

## Scientific Note

# Ticks (Acari: Ixodidae) in wild animals treated at the Federal University of Lavras, Minas Gerais State, Brazil

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Edited by: Peterson R. Demite

Received: September 13, 2021. Accepted: November 20, 2021. Published: December 06, 2021.

**Abstract.** Ticks have a great diversity of hosts, many of which are still being discovered. These parasites may be responsible for the transmission of several pathogens to animals and humans. For this reason, knowledge on tick species and their hosts is essential for planning actions in public health and fauna conservation. From February 2018 to July 2019, ticks found in animals treated at the Wild Animal Clinic of the Federal University of Lavras (UFLA) were surveyed. Animals came from nine municipalities at the southern region of Minas Gerais State, all close to the municipality of Lavras. During veterinary procedures the animals were inspected, and tick specimens were removed from the hosts' skins with the help of tweezers, and posteriorly identified. One hundred and three specimens of ticks were removed from the hosts and allocated in five species of *Amblyomma* Koch, 1844 (Ixodidae) [*A. nodosum* (Neumann, 1899), *A. sculptum* Berlese, 1888, *A. aureolatum* (Pallas, 1772), *A. calcaratum* Neumann, 1899, and *A. ovale* (Koch, 1844)] and one of *Rhipicephalus* Latreille, 1806 [*R. (Boophilus) microplus* (Canestrini, 1888)]. Ticks were collected from: *Cariama cristata* (Linnaeus, 1766) (Cariamidae); *Cerdocyon thous* Linnaeus, 1766 and *Chrysocyon brachyurus* Illiger, 1815 (Canidae); *Leopardus pardalis* Linnaeus, 1758 (Felidae); *Mazama gouazoubira* Fischer, 1814 (Cervidae); *Myrmecophaga tridactyla* Linnaeus, 1758 (Myrmecophagidae); *Sphiggurus villosus* (F. Cuvier, 1823) (Erethizontidae). In this study no new parasite-host relationships were found, however, wild animals can be vectors of important diseases, and monitoring the occurrence of ectoparasites in wildlife is a significant step in public health policies.

**Keywords:** *Amblyomma*, bird, ectoparasites, mammals, *Rhipicephalus*.

Ectoparasites have an important role in animal and human health, since they may act as potential vectors for several pathogens, including those responsible for zoonoses (Dantas-Torres et al. 2012). Among the ectoparasites, hard ticks (Ixodidae) have a great diversity of host species, and the ability to parasitize more than one host species during their life cycle. However, many parasite-host relationships are yet to be discovered (Dantas-Torres et al. 2014). Ticks may transmit several pathogens to animals and humans, such as those of the genus *Rickettsia*, *Borrelia*, *Ehrlichia*, *Hepatozoon*, *Babesia*, and *Anaplasma*. (Labruna et al. 2005; De La Fuente et al. 2008; Silveira et al. 2016). For this reason, knowledge on tick identification, and on their hosts associations, is vital for planning actions in public health and fauna conservation.

From February 2018 to July 2019, ticks found in animals treated at the Wild Animal Clinic of the Federal University of Lavras (UFLA), Lavras, Minas Gerais State were surveyed. All animals treated during this period came from the southern region of Minas Gerais, close to the municipality of Lavras. Most animals were victims of anthropic impacts, such as car accidents, criminal wildfires, electrocutions, or attacks by domestic animals. During veterinary procedures, animals were inspected, and tick specimens were collected from hosts' skins with the help of tweezers. Specimens were stored in 80% ethyl alcohol and identified on a stereomicroscope using dichotomous keys (Martins et al. 2010; 2016). All ticks were deposited at the scientific tick collection "Coleção Nacional de Carrapatos Danilo Gonçalves Saraiva" (under the n.º. CNC-4039-4049, 4200-4204) of the School of Veterinary Medicine and Animal Science (FMVZ) of University of São Paulo (USP), São Paulo State, Brazil.

One hundred and three specimens of ticks of the order Ixodida

(family Ixodidae) were collected from 16 individuals of vertebrates, which included the following species: Red-legged Seriema, *Cariama cristata* (Linnaeus, 1766) (Cariamiformes: Cariamidae); Crab-eating Fox, *Cerdocyon thous* Linnaeus, 1766 (Carnivora: Canidae); Maned Wolf, *Chrysocyon brachyurus* Illiger, 1815 (Carnivora: Canidae); Oncelot, *Leopardus pardalis* Linnaeus, 1758 (Carnivora: Felidae); Gray Brocket, *Mazama gouazoubira* Fischer, 1814 (Artiodactyla: Cervidae); Giant Anteater, *Myrmecophaga tridactyla* Linnaeus, 1758 (Pilosa: Myrmecophagidae); and Orange-spined Hairy Dwarf Porcupine, *Sphiggurus villosus* (F. Cuvier 1823) (Rodentia: Erethizontidae). Hosts came from 12 cities in Minas Gerais State: Alterosa, Boa Esperança, Campanha, Campo do Meio, Carmo da Cachoeira, Ijací, Lambari, Lavras, Nepomuceno, Oliveira, Pedralva, and Três Pontas (Tab. 1, Fig. 1). Tick specimens were identified as 26 males, 22 females and 55 nymphs, belonging to five species of *Amblyomma* - *Amblyomma aureolatum* (Pallas, 1772), *A. calcaratum* Neumann, 1899, *A. longirostre* (Koch, 1844), *A. nodosum* (Neumann, 1899), *A. ovale* (Koch, 1844), and *A. sculptum* Berlese, 1888; and one of *Rhipicephalus* - *R. (Boophilus) microplus* (Canestrini, 1888) (Tab. 1).

