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Short Communication

Ticks in wild animals at a resort and the first documentation of *Amblyomma sculptum* infesting Emu (*Dromaius novaehollandiae*)

Carrapatos em animais selvagens em um resort e o primeiro registro de *Amblyomma sculptum* infestando Emu (*Dromaius novaehollandiae*)

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Abstract

The study aimed to identify species of ticks present in the environment and among captive animals, in Mangaratiba, Rio de Janeiro, Brazil. Ticks were isolated from captive animals by manual examination and free-living ticks in the environment were captured using the flannel drag technique. A total of 91 ticks were obtained (51 adults, 25 nymphs and 15 larvae). The specimens were identified morphologically as *Amblyomma* sp., *Amblyomma dubitatum*, *Amblyomma ovale* and *Amblyomma sculptum*, and were distributed among five species of native mammals and an exotic bird. This study also reports the first case of infestation of the Australian emu (*Dromaius novaehollandiae*) by *A. sculptum*.

Keywords: Ticks, *Amblyomma,* wild animal, Rio de Janeiro, Brazil.

Resumo

O estudo teve como objetivo identificar espécies de carrapatos presentes no ambiente e entre animais de cativeiro em Mangaratiba, Rio de Janeiro, Brasil. Os carrapatos foram removidos manualmente de animais de cativeiro e no ambiente usando a técnica de arrasto em flanela. Um total de 91 carrapatos foram capturados (51 adultos, 25 ninfas e 15 larvas). Os espécimes foram identificados morfologicamente como *Amblyomma* sp., *Amblyomma dubitatum*, *Amblyomma ovale* e *Amblyomma sculptum*, e foram distribuídos entre cinco espécies de mamíferos nativos e uma ave exótica. Este estudo também relata o primeiro caso de infestação do emu australiano (*Dromaius novaehollandiae*) por *A. sculptum*.

Palavras-chave: Carrapatos, *Amblyomma,* animais selvagens, Rio de Janeiro, Brasil.

Ticks are haematophagous ectoparasites with a cosmopolitan distribution and a wide variety of species (GUGLIELMONE et al., 2014). In Brazil, most species of ticks belong to the genus *Amblyomma* (DANTAS-TORRES et al., 2012), which parasitize a great diversity of hosts. Humans may also play host to these ticks when coming into contact with their natural habitat and hosts (BARROS-BATTESTI et al., 2006).

In Brazil, recent studies have demonstrated the importance of knowing the species of ticks on captive animals in public and private conservation units (GONZALEZ et al., 2017; MAGALHÃES-MATOS et al., 2017; NASCIMENTO et al., 2017).

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Therefore, this study aimed to identify tick species occurring in the environment and among captive animals at a resort and safari in the municipality of Mangaratiba, Rio de Janeiro.

The study was carried out between September 2016 and February 2017 at a Porto Bello safari belonging to a Resort in Mangaratiba, Rio de Janeiro state, Brazil (22°54'58.135"S, 44°4'23.046"W). This safari has an area of 300.000 m^2 and houses about 500 animals of the South American, European and African fauna, which coexist in the same environment. Among the species that inhabit the safari are zebras (*Equus burchellii* Linnaeus, 1758), camels (*Camelus dromedaries* Linnaeus, 1758), dromedaries (*Camelus bactrianus* Linnaeus, 1758), llamas (*Lama glama* Linnaeus, 1758), deer (*Rusa unicolor* Kerr, 1792), capybaras (*Hydrochoerus hydrochaeris* Linnaeus, 1766), tapirs (*Tapirus terrestris* Linnaeus, 1758), peccaries (*Tayassu tajacu* Linnaeus, 1758), and a variety of wild birds such as macaws (*Ara chloropterus* Gray, 1859), emus (*Dromaius novaehollandiae* Latham, 1790) and ostriches (*Struthio camelus* Linnaeus, 1758).

During the study period, visits were made to the safari with the objective of collecting ticks from the animals and searching the environment by dragging white flannel over the vegetation, as described by Oliveira et al. (2000).

Immediately after collection, all ticks were packed in polypropylene tubes containing RNAlater® solution. Thereafter, they were transported to the laboratory. Taxonomic identification was performed based on morphology using dichotomic keys specific for ixodid ticks, the key proposed by Martins et al. (2010) for nymphs and the key modified by Guimarães et al. (2001) in Barros-Battesti et al. (2006) and Nava et al. (2014) for adults.

In total, 91 ticks of the genus *Amblyomma* were obtained, 51 adults, 25 nymphs and 15 larvae. The identities of tick species and their respective hosts are shown in Table 1.

Amblyomma sculptum Berlese, 1888 was captured in the environment and was also found parasitizing capybara (*Hydrochoerus hydrochaeris* Linnaeus, 1766), tapirs (*Tapirus terrestris* Linnaeus, 1758), peccary (*Tayassu tajacu* Linnaeus, 1758) and an emu, *Dromaius novaehollandiae* Latham, 1790 (Table 1, Figure 1). According to Guimarães et al. (2001), it is common to find *A. sculptum* in large and medium-sized mammals. The ticks are mainly found on capybaras and tapirs, as they play a fundamental role in the lifecycle of the tick, serving as the main hosts for all parasitic stages.

