

SCIENTIFIC NOTE

Ticks (Acari: Ixodidae) from Yellow Armadillo, *Euphractus sexcinctus* (Cingulata: Dasypodidae), in Brazil's Pantanal Wetlands

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ABSTRACT - Tick species parasitizing yellow armadillo, *Euphractus sexcinctus*, were recorded from October 2006 to October 2007 in Pantanal. A total of 89 ticks were collected from 23 yellow armadillos. Most ticks (n = 50) were identified as *Amblyomma cajennense* (Fabricius) (32 males and 18 females). The only other species found was *Amblyomma parvum* (Aragão) (three females and two males). The remaining ticks were immatures of *Amblyomma* (29 nymphs and five larvae). The prevalence of *A. cajennense* was 55%, the mean intensity was 2.7 ± 0.5 (SE) (n = 17) and the mean abundance was 1.5 ± 0.4 (n = 31).

KEY WORDS: *Amblyomma cajennense*, *Amblyomma parvum*, ectoparasite

Ticks are obligatory hematophagous ectoparasites of vertebrates acting as vectors of pathogens to animals, including humans. Moreover, they can cause local irritations and inflammatory processes, anemia resulting from high infestations, predisposition to myiasis, secondary bacterial infections, and skin alterations (Jongejan & Uilenberg 2004). The majority of studies have focused on ticks of domestic animals. However, it is important to know more about parasitic ticks of wild animals, because many of these species can be vectors of pathogens causing emergent zoonoses.

Studies conducted in Brazilian Pantanal (Campos Pereira *et al* 2000) and in the Cerrado biome report tick species associated with armadillos (Botelho *et al* 1989, Bechara *et al* 2002). In most of these studies, the species of *Amblyomma* Koch, were dominant. *Amblyomma* is the richest tick genus (33 species) in Brazil (Aragão & Fonseca 1961). The purpose of the present study was to determine the species of ticks associated to the yellow armadillo, *Euphractus sexcinctus*, in the Pantanal wetlands.

The study was conducted monthly from October 2006 to October 2007 with the exception of January, June and July, at the Embrapa Pantanal experimental station known as the Nhumirim Ranch (18°59'S; 56°39'W), located at the municipality of Corumbá, Mato Grosso do Sul, Brazil. The region comprises a mosaic of permanent and temporary ponds, forest patches, savanna, scrub savanna and seasonally flooded grasslands on sandy soils. Annual precipitation is 1,182 mm, and the average annual temperature is 25.5°C (Soriano *et al* 1997).

Yellow armadillos were caught by hand, placed in a

plastic carrier box with adequate ventilation, and taken to the laboratory of the ranch. Animals were anesthetized (4 mg/kg of tiletamine and zolazepam - Zoletil® 50, Virbac do Brasil, Jurubatuba, São Paulo), and ticks and blood samples were taken for further studies. Ticks were manually removed from the armadillos and placed in 70% ethanol. The armadillos were released at the same day in the same site of capture. Tick species were identified with the following keys: Aragão & Fonseca (1961), Guimarães *et al* (2001) and Onofrio *et al* (2006). Nymphs and larvae of *Amblyomma* were not identified to species because there was not any available key to immature *Amblyomma* of the Neotropical region until the moment of ticks analysis. The ticks were deposited in the collection of Instituto de Pesquisas Veterinárias Desidério Finamor, Rio Grande do Sul, Brazil.

The prevalence, mean intensity and mean abundance were calculated according to the procedures described by Margolis *et al* (1982) and Bush *et al* (1997). Prevalence = the number of hosts infested with one or more individuals of a parasite species, divided by the number of hosts examined for that parasite species; mean intensity = the total number of parasites of a species found in a sample divided by the number of hosts infested with that parasite; and mean abundance = the total number of individuals of a parasite species in a sample of a host species divided by the total number of hosts of that species examined, including both infested and not infested hosts. The recaptures of yellow armadillos were not considered in the calculation of these rates.

Of 31 yellow armadillos (16 males and 15 females) captured in the Pantanal, 23 (12 males and 11 females)

contained ticks. There was no significant difference between the number of parasitized yellow armadillos of both sexes ($\chi^2 = 0.002$; $P = 0.96$). The prevalence of infestation by ticks among the yellow armadillos was 74%. One individual was recaptured twice in the interval of at least two months between captures and another individual was recaptured once. A total of 26 collections of ticks from yellow armadillos were carried out. The parasited individuals showed low intensity of infestation: the two animals with the largest number of ticks had 11 ticks each. Eighty-nine ticks were collected during this study. Most of them were found in the ventral region

of the armadillos; a single specimen was found on the skin between the moveable bands, on the dorsum of the animal. Of this total, 56% were identified as *Amblyomma cajennense* (Fabricius) and 6% as *Amblyomma parvum* (Aragão). The remaining ticks were represented by *Amblyomma* immatures: nymphs (32%) and larvae (6%) (Table 1). Most armadillos carried a single tick species, except for four individuals infested by *A. cajennense* and *A. parvum* simultaneously.