The most significant diversity of ticks was found on *C. brachyurus*, including *A. aureolatum*, *A. ovale*, *A. sculptum*, and *R. microplus*. The ticks *A. aureolatum* and *A. sculptum* were found on *C. thous*. While *A. sculptum*, and *R. microplus* were found in *M. gouazoubira*. Besides that, the ticks *A. calcaratum*, *A. nodosum*, and *A. sculptum*, were found on *M. tridactyla*, the first two were not found on the other hosts. *Amblyomma longirostre* was found exclusively on *S. villosus*. Finally, *A. ovale* was found on *L. pardalis*, and only *A. sculptum* was found on *C. cristata*.

*Amblyomma sculptum*, as observed in other studies (Bastos et al.

2016), was the ixodid with the highest occurrence, presently found in five of the seven host species studied (Luz et al. 2012; Bastos et al. 2016). As reported in other studies, the species *A. calcaratum* and *A. nodosum* are commonly found on Giant Anteaters and Southern Tamanduas, *Tamandua tetradactyla* (Linnaeus, 1758) (Martins et al. 2004; 2015). These ticks were also registered on several bird species that mainly forage closer to the ground, since they facilitate the parasite cycle (Luz et al. 2012). It is worth noting that the bacteria *Rickettsia parkeri* has already been isolated from the tick *A. nodosum* parasitizing birds (Ogrzewalska et al. 2009).

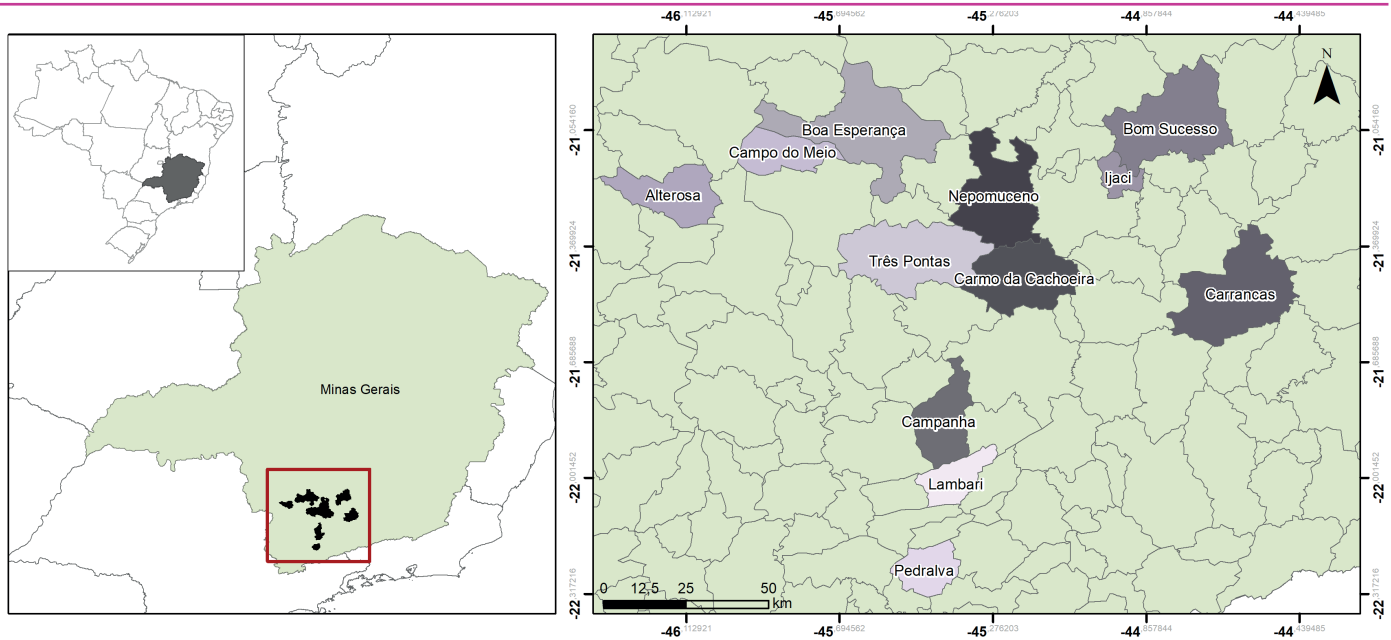
*Amblyomma aureolatum*, found on *C. thous* (Labruna et al. 2005) and *C. brachyurus*, is a vector for *Rickettsia rickettsii* (Müller et al. 2009). However, in a study conducted in a Cetas (Wild Animal Screening Center) in São Paulo Municipality, 67 ticks were tested by real-time PCR, in order to detect pathogens of the *Rickettsia* group, and did not detect any positive ixodids (Martins et al. 2015). The parasitic relationship of this tick and host canids has been reported in previous studies (Martins

