

FIRST RECORD OF *Amblyomma ovale* PARASITIZING HUMAN IN CENTRAL RIO GRANDE DO SUL, BRAZIL

(PRIMEIRO REGISTRO DE *Amblyomma ovale* PARASITANDO HUMANO NO CENTRO DO RIO GRANDE DO SUL, BRASIL)

Julia Somavilla Lignon^{1*}, Diego Moscarelli Pinto², Bianca Conrad Bohm², Silvia Gonzalez Monteiro¹

¹Laboratório de Parasitologia Veterinária, Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brasil.

²Departamento de Veterinária Preventiva, Universidade Federal de Pelotas, Pelotas, Rio Grande do Sul, Brasil.

*Corresponding author: julialignon@gmail.com

DOI 10.4025/revcivet.v11i2.65799

RESUMO

Os carrapatos são um dos mais importantes grupos de vetores de doenças infecciosas para animais e humanos, sendo responsáveis pela transmissão de patógenos como bactérias e protozoários, além de causar lesões aos seus hospedeiros durante a hematofagia. No entanto, ainda existem poucos casos de parasitismo de carrapatos em humanos no Brasil. Portanto, objetivou-se relatar pela primeira vez o parasitismo por *Amblyomma ovale* (Koch, 1844) em humanos na região central do Rio Grande do Sul, Brasil, a fim de alertar a população sobre o risco de infecção por patógenos, incluindo zoonoses. Para tanto, um exemplar de ectoparasita encontrado em uma mulher residente na cidade de Santa Maria, Rio Grande do Sul, foi encaminhado ao Laboratório de Parasitologia Veterinária da Universidade Federal de Santa Maria para identificação taxonômica em nível de espécie. O carrapato foi taxonomicamente classificado como um macho adulto de *A. ovale*, concluindo-se que o vetor está presente na localidade estudada e pode parasitar humanos.

Palavras-chave: Carrapatos. Ectoparasitas. Saúde pública. Vetores.

ABSTRACT

Ticks are one of the most important groups of infectious disease vectors for animals and humans, being responsible for the transmission of pathogens such as bacteria and protozoa, in addition to causing injuries to their hosts during hematophagy. However, there are still few cases of tick parasitism in humans in Brazil. Therefore, the objective was to report for the first time the parasitism by *Amblyomma ovale* (Koch, 1844) in humans in the central region of Rio Grande do Sul, Brazil, in

order to alert the population about the risk of infection by pathogens including zoonoses. Therefore, a specimen of ectoparasite found in a woman residing in the city of Santa Maria, Rio Grande do Sul, was sent to the Laboratory of Veterinary Parasitology of the Federal University of Santa Maria for taxonomic identification at the species level. The tick was taxonomically classified as an adult male of *A. ovale*, concluding that the vector is present in the studied locality and can parasitize humans.

Keywords: Ticks. Ectoparasites. Public health. Vectors.

INTRODUCTION

Ticks are hematophagous ectoparasite arthropods with great importance for public and animal health, mainly because they transmit pathogens to their hosts (EVANGELISTA et al., 2021). In Brazil, the genus *Amblyomma* stands out as the most prevalent, having about 30 known species, which have a wide variety of hosts (DANTAS-TORRES et al., 2019).

They are responsible for transmitting pathogens such as bacteria (*Anaplasma*, *Borrelia*, *Ehrlichia* and *Rickettsia*) and protozoa (*Babesia*, *Hepatozoon*, *Rangelia* and *Theileria*) to domestic and wild animals, including humans (VIEIRA et al., 2004), causing injuries to their hosts during hematophagy, such as irritation, inflammation and hypersensitivity and, when present in large numbers, can cause anemia (MASSARD et al., 2004). One study points to *Amblyomma ovale* as probably the main vector of human spotted fever in Brazil, an emerging disease caused by *Rickettsia parkeri* strain Atlantic rainforest and, therefore, playing an important epidemiological role in the epidemic cycle of the disease (KRAWCZAK et al., 2016; VOIZZONI et al., 2016; JAGUEZESKI et al., 2018; BITENCOURTH et al., 2019).

