Neotrop. Helminthol., 5(2), 2011
© 2011 Asociación Peruana de Helmintología e Invertebrados Afines (APHIA)
Versión Impresa: ISSN 2218-6425 / Versión Electrónica: ISSN 1995-1043

aphia
ASOCIACIÓN PERUANA DE HELMINTOLOGÍA E INVERTEBRADOS AFINES

RESEARCH NOTE/ NOTA CIENTÍFICA

HELMINTH FAUNA OF TWO GECKO LIZARDS, *HEMIDACTYLUS AGRIUS* AND *LYGODACTYLUS KLUGEI* (GEKKONIDADE), FROM CAATINGA BIOME, NORTHEASTERN BRAZIL

HELMINTOFAUNA DE DOS LAGARTOS GECONÍDEOS, *HEMIDACTYLUS AGRIUS* Y *LYGODACTYLUS KLUGEI* (GEKKONIDADE), EN EL BIOMA CAATINGA, NORESTE DEL BRASIL

Luciano Alves dos Anjos*, Castiele Holanda Bezerra[§], Daniel Cunha Passos[§], Djan Zanchi[§] & Conrado Aleksander Barbosa Galdino[§,†]
Depto de Biologia e Zootecnia – FEIS, UNESP, campus Ilha Solteira, SP, Brasil. CEP 15385000.
mabuyasp@yahoo.com.br,
§-Núcleo Regional de Ofiologia da Universidade Federal do Ceará - NUROF-UFC Centro de Ciências, Universidade Federal do Ceará, Campus do Pici, Bloco 905, CEP 60.455-760, Fortaleza, Ceará, Brazil. Email: castieleholanda@gmail.com; biologodanielpassos@gmail.com; djanzanchi@yahoo.com.br
† - Programa de Pós-graduação em Zoologia de Vertebrados, Pontifícia Universidade Católica de Minas Gerais, Avenida Dom José Gaspar, 290, Bairro Coração Eucarístico, Belo Horizonte, Minas Gerais, Brasil. CEP 30535-901. e-mail: galdinoc@gmail.com

Suggested citation: Anjos, L.A., Bezerra, C.H., Passos, D.C., Zanchi, D. & Galdino, C.A.B. 2011. Helminth fauna of two gecko lizards, Hemidactylus agrius and Lygodactylus klugei (Gekkonidade), from Caatinga biome, northeastern Brazil. Neotropical Helminthology, vol 5, nº 2, pp. 285-290.

Abstract

This study presented data on helminth fauna of two gecko lizards, *Hemidactylus agrius* and *Lygodactylus klugei*, from Caatinga biome in northeastern Brazil. It was found four helminth species parasitizing *H. agrius*, cistacanth of Centrorhynchidae (Acanthocephala) and the nematodes Physalopteridae (larvae), *Parapharyngodon alvarengai* (Pharyngodonidae) and *Skrjabinelazia* sp. (Seuratidade). The host *Lygodactylus klugei* presented two helminth species, one individual of *Mesocoelium monas* (Trematoda: Mesocoeliidae) in the small intestine and one encysted larvae of Physalopteridae (Nematoda: Physalopteridae) attached at stomach wall. The lizard species showed a low prevalence and low richness of helminths. Moreover, *H. agrius* presented a low intensity of infection. The foraging mode, arboreal habit and a restricted composition of diet could favoring the low prevalence, low infection rates and low richness of helminths found in these geckonid host species.

Keywords: gastrointestinal tract - Gekkota – *Hemidactylus* – helminth.

Resumen

Este estudio presenta datos sobre la fauna de helmintos de dos lagartos geconídeos, *Hemidactylus agrius* y *Lygodactylus klugei*, en el bioma caatinga en el noreste del Brasil. Hay cuatro especies de helmintos parásitos de *H. agrius*, cistacanto de Centrorhynchidae (Acanthocephala) y nematodos Physalopteridae (estadios larvarios), *Parapharyngodon alvarengai* (Pharyngodonidae) y *Skrjabinelazia* sp. (Seuratidade). El hospedador *Lygodactylus klugei* presentó dos especies de helmintos, un individuo de *Mesocoelium monas* (Trematoda: Mesocoeliidae) en el intestino delgado y una larva enquistada de Physalopteridae (Nematoda: Physalopteridae) adjunta a la pared del estómago. Las especies de lagarto mostraron una baja prevalencia y baja riqueza de helmintos. Además, *H. agrius*

mostró una baja intensidad de infección. El modo de búsqueda de alimento, el hábito arbóreo y la composición de una dieta restringida pudieran haber favorecido la baja prevalencia, las bajas tasas de infección y riqueza baja de helmintos que se encontraron en las especies hospedadoras.