The prevalence of *A. cajennense* was 55%, the mean intensity was 2.7 ± 0.5 (SE) ($n = 17$) and the mean abundance was 1.5 ± 0.4 ($n = 31$). Forty-seven ticks of this species were

Table 1 Ticks collected from yellow armadillos captured or recaptured from October 2006 to October 2007 in the Nhumirim Ranch, Pantanal, MS, Brazil. Sex: (M) = male; (F) = female. Age of the yellow armadillos: (a) = adult; (y) = young. Tick stages: (L) = larva; (N) = nymph; adult ticks are indicated by sex. * = Recapture.

Armadillo		Capture or recapture date	Local (UTM) 21 K	Tick species (number, sex/stage)
Specimen	Sex/Age			
ES1	M/a	25 Oct 2006	0539112 7899148	<i>Amblyomma cajennense</i> (6M)
ES2	F/a	27 Oct 2006	0541579 7900394	<i>A. cajennense</i> (2M)
ES3	M/a	04 Nov 2006	0538241 7900871	<i>A. cajennense</i> (1M; 2F); <i>Amblyomma</i> sp. (1N)
ES3	M/a	*21 Feb 2007	0538185 7901104	<i>A. cajennense</i> (1M)
ES3	M/a	*15 May 2007	0538788 7900565	<i>A. cajennense</i> (1M; 1F)
ES4	F/a	30 Nov 2006	0535840 7897118	<i>A. cajennense</i> (3M)
ES5	F/a	05 Dec 2006	0537531 7896780	<i>A. cajennense</i> (2F)
ES8	M/a	13 Mar 2007	0541879 7901964	<i>A. cajennense</i> (4M; 5F); <i>Amblyomma</i> sp. (2N)
ES9	M/a	20 Mar 2007	0538250 7900856	<i>A. cajennense</i> (1M; 1F)
ES10	F/a	26 Mar 2007	0541959 7900984	<i>A. cajennense</i> (1M; 1F)
ES12	F/a	15 Apr 2007	0539086 7901080	<i>A. cajennense</i> (2F)
ES13	M/a	16 Apr 2007	0539492 7900636	<i>A. cajennense</i> (2M); <i>A. parvum</i> (1F); <i>Amblyomma</i> sp. (1N)
ES14	M/a	19 Apr 2007	0537138 7901211	<i>A. cajennense</i> (5M; 1F); <i>Amblyomma</i> sp. (1N)
ES15	F/a	24 Apr 2007	0538872 7900075	<i>A. cajennense</i> (1F); <i>Amblyomma</i> sp. (2L; 2N)
ES16	M/a	30 Apr 2007	0535987 7900396	<i>A. cajennense</i> (1M; 1F); <i>A. parvum</i> (1M); <i>Amblyomma</i> sp. (1N)
ES17	F/a	01 May 2007	0540085 7900356	<i>Amblyomma</i> sp. (3N)
ES18	F/a	12 May 2007	0536224 7900211	<i>A. cajennense</i> (1F)
ES20	M/y	13 May 2007	0539498 7900195	<i>Amblyomma</i> sp. (1N)
ES21	F/a	15 May 2007	0537943 7901330	<i>A. cajennense</i> (2M); <i>A. parvum</i> (1F); <i>Amblyomma</i> sp. (1N)
ES22	M/a	20 Aug 2007	0538936 7899492	<i>A. cajennense</i> (1M); <i>A. parvum</i> (1M); <i>Amblyomma</i> sp. (3N)
ES22	M/a	*25 Aug 2007	0539693 7899001	<i>A. parvum</i> (1F); <i>Amblyomma</i> sp. (1N)
ES23	M/a	24 Aug 2007	0538413 7899569	<i>Amblyomma</i> sp. (11N)
ES24	M/a	24 Aug 2007	0538928 7900655	<i>A. cajennense</i> (1M)
ES25	F/a	25 Aug 2007	0539699 7898976	<i>Amblyomma</i> sp. (1N)
ES29	M/a	17 Sep 2007	0537360 7900090	<i>Amblyomma</i> sp. (1L)
ES31	F/a	09 Oct 2007	0538479 7899534	<i>Amblyomma</i> sp. (2L)