Despite being one of the most important groups of vectors of infectious diseases for animals and humans, there are few cases of parasitism by ticks in humans in Brazil (JAGUEZESKI et al., 2018; VALENTE et al., 2020). Therefore, the objective of this work was to report for the first time the parasitism by *A. ovale* (Koch, 1844) in humans in the central region of Rio Grande do Sul, Brazil, in order to alert the population about the risk of infection by pathogens including zoonoses.

DEVELOPMENT

An ectoparasite species found in a human was sent to the Laboratory of Veterinary Parasitology of the Federal University of Santa Maria for taxonomic identification at the species level. The 52-year-old woman was a resident of the city of Santa Maria in the central region of Rio Grande do Sul (RS), Brazil (29°41'03"S; 53°48' 25"W) and frequently travels to her rural property, located within the same city (29°39'37.2"S 53°42'32.2"W) (Figure 1). The property has pets (e.g. dogs) and production animals (e.g. geese, ducks, turkeys and chickens) in its peridomicile, in addition to humans

routinely. The type of vegetation in the area is native vegetation (Atlantic Forest and grassland vegetation) with predominance of the Atlantic Forest (MARCHIORI, 2009), with the presence of streams and lakes in the area. The ectoparasite was found fixed in the region of the back, after an external investigation carried out by the human herself. The woman presented itching and swelling at the bite site and did not seek medical attention.