Palabras clave: Gekkota – *Hemidactylus* – helminth - tracto digestivo.

INTRODUCTION

Knowledge on the aspects of parasitism by helminths of neotropical lizards had increased in last decade (*e.g.* Vrcibradic *et al.*, 2000; Rocha *et al.*, 2003; Ávila & Silva, 2010). However, despite the great diversity of the neotropical gekkotans relatively few species have been surveyed for parasites; two species of Gekkonidae (Anjos *et al.*, 2005; Anjos *et al.*, 2007; Anjos *et al.*, 2008; Ávila *et al.*, in press), one species of Sphaerodactylidae (Ávila & Silva, 2010) and 12 species of Phyllodactylidae (Ávila & Silva, 2010; Ávila *et al.*, in press).

Recently the taxonomy and systematic of geckos was revised (Gamble *et al.*, 2008a; 2008b) and the Gekkota infraorder now compriese seven lizards' families. In South America three families are most representatives, Gekkonidade, Spaherodactylidade and Phyllodactylidae (Gamble *et al.*, 2008b). *Hemidactylus agrius* Vanzolini, 1978 (Gekkonidae) is a nocturnal lizard associated to pristine environments (Rodrigues, 2003). This lizard was first considered to be endemic to the Caatinga Biome (Vanzolini, 1978), however recently Andrade *et al.* (2004) extended the species range to the cerrado of Maranhão State. Information on the species is scarce (Bezerra *et al.*, 2011; Passos & Borges-nojosa, in press). *Lygodactylus klugei* (Smith *et al.*, 1977) (Gekkonidae) is a small-bodied diurnal and arboreal lizard with a wide distribution along the Caatinga (Vitt, 1995).

Herein we present data on helminth fauna of two geckonid lizards, *H. agrius* and *L. klugei* from Caatinga (Savanna-Like vegetation) from Northeastern Brazil.

MATERIAL AND METHODS

Lizards were sampled at "Fazenda Experimental do Vale do Curu (FEVC)" (03°49'0.03"S, 39°20'16.7"W, 45 msnm), Pentecoste municipality, Ceará State, northeastern Brazil, between February and March 2010. The FEVC covers 142 ha of caatinga vegetation, characterized by a xerophytic, deciduous, thornscrubland forest, typical of the northeastern Brazil (Leal *et al.*, 2005). This semi-arid biome can experience in some years up to 11 month of dry condition.

Lizards were searched from ca. 0700h to ca. 1600h. After capture lizards were euthanized with a lethal injection of sodium thiopental, fixed in 10% formalin and stored in 70% alcohol. In the laboratory, lizards were necropsied and their body cavity and digestive tract were checked under a stereomicroscope for endoparasites.

Nematodes were cleared in lactophenol; trematodes and cistacanth were stained with hydrochloric carmine, dehydrated and cleared with creosote. Helminths were mounted on temporary slides, identified and deposited in the Coleção Helmintológica do Instituto de Biociências Botucatu, São Paulo State, Brazil, under the acronym CHIBB 6724-6730. Parasitological terminology used throughout and values of means ± 1 standard error follows that of Bush *et al.* (1997).

RESULTS

It was collected 56 *H. agrius* (19 adult male, 19 adult female and 18 juveniles) and 22 *L. klugei.* For *H. agrius* were found four taxa of infecting helminths: cistacanth of Centrorhynchidae (Acanthocephala), larvae of Physalopteridae (Nematoda), *Parapharyngodon alvarengai* Freitas, 1957 (Nematoda: Pharyngodonidae), and *Skrjabinelazia* sp. Sypliaxov, 1930 (Nematoda: Seuratidae). Cistacanth were found only in lizards' body cavity. Among nematodes Physalopteridae larvae were found only in the small intestine, *P. alvarengai* in the small and large intestine while *Skrjabinelazia* sp. were found exclusively in the large intestine.

