

SHORT COMMUNICATION

## *Amblyomma cajennense* and *Amblyomma dubitatum* in capybaras run over on highways in Santa Catarina State, Brazil

### Amblyomma cajennense e Amblyomma dubitatum em capivaras atropeladas em rodovias de Santa Catarina, Brasil

Rosiléia M. de Quadros<sup>1,2</sup>  
rosileia18@hotmail.com

Márcia S. Lavina<sup>2</sup>  
marcinhas18@hotmail.com

Sandra M. Tietz Marques<sup>3\*</sup>  
sandra.marques@ufrgs.br

Marciel França<sup>2</sup>  
marciel.franca@hotmail.com

Wiliam R. Veronezi<sup>4</sup>  
wiliamrafa@bol.com.br

Jary A. Carneiro Júnior<sup>1</sup>  
jarybio@gmail.com

#### Abstract

*Hydrochoerus hydrochaeris* serves as a host for a number of tick species that play an important role as vectors of emergent zoonotic diseases. This is the first report of the occurrence of *Amblyomma cajennense* adults and *Amblyomma dubitatum* nymphs retrieved from capybaras run over on two highways in the state of Santa Catarina, southern Brazil.

**Key words:** Ticks, ixodidae, biology, morphology, nymphs

#### Resumo

*Hydrochoerus hydrochaeris* serve de hospedeiro para várias espécies de carrapatos, os quais exercem papel importante como vetores de agentes zoonóticos emergentes. Este artigo relata pela primeira vez a ocorrência de carrapatos adultos *Amblyomma cajennense* e ninfas de *Amblyomma dubitatum* parasitando capivaras resgatadas sem vida, provenientes de atropelamento em duas rodovias no Planalto Catarinense, região sul do Brasil.

**Palavras-chaves:** carrapato, Ixodidae, morfologia, ninfas

*Hydrochoerus hydrochaeris* Linnaeus, 1766 is the world's largest rodent. Its natural habitat consists of pastures, riparian forests, mangrove forests, swamps and places where bodies of water are available. It is a semiaquatic herbivore found in Central America and South America (except in Chile), from Panama to northeastern Argentina (Eisenberg and Redford, 1999).

There are about 879 tick species described worldwide, and approximately 60 species reported in Brazil. They belong to the superfamily Ixodoidea that includes three families: Argasidae (186 species) and Ixodidae (692 species), with a broad geographical distribution, and Nuttalliellidae (one species) confined to a smaller number of continents (Keirans *et al.*, 1976; Labruna *et al.*, 2005; Nava *et al.*, 2009). There are approximately 130 *Amblyomma* species of which 57 are found in the Neotropical region. Thirty of them occur in Brazil, most of which are regarded as established (Dantas-Torres *et al.*, 2009). Two species, *A. fuscum* Neumann, 1907 and *A. parkeri* Fonseca and Aragão, 1952, are truly endemic to Brazil (Onofrio *et al.*, 2006).

<sup>1</sup> Universidade do Planalto Catarinense. Av. Castelo Branco, 170, 88509-900, Lages, SC, Brasil.

<sup>2</sup> Centro de Ciências Agroveterinárias, Universidade do Estado de Santa Catarina. Av. Luiz de Camões, 2090, 88520-000, Lages, SC, Brasil.

<sup>3</sup> Médica veterinária. Departamento de Patologia Clínica Veterinária, Faculdade de Veterinária da Universidade Federal do Rio Grande do Sul. Av. Bento Gonçalves, 9090, 91540-000, Porto Alegre, RS, Brasil.

<sup>4</sup> Técnico Administrativo. Base Avançada de Pesquisa – IBAMA, C.P. 250, 88502-970, Lages, SC, Brasil.