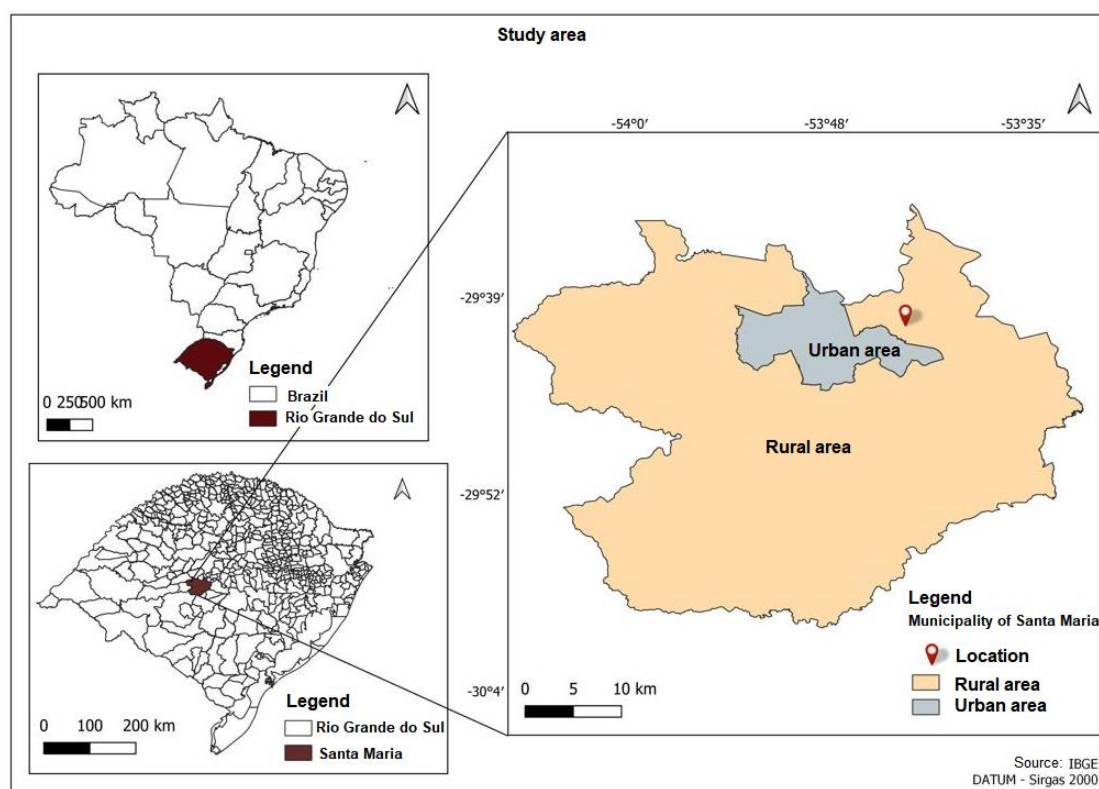


Figure 1. Map of the location of the rural property located in the rural area of Santa Maria, Rio Grande do Sul, Brazil.

The *species* was removed by hand by twisting its longitudinal axis and preserved in 70% alcohol for later taxonomic classification. The *species* was identified and photographed using a Leica EZ4 HD incident-illuminated binocular stereoscopic microscope. To identify the ixodid, we used the taxonomic key for adults of the genus *Amblyomma* of Barros-Battesti et al. (2006).

The tick was taxonomically classified as an adult male of *A. ovale* (Figure 2). The species is characterized by having a brown shield with coppery and greenish spots with the presence of a marginal groove that later limits all the festoons. They have a hypostome with three rows of teeth on each side (3/3 hypostome). The thigh I has two long spines, where the outer spine is slightly curved outward and slightly longer than the inner spine. The IV thigh has a single spine (BARROS-BATTESTI et al., 2006).

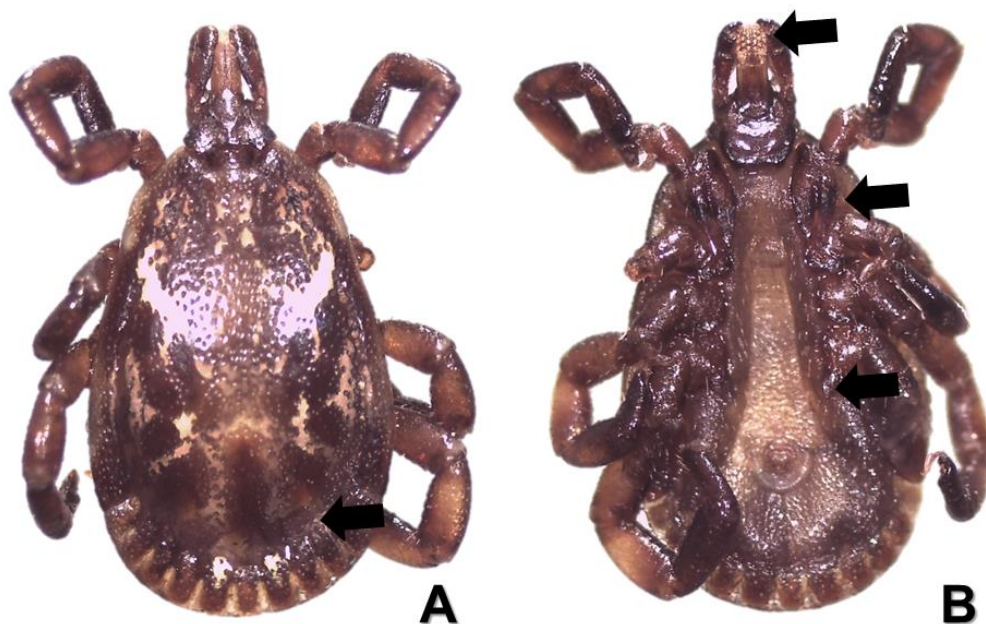


Figure 2. Male *Amblyomma ovale*. A – Dorsal view, with presence of the marginal groove (arrow); B – Ventral view, with 3/3 hypostome, coxa of leg I with two long spines and coxa IV with one spine (arrows).