From the 56 individuals of *H. agrius* analyzed eight lizards were infected by at least one parasite (overall prevalence of 14.3%). Prevalence on the adult male host were 26.3% (n = 5) and on adult females were 15.8% (n = 3). There was no significant difference in the overall prevalence between females and males (Test Z for proportions; Z = 0.40; P = 0.70). No juvenile lizard was parasitized. The mean intensity of infection was 1.9 ± 0.3 parasites per host. Nematode *P. alvarengai* was the most prevalent (5/8, P = 62.5%), with all other helminths present in a single lizard host.

From the 22 individuals of *L. klugei*, just two lizards were found harboring helminths (overall prevalence of 9.1%). It was found two helminth species, one individual of *Mesocoelium monas* (Rudolphi, 1819) (Trematoda: Mesocoeliidae) in the small intestine and one encisted larvae of Physalopteridae (Nematoda: Physalopteridae) attached at stomach wall.

DISCUSSION

The helminth fauna of *H. agrius* from FEVC had been also found infecting other neotropical lizards species, and such infections are not restricted to the gekkotans. Cistacanth of Centrorhynchidae was found parasitizing the gekkonid *H. mabouia,* in that case with a high prevalence and intensity of infection (Anjos *et al.*, 2005). Larvae of *Physaloptera* have been found in many lizards from different families (Ávila *et al.*, 2010), usually these lizards act as intermediate host (Anderson, 2000). *Parapharyngodon alvarengai* have been found in lizards *Trachylepis atlantica, Ameiva ameiva* and in *Amphisbaena ridleyi* (Ávila & Silva, 2010). Species of the genus *Skrjabinelazia* is a common parasite of gekkotan lizards from Old World (Lhermitte *et al.*, 2008; Goldberg *et al.*, 2011). Nonetheless, species of *Skrjabinelazia* were found also parasitizing the neotropical *Gonatodes humeralis* (Phyllodactylidade) in North Brazil (Vicente *et al.*, 1993).

Additionally, *Skrjabinelazia intermedia* was found infecting the teiid *Cnemidophorus nativo* in the northeast Brazil (Menezes *et al.*, 2004). Since there is no previous study addressing the helminth parasitism for *H. agrius* this lizard species is here reported as a new host for Centrorhynchidae cistacanth, Physalopteridae larva, *Parapharyngodon alvarengai,* and *Skrjabinelazia* sp.

The existing information on parasitic aspects from Neotropical gecko lizards (Gekkonidae, Sphaerodactylidae and Phyllodactylidae) accounts for a relatively low overall prevalence and richness of helminth supracommunity ranging from one to four species of parasite (Vicente *et al.*, 1993; Ávila & Silva, 2010). The exception occurs in *H. mabouia* an exotic invader species, which acquired helminth fauna of native host lizards (Anjos *et al.*, 2005; Anjos *et al.*, 2007).

Several aspects of the biology and the ecology of lizards such as, foraging mode, use of microhabitat, body size, pregnancy, diet composition and ontogeny (Aho, 1990; Combes, 2005; Poulin, 2007) play a key role in the acquisition of the associated helminth fauna. The low richness of helminths and the low prevalence and infection rates found for *H. agrius* might be related to the species foraging mode and also to intrinsic features of each lizard species.

In spite of *H. agrius* has a generalist diet in terms of prey composition; orthopterans were the predominant food item ingested by the individuals from FEVC (C. Galdino, in prep.). Thereby, such bias in the specialization on prey consumption should be a factor contributing to the low rate of parasites acquisition in the population. Is also important to point out that the composition of the helminth fauna of *H. agrius* was dominated by monoxenic life-cycle parasites (Anderson, 2000). Thus, behavioral components as the selection of foraging sites with low occurrence of parasites might be of importance in determining low infection in the species, as pointed by the theory of Combe's filter (Combes, 2005).

Lygodactylus klugei is an arboreal lizard, and this trait could reduce their chances to be infected by helminths. The cestode *M. monas* have been registered in more than a hundred species of reptiles and amphibians (Travassos *et al.*, 1969; Goldberg *et al.*, 2005; Ávila & Silva, 2010) in almost all continents and this study found a new host species for the parasite.