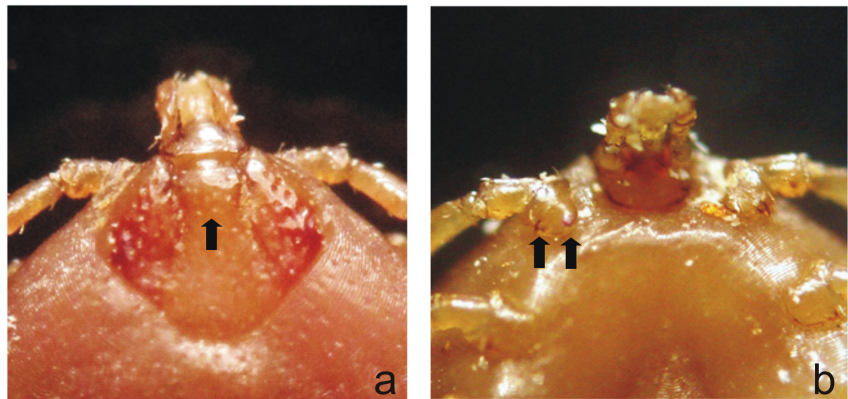
Three dead capybaras (*Hydrochoerus hydrochaeris*) were picked up from two highways in the state of Santa Catarina, southern Brazil, after being run over. They are: (i) an adult female found in Nov. 2010 on highway SC 438, km35, in Paniel (27°55'30" S and 50°6'12" W); (ii) an adult male picked up in Mar. 2011 on highway BR 282, in Lages (27°48' S and 50°20' W) and (iii) an adult female found in Paniel, km9, in December 2012. The three animals were necropsied at the Laboratory of Parasitology of the Center for Agricultural and Veterinary Sciences of Universidade do Estado de Santa Catarina (CAV- UDESC). Ixodidae ectoparasites were found in the carcasses of the animals. The ticks were retrieved from different parts of the body, especially from the abdominal region, with a pair of tweezers, preserved in 70% alcohol, and identified under a stereomicroscope, according to Onofrio *et al.* (2006). The ixodid ticks were photographed and placed in the animal collection of the Laboratory of Parasitology of Universidade do Planalto Catarinense (UNIPLAC). Fifteen *A. dubitatum* Neumann, 1899 nymphs were obtained from animal 1. The nymphs were oval-shaped, with anal groove posterior to the anus, and had 11 festoons without chitinous tubercles. The shield was punctate (a), but not ornate; they had a long and deep cervical groove extending into the final third of the shield; the spiracular plate was ring-shaped with dorsal extension; the base of the capitulum was slightly hexagonal and much broader than long; coxa I had two pointed spurs, the external one being slightly longer than the internal one (b); coxae II and IV had a small triangular spur (Figure 1).

Fourteen adult male *A. cajennense* Fabricius, 1787 ticks were found in capybaras 2 and 3, i.e., four ticks in capybara 2 and 10 in capybara 3. They were identified by their phenotypic characteristics (Figure 2). The male has a distinct groove (c) limiting all festoons posteriorly; coxa I has two

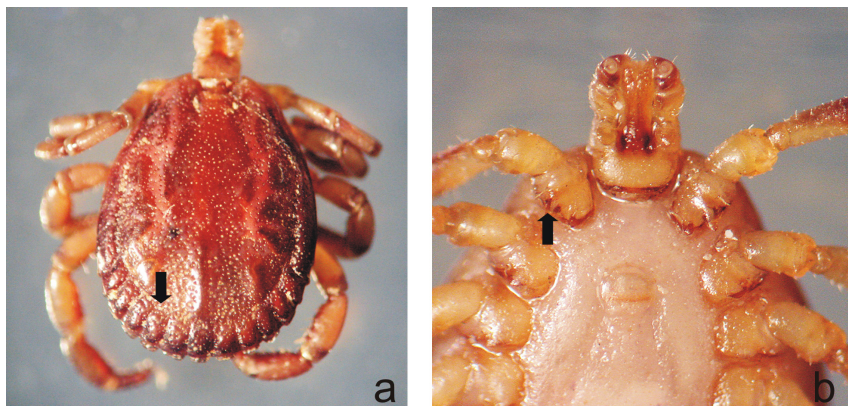
unequal spurs (d) and coxa IV has a spur longer than the article. The distribution of *A. dubitatum* is limited to southern areas of South America, mainly Uruguay, Argentina, Paraguay, Bolivia, and Brazil. In Brazil, it has been found in the southern, southeastern and central western regions (Vieira *et al.*, 2004; Guglielmone *et al.*, 2003). A study on the hosts and genetic divergence of *A. dubitatum* in Brazil revealed that this tick is more prevalent in biomes such the Pampa, Cerrado, Atlantic Forest, and Araucaria Forest, but there are reports for the Marajó Island (state of Pará) and some regions of the Pantanal. The genetic divergence among ticks from Argentina, Brazil and Uru-