et al. 2015; 2017). The tick species *A. aureolatum*, *A. ovale*, and *R. microplus* have already been reported parasitizing dogs (Labruna et al. 2001). *Rhipicephalus microplus* has already been reported on horses and cattle, *C. thous* (Labruna et al. 2005), and *M. gouazoubira* (Martins et al. 2015; 2017). *Amblyomma ovale* has been reported only on *C. brachyurus*, (Labruna et al. 2005, Martins et al. 2015), as observed in this study. In Rio Grande do Sul State, *A. longirostre* was also reported on *Sphiggurus villosus* (Brum et al. 2003). The occurrence of *A. ovale* is already known on *L. pardalis*. However, previous records were from Paraná and São Paulo States (Labruna et al. 2005), and the current record is the first observation in Minas Gerais State.

In this study, we did not find new specific parasite-host relationships. However, studies on the association of ticks and wild animals are scarce. For this reason, monitoring these associations is important, since some of these parasites can transmit pathogens to humans and domestic animals (Liyanaarachchi et al. 2015), with relevant risks to public health and economy.

**Table 1.** Ticks collected from birds and mammals treated at UFLA from February 2018 to July 2019.

Host	Sex	Stage	Municipality	Tick species
<i>Cerdocyon thous</i> Linnaeus, 1766	male	adult	Nepomuceno	<i>Amblyomma aureolatum</i> (Pallas, 1772) (1 male) <i>A. sculptum</i> Berlese, 1888 (2 nymphs)
	male	adult	Pedralva	<i>Rhipicephalus microplus</i> (Canestrini, 1888) (1 nymph and 1 female)
<i>Chrysocyon brachyurus</i> Illiger, 1815	male	adult	Lavras	<i>A. aureolatum</i> (1 female) <i>A. ovale</i> (Koch, 1844) (1 female)
	female	adult	Três Pontas	<i>A. aureolatum</i> Neumann, 1899 (1 male) <i>A. sculptum</i> (2 nymphs)
	female	adult	Lavras	<i>A. sculptum</i> (18 nymphs)
<i>Mazama gouazoubira</i> Fischer, 1814	male	adult	Carmo da Cachoeira	<i>R. microplus</i> (1 male and 8 females) <i>A. sculptum</i> (1 nymph)
	male	juvenile	Oliveira	<i>R. microplus</i> (1 male)
<i>Sphiggurus villosus</i> (F. Cuvier, 1823)	male	adult	Lavras	<i>A. longirostre</i> (Kock, 1844) (1 male)
<i>Leopardus pardalis</i> Linnaeus, 1758	female	adult	Oliveira	<i>A. ovale</i> (1 female)
	male	adult	Boa Esperança	<i>A. nodosum</i> (Neumann, 1899) (4 males and 3 females) <i>A. sculptum</i> (11 males)
	male	adult	Campo de meio	<i>A. calcaratum</i> Neumann, 1899 (1 male) <i>A. sculptum</i> (11 nymphs) <i>A. nodosum</i> (3 females)
	male	juvenile	Alterosa	<i>A. calcaratum</i> (1 male)
	male	adult	Lambari	<i>A. nodosum</i> (4 males and 4 females)
<i>Cariama cristata</i> (Linnaeus, 1766)	female	adult	Ijací	<i>A. sculptum</i> (1 nymph)
	male	adult	Campanha	<i>A. sculptum</i> (4 nymphs)
	male	adult	Lavras	<i>A. sculptum</i> (15 nymphs)



**Figure 1.** Municipalities in the south of Minas Gerais State where hosts were found.

## Acknowledgments

LFOB thanks to the Coordination for the Improvement of Higher Education Personnel for providing pos-doctoral scholarship from the National Postdoctoral Program (CAPES-PNPD/Brazil). LBB thanks to National Council for Scientific and Technological for the scholarship (PIBIC/CNPq). Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP). Thanks to Erik Wild for the English review.

## Authors' Contributions

LBB, SMF and AMG performed species collection. LFOB, TFM and LBL performed species identification. All authors had reviewed the literatura and wrote the manuscript.

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