The low prevalence and intensity of infection of these geckonid lizards are according to other studies focusing on helminth fauna of gekkotans (except *H. mabouia*). The movement rate, arboreal habit and a trend of specialization on prey consumption usually reflect on their depauperated helminth fauna, composed primarily by species monoxenic and commons.

ACKNOWLEDGEMENTS

We thank the administrative staff of the Fazenda Experimental do Vale do Curu for logistical support and for the permission to work at the area. We also thank R. J. da Silva and people from LAPAS (Laboratory of Wildlife Parasitology) for the facilities at the lab. This Study were supported by grant from Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPQ) proc. 35.0241/2008-2 and from Fundação Cearense de Apoio ao Desenvolvimento Científico e Tecnológico conv. 22/2007 to C. A. B. Galdino. Currently C.A.B. Galdino benefits from a grant from CNPq (postdoctoral fellowship proc. 151663/2010-6). LA Anjos received grants from FAPESP (postdoctoral fellowship, proc. 20.08/50417-7). D Zanchi is grateful to Fundação Cearense de Apoio ao Desenvolvimento Científico e Tecnológico for the grant BMD-0008-00060.01.14/10 and from Coordenação de Aperfeiçoamento de Pessoal de Nível Superior. We also thank Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) for collecting permission (license nº 21551-1).

BIBLIOGRAPHIC REFERENCES

Aho, J. 1990. *Helminth communities of amphibians and reptiles: Comparative approaches to understanding patterns and processes*. p.157 - 195. *In:* Esch, G W, Bush, A O & Aho, J M (eds.). *Parasite communities: patterns and processes.* New York, USA. Chapman and Hall.

Anderson, R (ed.). 2000. *Nematode parasites of vertebrates: Their development and transmission.* CABI.

Andrade, GV, Gomes, JO, Freire, P C & Cruz, LD. 2004. *Geographic Distribution.* Hemidactylus agrius. Herpetological Review, vol.35, pp. 287.

Anjos, LA, Almeida, WO, Vasconcellos, A, Freire, EMX & Rocha, CFD. 2007. *The alien and native pentastomids fauna of an exotic lizard population from Brazilian Northeast.* Parasitology Research, vol.101, pp. 627-628.

Anjos, LA, Almeida, WO, Vasconcellos, A, Freire, EMX & Rocha, CFD. 2008. *Pentastomids infecting an invader lizard,* Hemidactylus mabouia *(Gekkonidae) in northeastern Brazil*. Brazilian Journal of Biology, vol.68, pp. 611-615.

Anjos, LA, Rocha, CFD, Vrcibradic, D & Vicente, J J. 2005. *Helminths of the exotic lizard* Hemidactylus mabouia *from a rock outcrop area in southeastern Brazil*. Journal of Helminthology, pp. 307-313.

Ávila, R, Souza, F & da Silva, R. 2010. *Helminths from seven species of Lizards (Reptilia: Squamata) at the Cerrado of Mato Grosso do Sul State, Brazil*. Comparative Parasitology, vol.77, pp. 67-71.

Ávila, RW, Anjos, L A, Ribeiro, SC, Morais, DH, Silva, RJ & Almeida, WO 2011. Nematodes of lizards (Reptilia: Squamata) from Caatinga Biome, Northeastern Brazil. *Comparative Parasitology.*

Ávila, RW & Silva, RJ. 2010. *Checklist of helminths from lizards and amphisbaenians (Reptilia, Squamata) of South America*. Journal of Venomous Animals and Toxins including Tropical Diseases, vol.16, pp. 543-572.

Bezerra, CH, Passos, DC, Mesquita, PCMD & Borges-nojosa, DM. 2011. Hemidactylus agrius *(Country-leaf toad gecko) reproduction*. Herpetological Review, vol.42, pp. 274-275.

Bush, A, Lafferty, K, Lotz, J & Shostak, A. 1997. *Parasitology meets ecology on its own terms: Margolis et al. revisited.* The Journal of parasitology, vol.83, pp. 575-583.

Combes, C (ed.). 2005. *The art of being a parasite*. University of Chicago Press, Chicago.

Gamble, T, Bauer, A M, Greenbaum, E & Jackman, TR. 2008a. *Evidence for Gondwanan vicariance in an ancient clade of gecko lizards*. Journal of Biogeography, vol.35, pp. 88-104.