guay, identified according to morphological features, was small, and these genetic variations are common at the intraspecific level for neotropical species of the genus *Amblyomma* (Nava *et al.*, 2010). Although the immature and adult stages have high specificity for capybara, larvae and nymphs can naturally infect the Brazilian wildlife (e.g., tapirs, bats, and cattle), humans (Guimarães *et al.*, 2001; Barros-Battesti *et al.*, 2006; Labruna *et al.*, 2007), as well as dogs, cats, and skunks (Horta *et al.*, 2007).

*Amblyomma cajennense* is the most important tick species in Brazil and the major ixodid implied in the transmission and maintenance of *Rickettsia rickettsii* (Wolbach, 1919) leading to



**Figure 1.** Phenotypic characteristics of *A. dubitatum* nymphs: dorsal (a) and ventral (b) views. The specimen measures 2.54 mm x 1.97 mm. The arrows show, respectively, the punctate, but not ornate, shield (a); and coxa I with two pointed spurs, the external one being slightly longer than the internal one (b).



**Figure 2.** Phenotypic (dorsal and ventral) characteristics of *A. cajennense* (male): dorsal (a) and ventral (b) views. The specimen measures 3.87 mm x 3.15 mm. The arrows show, respectively, a distinct groove limiting all festoons posteriorly (a); coxa I with two unequal spurs; and coxa IV with a spur longer than the article (b).

successive generations of the infected invertebrate, thus being a true reservoir for this bacterium. In addition to causing spotted fever, an extremely fatal zoonotic disease that affects humans in Brazil (Toledo *et al.*, 2008), this tick can be associated with *R. africae* and *R. parkeri*. Although it is potentially pathogenic to human beings, the risk of being infected by this microorganism in Brazil remains unknown (Labruna, 2004). This tick has low parasite specificity and a wide geographical distribution. In Brazil, the species is somewhat abundant in all states of the southern and central western regions, and the distribution is smaller in the other regions due to low temperatures and to the type of vegetable cover, as the tick population is associated with the presence of dirty pastures and woods (Vieira *et al.*, 2004).

Aragão (1936) and Evans *et al.* (2000) state that capybaras, tapirs, and horses are the major primary hosts for *A. cajennense*, increasing the tick fauna in their habitat. *A. cajennense* was reported as a parasite of capybaras in the Pantanal region, state of Mato Grosso (Ito *et al.*, 1984), and in Londrina (Toledo *et al.*, 2008) state of Paraná. *Amblyomma dubitatum* was detected in capybaras in Londrina (Toledo *et al.*, 2008), as well as in the states of Espírito Santo, Mato Grosso do Sul, São Paulo and Rio Grande do Sul (Nava *et al.*, 2010). Knowledge about these ectoparasite species is important because they can participate in the enzootic cycle of pathogens in the natural environment, infecting mainly wild animals, which end up as important vectors of emergent zoonotic diseases. With respect to their life cycle, ixodids have three hosts and the immature ticks feed on smaller animals, such as birds and rodents, whereas adults reproduce in medium-sized and large animals (Oliver Jr., 1989). The immature stages of neotropical ticks are poorly known and, in many cases, have not been described (Sanches *et al.*, 2009), thus hindering the reports

of human infection by tick larvae and nymphs (Labruna *et al.*, 2004).

This is the first report of capybaras infected by *Amblyomma cajennense* and *Amblyomma dubitatum* of the state of Santa Catarina, southern Brazil.