Despite being a species with known wild habits, commonly found in canids, felids and described in procyonids and mustelids (LABRUNA et al., 2005), this is the first report of parasitism by *A. ovale* in humans in the studied region (central region of RS). Parasitism by this same species in humans has also been reported in Santa Catarina (JAGUEZESKI et al., 2018), in the Metropolitan region of Porto Alegre (RS) in addition to the Northwest, Northeast and Serra do RS regions (RECK et al., 2018; BITENCOURTH et al., 2019), therefore, deserves attention from public health services. The proximity between dogs and humans, whose animals enter the woods near the residences and can carry wild fauna ticks into the house, in addition to human hunting behavior, ecotourism activities and work in the rural sector, end up facilitating contact and human infestation by the tick in addition to contracting diseases (RIO GRANDE DO SUL, 2018). Furthermore, according to Hayes and Burgdorfer (1982), human infection by ticks detached from dogs occurs more quickly, as reactivation of *Rickettsia* possibly occurs during feeding of the first host.

Rocky Mountain spotted fever (FM) is the main zoonosis associated with ticks in Brazil. It is a febrile disease with acute lethality, mainly due to infection of the *Rickettsia* genus (mainly *R. rickettsii*) whose main vectors are *A. cajennense* species complex or *A. cajennense* (*sensu lato*) represented by two species in Brazil, *A. cajennense* Fabricius, 1787 (*sensu stricto*) and *Amblyomma*

sculptum Berlese, 1888 (MARTINS et al., 2016). However, the disease is diagnosed in the state with the involvement of other tick species, such as *A. aureolatum*, *A. dubitatum*, *A. tigrinum* and even *A. ovale*, as well as other variants and/or types of bacteria that cause the disease (RIO GRANDE DO SUL, 2018). Also, in RS, *A. ovale* is considered the potential vector of *Rickettsia parkeri* strain of the Atlantic Forest (KRAWCZAK et al., 2016; VOIZZONI et al., 2016). This *Rickettsia* strain was shown to be strongly associated with this tick species and appears to have a wide distribution, at least on the south-southeast Atlantic coast of Brazil (SABATINI et al., 2010; MEDEIROS et al., 2011; SZABÓ et al., 2013).

Therefore, the importance of conducting research within the scope of the geographic distribution of tick species in Brazil is highlighted. Studies like this help to clarify the favorable environmental conditions for the maintenance of these potential transmitters of pathogens and help in the implementation of surveillance and control measures. It is often the only information for timely diagnosis and effective treatment of human patients. Due to the difficulty of an early diagnosis of FM, since it presents clinical signs similar to other diseases, and the rapid clinical progress, this disease is an important public health problem, however it is still quite neglected in several places, especially in those where the cases are less frequent (HORTA et al., 2004).

CONCLUSION

With the present study, it is concluded that the tick of the species *A. ovale* is present in the studied locality, being able to parasitize humans.

Ethical approval: Not applicable.

Funding Information: Not applicable.

Author's Contributions: JSL, DMP and SGM identified the tick. BCB prepared the map with the location of the study finding. All authors contributed to the data analysis and writing of the manuscript, and all read and approved the final version.

REFERENCES

BARROS-BATTESTI, D.M.; ARZUA, M.;
BECHARA, G.H. **Carrapatos de**

**importância médico-veterinária da
região neotropical: um guia ilustrado
para identificação de espécies.** São Paulo:
Vox/ICTTD-3/Butantan, 2006. 239p.

