pelviceps
Cope 1868

Four specimens (3 adult males and 1 adult female) were collected in October and November 2008 and February and May 2009 (UFACF 1106, 1200, 1789, 2378).

***Physaloptera retusa* Rudolphi, 1819 (CHIBB 5054, 5057, and 5058).**

Prevalence and intensity of infection: Four of 12 specimens were infected with 24 nematodes. The male individuals contained 3, 9, and 4 nematodes, respectively, and the female 8.

Temporal distribution: November 2008, February and May 2009.

Site of infection: Stomach

Previous reports in this host: Bursey et al., 2005; Goldberg et al., 2009.

Remarks: See remarks under *A. fuscoauratus*.

Family Gymnophthalmidae
Arthrosaura reticulata
O'Shaughnessy 1881

One male specimen collected in July 2008 (UFACF 929).

***Physaloptera lutzi* Cristófar, Guimarães, & Rodrigues, 1976 (CHIBB 5051)**

Prevalence: One individual was infected with 2 nematodes.

Temporal distribution: July 2008.

Site of infection: Stomach.

Type host and locality: *Ameiva ameiva*, Bahia, Brazil

Previous reports in this host: None.

Locality records: In the Brazilian states of Bahia, Espírito Santo, Goiás, Minas Gerais, Mato Grosso, Mato Grosso do Sul, Goiás, Pará, Rio de Janeiro, and São Paulo; Argentina; Bolívia; Paraguay.

Remarks: See remarks under *A. fuscoauratus*. *Arthrosaura reticulata* represents a new host record for *P. lutzi*. Acre represents a new locality record for *P. lutzi*.

Family Scincidae
Mabuya nigropunctata
Spix 1825

One female specimen collected in November 2008 (UFACF 1174).

***Physalopteroides venancioi* Lent, Freitas, & Proença, 1946 (CHIBB 5050)**

Prevalence: One individual was infected with 1 nematode.

Temporal distribution: November 2008.

Site of infection: Stomach.

Type host and locality: *Rhinella schneideri* (= *Bufo paracnemis*), Uruguay.

Previous reports in this host: None.

Locality records: In the Brazilian states of Acre, Bahia, Goiás, Mato Grosso, and Rio de Janeiro; Peru; Paraguay.

Remarks: *Mabuya nigropunctata* represents a new host record for *Physalopteroides venancioi*.

DISCUSSION

A great diversity of lizards is known for the Brazilian Amazon (Ávila-Pires, 1995), with some localities containing 29 species (e.g., Macedo et al., 2008; Ávila-Pires et al., 2009). Although lizards are considered the best known reptiles in Amazonia, our knowledge concerning these animals is still far from ideal (Ávila-Pires, 1995).

The records of *Physaloptera lutzi* in *Arthrosaura reticulata* and *Physalopteroides venancioi* in *Mabuya nigropunctata* represent the first record from Acre and new host for these species.

Despite the small sample size, the data presented in this study contribute to the overall knowledge about

the ecology of lizards and the associated helminth fauna in the state of Acre. Despite the recent increase of studies dealing with parasitism on lizards from Brazil, further studies that include host ecological data such as diet and habitat use are necessary to understand the host–parasite relationships.

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