## Acknowledgments

We would like to thank Dr. Darci Moraes Barros-Battesti for helping us with the confirmation of the tick *Amblyomma dubitatum*.

## References

- ARAGÃO, H. 1936. Ixodidas brasileiros e de alguns paizes limitrophes. *Memórias do Instituto Oswaldo Cruz*, 31(4):759-843. <http://dx.doi.org/10.1590/S0074-02761936000400004>
- BARROS-BATTESTI, D.M.; ARZUA, M.; BECHARA, G.H. 2006. *Carrapatos de importância médico-veterinária da Região Neotropical: um guia ilustrado para identificação de espécies*. São Paulo, Butantan, 223 p.
- DANTAS-TORRES, F.; ONOFRIO, V.C.; BARROS-BATTESTI, D.M. 2009. The ticks (Acari: Ixodida: Argasidae, Ixodidae) of Brazil. *systematic and Applied Acarology*, 14(1):30-46. Available at: <http://www.acarology.org/saas/saa14/pdf2009/2009-14-030-046.pdf>. Accessed on: 05/23/2012.
- EISENBERG, J.F.; REDFORD, K.H. 1999. *Mammals of the Neotropics: the central neotropics*. Chicago, University of Chicago, 609 p.
- EVANS, D.E.; MARTINS, J.R.; GUGLIELMONE, A.A. 2000. A review of the ticks (Acari: Ixodida) of Brazil, their hosts and geographic distribution – I. The state of Rio Grande do Sul, southern Brazil. *Memórias do Instituto Oswaldo Cruz*, 95(4):453-470. <http://dx.doi.org/10.1590/S0074-02762000000400003>
- GUIMARÃES, J.H.; TUCCI, H.E.C.; BARROS-BATTESTI, D.M. 2001. *Ectoparasitos de importância veterinária*. São Paulo, Plêiade, 213 p.
- GUGLIELMONE, A.A.; ESTRADA-PENÑA, A.; KEIRANS, J.E.; ROBBINS, R.G. 2003. Ticks (Acari: Ixodida) of the Neotropical Zoogeographic Region. In: *International Consortium on Ticks and Tick-borne Diseases*. Atlanta, Houten, 173 p.
- HORTA, M.C.; LABRUNA, M.B.; PINTER, A.; LINARDI, P.M.; SCHUMAKER, T.T.S. 2007. Rickettsia infection in five areas of the state of São Paulo, Brazil. *Memórias do Instituto Oswaldo Cruz*, 102(7):793-801. <http://dx.doi.org/10.1590/S0074-02762007000700003>
- ITO, F.H.; VASCONCELOS, S.A.; BERNARDI, F.; NASCIMENTO, A.A.; LABRUNA, M.B.; ARANTES, I.G. 1984. Evidência sorológica de brucelose e leptospirose e parasitismo por Ixodídeos em animais silvestres do Pantanal-sul-Mato-Grossense. *Ars Veterinaria*, 14:302-310.
- KEIRANS, J.E.; CLIFFORD, C.M.; HOOGSTRAAL, H.; EASTON, E.R. 1976. Discovery of *Nuttalliella namaqua* Bedford (Acarina: Ixodoidea: Nuttalliellidae) in Tanzania and redescription of the female based on scanning electronmicroscopy. *Annals of the Entomological Society of America*, 69(5):926-32. Available at: <http://www.entsoc.org>. Accessed on: 07/22/2012.
- LABRUNA, M.B. 2004. Carta acarológica. In: CONGRESSO BRASILEIRO DE PARASITOLOGIA VETERINÁRIA E SIMPÓSIO LATINO-AMERICANO DE RICKETTSIOSES, 13, Ouro Preto, 2004. *Anais...* Ouro Preto, 1:199-202.
- LABRUNA, M.B.; CAMARGO, L.M.A.; TERRASSINI, F.A.; FERREIRA, F.; SCHUMAKER, T.T.; CAMARGO, E.P. 2005. Ticks (Acari: Ixodidae) from the state of Rondonia western Amazon, Brazil. *Systematic and Applied Acarology*, 10:17-32. Available at: [http://www.nhm.ac.uk/hosted\\_sites/acarology/saas/saa/abst10/saa10\\_04.html](http://www.nhm.ac.uk/hosted_sites/acarology/saas/saa/abst10/saa10_04.html). Accessed on: 09/25/2012.
- LABRUNA, M.B.; PACHECO, R.C.; RICHTZENHAIN, L.J.; SZABO, M.P. 2007. Isolation of *Rickettsia rhipicephali* and *Rickettsia belli* from *Haemaphysalis juxtakochi* ticks in the state of São Paulo, Brazil. *Applied and Environmental Microbiology*, 73(3):869-873. <http://dx.doi.org/10.1128/AEM.02249-06>
- LABRUNA, M.B.; WHITWORTH, T.; HORTA, M.C.; BOUYER, D.H.; MCBRIDE, J.; PINTER, A.; POPOV, V.; GENNARI, S.M.; WALKER, D.H. 2004. Rickettsia species infecting *Amblyomma cooperi* ticks from an area in the state of São Paulo, Brazil, where Brazilian spotted fever is endemic. *Journal of Clinical Microbiology*, 42(1):90-98. <http://dx.doi.org/10.1128/JCM.42.1.90-98.2004>
- NAVA, S.; GUGLIELMONE, A.A.; MANGOLD, A.J. An overview of systematics and evolution of ticks. 2009. *Frontiers in Biosciences*, 14(1):2857-2877. <http://dx.doi.org/10.2741/3418>
- NAVA, S.; VENZAL, J.M.; LABRUNA, M.B.; MASTROPAOLO, M.; GONZALEZ, E.M.; MANGOLD, A.J.; GUGLIELMONE, A.A. 2010. Hosts, distribution and genetic divergence (16S rDNA) of *Amblyomma dubitatum* (Acari: Ixodidae). *Experimental and Applied Acarology*, 51(4):335-351. <http://dx.doi.org/10.1007/s10493-009-9331-6>
- OLIVER JÚNIOR, J.H. 1989. Biology and systematics of ticks (Acari: Ixodida). *Annual Review of Ecology and Systematics*, 20:397-430. <http://dx.doi.org/10.1146/annurev.es.20.110189.002145>
- ONOFRIO, V.C.; VENZAL, J.M.; PINTER, A.; SZABÓ, M.P.J. 2006. Família ixodidae: características gerais, comentários e chave para gênero. In: D.M. BARROS-BATTESTI; M.