- BITENCOURTH, K.; AMORIM, M.; DE OLIVEIRA, S. V.; VOLOCH, C. M.; GAZÊTA, G. S. Genetic diversity, population structure and rickettsias in *Amblyomma ovale* in areas of epidemiological interest for spotted fever in Brazil. **Medical and Veterinary Entomology**, v.33, n.1, p.256-268, 2019.
- DANTAS-TORRES, F.; MARTINS, T.F.; MUÑOZ-LEAL, S.; ONOFRIO, V.C.; BARROS-BATTESTI, D.M. Ticks (Ixodida: Argasidae, Ixodidae) of Brazil: Updated species checklist and taxonomic keys. **Ticks and Tick-borne Diseases**, v.10, p.101252, 2019.
- EVANGELISTA, L.S.M.; OLIVEIRA, A.L.; GOMES, N.R.S.; OLIVEIRA, N.M.S.; SOUSA, L.S.; PEREIRA, A.D.V. *Amblyomma* spp. e a relação com a febre maculosa brasileira. **Veterinária e Zootecnia**, v.28, p.001-015, 2021.
- HAYES, S.F.; BURGDORFER, W. Reactivation of *Rickettsia rickettsii* in *Dermacentor andersoni* ticks: an ultrastructural analysis. **Infection and Immunity**, v.37, p.779–785, 1982.
- HORTA, M.C.; LABRUNA, M.B.; SANGIONI, L.A.; VIANNA, M.C.B.; GENNARI, S.M.; GALVÃO, M.A.M.; MAFRA, C.L.; VIDOTTO, O.; SCHUMAKER, T.T.S.; WALKER, D.H. Prevalence of antibodies to Spotted Fever Group Rickettsiae in humans and domestic animals in a Brazilian Spotted Fever-Endemic area in the State of São Paulo, Brazil: Serologic evidence for infection by *Rickettsia rickettsii* and another spotted fever group *Rickettsia*. **American Journal of Tropical Medicine and Hygiene**, v.71, p.93-97, 2004.
- JAGUEZESKI, A.M.; LAVINA, M.S.; ORSOLIN, V.; SILVA, A.S. *Amblyomma ovale* parasitizing a human. **Comparative Clinical Pathology**, v.27, p. 535–537, 2018.
- KRAWCZAK, F.S.; AGOSTINHO, W.C.; POLO, G.; MORAES-FILHO, J.; LABRUNA, M.B. Comparative evaluation of *Amblyomma ovale* ticks infected and noninfected by *Rickettsia* sp. strain Atlantic rainforest, the agent of an emerging rickettsiosis in Brazil. **Ticks and Tick-borne Diseases**, v.7, p.502–507, 2016.
- LABRUNA, M.B.; JORGE, R.S.; SANA, D.A.; JÁCOMO, A.A.A.; KASHIVAKURA, C.K.; FURTADO, M.M.; FERRO, C.; PEREZ, S.A.; SILVEIRA, L.; SANTOS JÚNIOR, T.S.; MARQUES, S.R.; MORATO, R.G.; NAVA, A.; ADANIA, C.H.; TEIXEIRA, R.H.F.; GOMES, A.A.B.; CONFORTI, V.A.; AZEVEDO, F.C.C.; PRADA, C.S.; SILVA, J.C.R.; BATISTA, A.F.; MARVULO, M.F.V.; MORATO, R.L.G.; ALHO, C.J.R.; PINTER, A.; FERREIRA, P.M.; FERREIRA, F.; BARROS-BATTESTI, D.M. Ticks (Acari: Ixodida) on wild carnivores in Brazil. **Experimental and Applied Acarology**, v.36, p.149-163, 2005.
- MARCHIORI, J.N.C. A vegetação nativa em Santa Maria. *Balduínia*, v.1, n.15, p. 5-23, 2009.
- MARTINS, T.F.; BARBIERI, A.R.M.; COSTA, F.B.; Terassini, F.A.; CAMARGO, L.M.A.; PETERKA, C.R.L.; PACHECO, R.C.; DIAS, R.A.; NUNES, P.H.; MARCILI, A.; SCOFIELD, A.; CAMPOS, A.K.; HORTA, M.C.; GUILLOUX, A.G.A.; BENATTI, H.R.; RAMIREZ, D.G.; BARROS-BATTESTI, D.M.; LABRUNA, M.B. Geographical distribution of *Amblyomma cajennense* (sensu lato) ticks (Parasitiformes: Ixodidae) in Brazil, with description of the nymph of *A. cajennense* (sensu stricto). **Parasites & Vectors**, v.9, n.186, p. 1-14, 2016.
- MASSARD, C.L.; FONSECA, A.H. Carrapatos e doenças transmitidas comuns ao homem e aos animais. **A Hora Veterinária**, v.35, p.15-23, 2004.
- MEDEIROS, A.P.; DE SOUZA, A.P.; DE MOURA, A.B.; LAVINA, M.S.;