collected in 17 of 31 armadillos examined only once (not recaptured). Four *A. parvum* were found on four different hosts not recaptured. Prevalence was 13%, mean intensity was 1 ± 0 ($n = 4$), and mean abundance was 0.1 ± 0.1 ($n = 31$). Prevalence of *Amblyomma* larvae and nymphs was 45%, mean intensity was 2.3 ± 0.7 ($n = 14$), and mean abundance was 1 ± 0.4 ($n = 31$). Fifty-five of the ticks collected were adults, 29 were nymphs and five were larvae. The predominant species, *A. cajennense*, was collected throughout the year, with highest mean abundance in October (4 ± 1.8 ; $n = 3$), November (3 ± 0 ; $n = 2$), March (4.3 ± 2.3 ; $n = 3$) and April (2.6 ± 0.9 ; $n = 5$). *Amblyomma parvum* was collected only in April, May and August. Highest mean abundance of nymphs of *Amblyomma* sp. was observed in August (3.7 ± 2.5 ; $n = 4$). The total number of collected ticks did not correlate with the number of yellow armadillos captured per month ($r^2 = 0.37$; $P = 0.06$). Campos Pereira *et al* (2000) reported that *Amblyomma* species were abundant in the Pantanal, finding a predominance of nymphs in August and September.

Although other species of *Amblyomma* have been reported associated to yellow armadillos (Botelho *et al* 1989, Guglielmone & Viñabal 1994, Campos Pereira *et al* 2000, Bechara *et al* 2002, Robins *et al* 2003), our data indicate *A. cajennense* as the predominant tick of yellow armadillos in Pantanal.

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References

- Aragão H, Fonseca F (1961) Notas de Ixodologia. VIII. Lista e chave para os representantes da fauna ixodológica brasileira. Mem Inst Oswaldo Cruz 59: 115-129.
- Bechara G H, Szabó M P J, Almeida Filho W V, Bechara J N, Pereira R J G, Garcia J E, Pereira M C (2002) Ticks associated with armadillo (*Euphractus sexcinctus*) and anteater (*Myrmecophaga tridactyla*) of Emas National Park, State of Goiás, Brazil. Ann N Y Acad Sci 969: 290-293.
- Botelho J R, Linardi P M, Encarnação C D (1989) Interrelações entre Acari Ixodidae e hospedeiros Edentata da Serra da Canastra, Minas Gerais, Brasil. Mem Inst Oswaldo Cruz 84: 61-64.
- Bush A O, Lafferty K D, Lotz J M, Shostak A W (1997) Parasitology meets ecology on its own terms: Margolis *et al* revisited. J Parasitol 83: 575-583.
- Campos Pereira M, Szabó M P J, Bechara G H, Matushima E R, Duarte J M B, Rechav Y, Fielden L, Keirans J E (2000) Ticks (Acari: Ixodidae) associated with wild animals in the Pantanal region of Brazil. J Med Entomol 37: 979-983.
- Guglielmone A A, Viñabal A E (1994) Claves morfológicas dicotómicas e información ecológica para la identificación de garrapatas del género *Amblyomma* Koch, 1844 de la Argentina. Rev Inv Agrop 25: 39-67.
- Guimarães J H, Tucci E D, Barros-Battesti D M (2001) Ectoparasitos de importância veterinária. São Paulo, Editora Plêiade-FAPESP, 218p.
- Jongejan F, Uilenberg G (2004) The global importance of ticks. Parasitol 129: Supplement S1, S3-S14.
- Margolis L, Esch G W, Holmes J C, Kuris A M, Schad G A (1982) The use of ecological terms in parasitology (report of an ad hoc committee of the American Society of Parasitologists). J Parasitol 68: 131-133.
- Onofrio V C, Venzal J M, Pinter A, Szabó M P J (2006) Família Ixodidae: características gerais, comentários e chaves para gêneros, p.29-39. In Barros-Battesti D M, Arzua M, Bechara G H (eds) Carrapatos de importância médico-veterinária da região neotropical: um guia ilustrado para a identificação de espécies. São Paulo, Vox/ICTTD-3/Butantan, 223p.
- Robbins R G, Deem S L, Noss A J, Greco V (2003) First report of *Amblyomma pseudoconcolor* Aragão (Acari: Ixodida: Ixodidae) from Bolivia, with a new record of this tick from the grey brocket deer, *Mazama gouazoubira* (G. Fischer) (Mammalia: Artiodactyla: Cervidae). Proc Entomol Soc Wash 105: 1053-1055.
- Soriano B M A, Oliveira H, Catto J B, Comastri Filho J A, Galdino S, Salis S M (1997) Plano de utilização da fazenda Nhumirim. Publicações da Embrapa Pantanal. Documentos 21: 1-72.

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