This is the first record of *A. sculptum* from an emu, a large bird that is not capable of flying, native to Australia and present over almost the entire continent, especially in semi-arid regions (THOMPSON, 2001). To date, there is limited knowledge regarding the species of ticks that commonly parasitize emus, with only a recent study reporting the parasitism by *Ixodes cornuatus* Roberts, 1960 of a captive emu at the Healesville sanctuary, Australia (KWAK & MADDEN, 2017). In the present study, eight semi-engorged nymphs of *A. sculptum* were found fixed to the temporal region of the head and proximal part of the neck of captive animals at a safari in Rio de Janeiro, Brazil (Table 1, Figure 1). Of these nymphs, two were deposited at the collection of Wingless Vector Arthropods of Importance in the Health of Communities of the Oswaldo Cruz Institute (CAVAISC – FIOCruz), in Rio de Janeiro, with deposit numbers CAVAISC-IXO 3296.

Ticks of the species *Amblyomma dubitatum* Neumann, 1899, *Amblyomma ovale* Koch, 1844 and *Amblyomma incisum* Neumann, 1906 were found in the inspected capybara (Table 1). This large rodent has previously been described as the main host for all parasitic stages of *A. dubitatum* (NAVA et al., 2010). However, *A. ovale* is most commonly recorded in wild and domestic carnivores (GUGLIELMONE et al., 2003; LABRUNA et al., 2005a; MAGALHÃES-MATOS et al., 2017), with small rodents as hosts during the immature stages (GUGLIELMONE et al., 2003). *Amblyomma incisum* primarily parasitizes the tapir in adulthood (LABRUNA et al., 2005b) and little is known about hosts for the immature stages (GUIMARÃES et al., 2001; SZABÓ et al., 2009). In the present study, although no specimen of *A. incisum* was found in the tapirs, the animals sharing an enclosure may have facilitated the infestation of capybaras by a nymph of this species of tick. No ticks were found in the inspected *Chelonoidis* spp. (Table 1).

Therefore, it is important to perform acarological surveys in captive animals, especially in places where humans are common (such as safaris and zoos) since many species of ticks therein are vectors of pathogens that cause human diseases. In this study, three species of ticks that are of great importance for public health were identified, namely *A. sculptum*, *A. dubitatum* and *A. ovale*, which are responsible for the transmission of *Rickettsia* bacteria that cause spotted fever (SZABÓ et al., 2013).

Table 1. Ticks captured in vegetation and collected in wild animals kept in captivity on a safari, in the municipality of Mangaratiba, Rio de Janeiro, Brazil.

Hosts (n)	Numbers, stages and species of ticks
Mammalia	
Order Perissodactyla	
Tapirus terrestis (2)	5M, 1F, 1N *A. sculptum*
Order Artiodactyla	
Tayassu tajacu (1)	1M *A. sculptum*
Order Rodentia	
Hydrochoerus hydrochaeris (1)	1F *A. ovale*; 5F *A. dubitatum;* 2F, 13M, 1N *A. sculptum*
H. hydrochaeris (1)	20M, 3F *A. dubitatum;* 1N *A. incisum*
Aves	
Order Casuariiformes	
Dromaius novaehollandiae (1)	8N *A. sculptum*
Reptilia	
Order Testudinata	
Chelonoidis spp. (12)	0
Questing Ticks *	14N *A. sculptum;* 15L *Amblyomma* sp.

L=larvae; N= nymphs; A= adults;

* Free-living ticks captured through the technique of dragging a white flannel over vegetation.

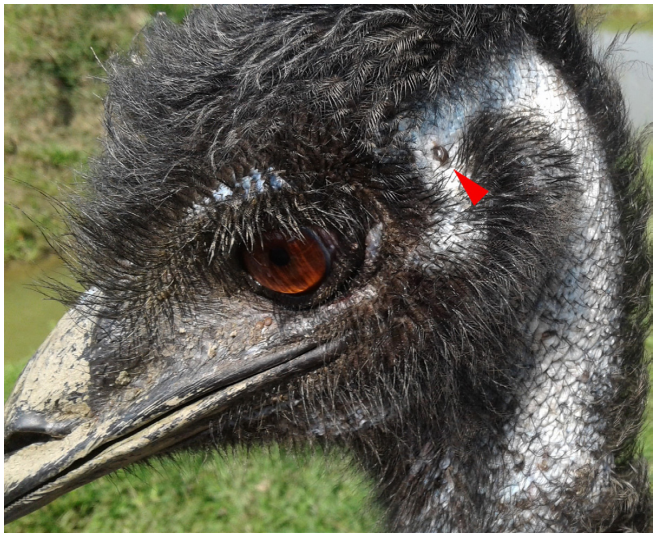

Figure 1. An emu (*Dromaius novaehollandiae*) infested by a nymph of *Amblyomma sculptum* in the left temporal region of the head (arrow).

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