BELATTO, V.; SARTOR, A.A.; NIERI-BASTOS, F.A.; RICHTZENHAIN, L.J.; LABRUNA, M.B. Spotted fever group *Rickettsia* infecting ticks (Acari: Ixodidae) in the state of Santa Catarina, Brazil. **Memórias do Instituto Oswaldo Cruz**, v.106, p.926–930, 2011.

RECK, J.; SOUZA, U.; SOUZA, G.; KIELING, E.; DALL'AGNOL, B.; WEBSTER, A.; MICHEL, T.; DOYLE, R.; MARTINS, T.F.; LABRUNA, M.B.; MARKS, F.; OTT, R.; MARTINS, J.R. Records of ticks on humans in Rio Grande do Sul state, Brazil. **Ticks and Tick-borne Diseases**, v.9, p.1296-1301, 2018.

RIO GRANDE DO SUL, SECRETARIA ESTADUAL DA SAÚDE, CENTRO ESTADUAL DE VIGILÂNCIA EM SAÚDE. **Guia de Vigilância Acarológica: vetores e hospedeiros da febre maculosa e outras riquetsioses no Rio Grande do Sul**. Porto Alegre: CEVS/RS, 2018. 114p.

SABATINI, G.S.; PINTER, A.; NIERI-BASTOS, F.; MARCILI, A.; LABRUNA, M.B. Survey of ticks (Acari: Ixodidae) and their *Rickettsia* in an Atlantic rainforest reserve in the State of São Paulo, Brazil. **Journal of Medical Entomology**, v.47, 913–916, 2010.

SZABÓ, M.P.J.; NIERI-BASTOS, F.A.; SPOLIDORIO, M.G.; MARTINS, T.F.; BARBIERI, A.M.; LABRUNA, M.B. In vitro isolation from *Amblyomma ovale* (Acari: Ixodidae) and ecological aspects of the Atlantic rainforest *Rickettsia*, the causative agent of a novel spotted fever rickettsiosis in Brazil. **Parasitology**, v.140, p. 719–728, 2013.

VALENTE, J.D.M.; SILVA, P.W.; ARZUA, M.; BARROS-BATTESTI, D.M.; MARTINS, T.F.; SILVA, A.M.; VIEIRA, T.S.W.J.; LABRUNA, M.B.; VIEIRA, R.F.C. Records of ticks (Acari: Ixodidae) on humans and distribution of spotted-fever cases and its tick vectors in Paraná State,

southern Brazil. **Ticks and Tick-borne Diseases**, v.11, n.6, 101510, 2020.

VIEIRA, A.M.L.; SOUZA, C.E.; LABRUNA, M.B.; MAYO, R.C.; SOUZA, S.S.L.; CAMARGO-NEVES, V.L.F. **Manual de Vigilância Acarológica do Estado de São Paulo**. 1th ed. São Paulo: SUCEN, 2004. 60p.

VOIZZONI, V.F.; SILVA, A.B.; CARDOSO, K.M.; SANTOS, F.B.; STENZEL, B.; AMORIM, M.; DE OLIVEIRA, S.V.; GAZETA, G.S. Genetic identification of *Rickettsia* sp. strain Atlantic rainforest in an endemic area of a mild spotted fever in Rio Grande do Sul state, Southern Brazil. **Acta Tropica**, v.162, p. 142–145, 2016.