- ARZUA; G.H. BECHARA, *Carrapatos de importância médico-veterinária da Região Neotropical: um guia ilustrado para identificação de espécies*. São Paulo, Butantan, p. 29-35.
- SANCHES, G.S.; BECHARA, G.H.; CAMARGO-MATHIAS, M.I. 2009. Morphological description of *Amblyomma brasiliense* Aragão, 1908 (Acari: Ixodidae) larvae and nymphs. *Revista Brasileira de Parasitologia Veterinária*, **18**(3):15-21  
<http://dx.doi.org/10.4322/rbpv.01803003>
- TOLEDO, R. S.; TAMEKUNI, K.; HAYDU, V. B.; VIDOTTO, O. 2008. Dinâmica sazonal de carrapatos do gênero *Amblyomma* (Acari: Ixodidae) em um parque urbano da cidade de Londrina, PR. *Revista Brasileira de Parasitologia Veterinária*, **17**(suppl.1):50-54. Available at: <http://cbpv.org.br/rbpv/documentos/17supl.12008/Artropode010.pdf>. Accessed on: 08/23/2012.
- VIEIRA, A.M.L.; SOUZA, C.E.; LABRUNA, M.B.; MAYO, R.C.; SOUZA, S.S.L.; CAMARGO-NEVES, V.L.F. 2004. *Manual de Acarologia do Estado de São Paulo*. São Paulo, SUCEN, 62 p.

Submitted on November 04, 2012

Accepted on July 29, 2013