Gamble, T, Bauer, AM, Greenbaum, E & Jackman, TR. 2008b. *Out of the blue: a novel, trans-Atlantic clade of geckos (Gekkota, Squamata)*. Zoologica Scripta, vol.37, pp. 355-366.

Goldberg, SR, Bursey, CR, Bauer, AM, de Silva, A & Austin, CC. 2011. *Helminths from 9 Species of Geckos (Squamata: Gekkonidae) from Sri Lanka*. Comparative Parasitology, vol.78, pp. 359-366.

Goldberg, SR, Bursey, CR & Telford, SR. 2005. *Metazoan endoparasites of four species of lizards,* Gehyra mutilata, Hemidactylus frenatus *(Gekkonidae),* Mabuya cumingi, Mabuya multifasciata *(Scincidae), and one species of snake,* Ramphotyphlops braminus *(Typhlopidae), from the Philippine Islands*. Comparative Parasitology, vol.72, pp. 88-101.

Leal, I R, Silva, J M C, Tabarelli, M & Lacher, T E J. 2005. *Changing the course of biodiversity conservation in the Caatinga of Northeastern Brazil*. Conservation Biology, vol.19, pp. 701-706.

Lhermitte, N, Bain, O & Virga, A. 2008. Skrjabinelazia rizzoi *n. sp.(Nematoda: Seuratoidea) from a Sicilian lacertid, with comments on specific and biological diversity in the genus*. Parasite, vol.15, pp. 45-52.

Menezes, VA, Vrcibradic, D, Vicente, JJ, Dutra, G F& Rocha, CFD. 2004. *Helminths infecting the parthenogenetic whiptail lizard* Cnemidophorus nativo *in a restinga habitat of Bahia State, Brazil*. Journal of Helminthology, vol.78, pp. 323-328.

Passos, DC & Borges-nojosa, DM in press. *Morphometry of hatchlings of the gecko* Hemidactylus agrius *(Squamata:Gekkonidae) from a semi-arid area of northeastern Brazil*. *Herpetology Notes.*

Poulin, R (ed.). 2007. *Evolutionary ecology of parasites*. Princeton UP, Princeton, NJ.

Rocha, CFD, Vrcibradic, D, Vicente, JJ & Cunha-Barros, M. 2003. *Helminths infecting* Mabuya dorsivittata *(Lacertilia, scincidae) from a high-altitude habitat in Itatiaia National Park, Rio de Janeiro State, southeastern Brazil*. Brazilian Journal of Biology, vol.63, pp. 129-132.

Rodrigues, MT. 2003. *Herpetofauna da caatinga*. p.181-236. *In:* Leal, I R, Tabarelli, M & Silva, J M C (eds.). *Ecologia e conservação da Caatinga.* UFPE. 181-236.

Travassos, L, Freitas, JFT & Kohn, A. 1969. *Trematódeos do Brasil*. Memorias do Instituto Oswaldo Cruz, vol.67, pp. 1 - 886.

Vanzolini, PE. 1978. *On South American* Hemidactylus *(Sauria, Gekkonidae)*. Papéis Avulsos de Zoologia, vol.31, pp. 307-343.

Vicente, J J, Rodrigues, HDO, Gomes, DC & Pinto, R M. 1993. *Nematóides do Brasil. Parte III: nematóides de répteis*. Revista Brasileira de Zoologia, vol.10, pp. 19-168.

Vitt, L J. 1995. *The ecology of tropical lizards in the caatinga of northeast Brazil*. Occasional Papers of the Oklahoma Museum of Natural History, vol.1, pp. 1-29.

Vrcibradic, D, Cunha-Barros, M, Vicente, JJ, Galdino, CAC, Hatano, F H, Van Sluys, M & Rocha, CFD. 2000. *Nematode infection patterns in four sympatric lizards from a restinga habitat (Jurubatiba) in Rio de Janeiro state, southeastern Brazil*. Amphibia-Reptilia, vol.21, pp. 307-316.

Received October 14, 2011.
Accepted October 31, 2011.

Correspondence to author /Autor para correspondência:

Luciano Alves dos Anjos.
Depto de Biologia e Zootecnia – FEIS, UNESP, campus Ilha Solteira, SP, Brasil. CEP 15385000.

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