Research Note

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Rhipicephalus sanguineus sensu lato (Ixodidae) in synantropic rodents in Rio Grande do Sul, Brazil

Rhipicephalus sanguineus sensu lato (Ixodidae) em roedores sinantrópicos no Rio Grande do Sul, Brasil

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Abstract

Rhipicephalus sanguineus, the brown dog tick, is responsible for maintaining and transmitting various pathogens, both in animals and human beings, and it is of great sanitary importance. This communication reports the first occurrence of *Rhipicephalus sanguineus sensu lato* parasitizing *Rattus norvegicus* in the state of Rio Grande do Sul, Brazil, and it is also the first record of this tick species parasitizing *Rattus rattus* in Brazil. The rodents were captured from the port area, located in the city of Pelotas, Rio Grande do Sul, Brazil. We collected 6 larvae of this tick species from 2 male *R. rattus* individuals, and 3 larvae from 2 female *R. norvegicus* individuals; parasitized specimens of both rodent species were captured from different sites within the experimental area. This record broadens the number of *Rhipicephalus sanguineus sensu lato* hosts in urban areas, indicating the need for continued monitoring on population density for both *R. sanguineus* and synanthropic rodents.

Keywords: Tick, *Rhipicephalus sanguineus*, *Rattus norvegicus*, *Rattus rattus*.

Resumo

Rhipicephalus sanguineus, carrapato-vermelho-do-cão, é responsável por manter e transmitir diversos patógenos tanto para animais quanto para o homem, sendo de grande importância sanitária. Essa comunicação relata a primeira ocorrência de *Rhipicephalus sanguineus sensu lato* parasitando *Rattus norvegicus* no Estado do Rio Grande do Sul e, pela primeira vez, *Rattus rattus* no Brasil. Os roedores foram capturados na área portuária da cidade de Pelotas, Rio Grande do Sul, Brasil. Foram coletadas seis larvas desse carrapato em dois machos de *R. rattus* e três larvas em duas fêmeas de *R. norvegicus*. As duas espécies de roedores parasitados foram capturadas em pontos distintos na área do experimento. Esse registro amplia o número de hospedeiros de *Rhipicephalus sanguineus sensu lato* em áreas urbanas, indicando a necessidade de monitoramento contínuo da densidade populacional, tanto de *R. sanguineus* quanto de roedores sinantrópicos.

Palavras-chave: Carrapato, *Rhipicephalus sanguineus*, *Rattus norvegicus*, *Rattus rattus*.

Infestation by *Rhipicephalus sanguineus* (Latreille, 1806) (Acari, Ixodidae), the brown dog tick, has increased considerably in recent years in southern Rio Grande do Sul, Brazil. This species is of great sanitary importance, since it is capable of causing and transmitting various diseases, such as paralysis (OTRANTO et al., 2012), Rocky Mountain spotted fever (*Rickettsia rickettsii* (Wolbach, 1919)) (DEMMA et al., 2005; DEL FIOL et al., 2010), canine babesiosis (*Babesia vogeli* Reichenow, 1937), and ehrlichiosis (Donatien and Lestoquard, 1935) (NDIP et al., 2007). Dogs are the preferred hosts of *R. sanguineus* (EVANS et al., 2000); however, human beings may become accidental hosts. Consequently, the probability of infection by pathogens carried by this species in human beings is high, due to the increase in population density of ticks and the number of hosts, enforcing the need for monitoring.

This study aims to report the first occurrence of *R. sanguineus sensu lato*, both in *Rattus norvegicus* (Berkenhaut, 1769) and in *Rattus rattus* (Linnaeus, 1758) (Rodentia, Muridae), in the state of Rio Grande do Sul, Brazil.

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The rodents were captured weekly from two sites (31°46'49.8"S, 52°19'32.9"W and 31°46'51.8"S, 52°20'38.2"W), in the port area located in the city of Pelotas, Rio Grande do Sul, Brazil, during the period from January to May 2013, using *Tomahawk*® traps (29 cm × 18 cm × 15 cm). The ticks were collected directly from rodents, by means of brushing, and fixed in ethanol 70° GL. Thereafter, the ticks were mounted on permanent slides in Hoyer's medium.

The identification of *Rhipicephalus sanguineus* larvae lacks specific bibliography; therefore we used the diagnostic characteristics of adult morphology, through the dichotomous keys of Walker et al. (2000) and Pratt and Stojanovich (1969). In order to confirm the identification, adults were collected, identified with the abovementioned keys and reared in the laboratory to obtain the larvae; then a morphological comparison was performed between the laboratory obtained larvae and the collected larvae.

The capture methods and euthanasia (CFMV, 2012) adopted for rodents went through a standardization process by the Animal Experimentation and Ethics Commission (EAEC) of Universidade Federal de Pelotas, registered under the number 6615 and authorized by the Chico Mendes Institute for Biodiversity Conservation (ICMBio), under the number 35546-1. According to ICMBio, these species should be removed from the natural environment, because they are considered plagues and, therefore, require euthanasia.

Overall, we collected 35 *Rattus norvegicus*, 7 *Rattus rattus* and 9 *Rhipicephalus sanguineus sensu lato* larvae; this was the only tick species collected. From these, 6 *R. sanguineus sensu lato* larvae in 2 male *R. rattus* individuals (5 in 1 of the hosts) and 3 larvae in 2 female *R. norvegicus* individuals. This tick species has already been found parasitizing *R. norvegicus* in the Distrito Federal, Brazil, but the author did not mention the tick's stage (YOSHIZAWA et al., 1996), and has also been found parasitizing an adult male in Chile (GONZÁLEZ-ACUÑA et al., 2003).

Figure 1. a)*Rhipicephalus sanguineus latu sensu* larvae found parasitizing *Rattus rattus* and *Rattus norvegicus*. b) Newly hatched *Rhipicephalus sanguineus latu sensu* larvae reared in laboratory.

Figure 2. a)Capitulum of *Rhipicephalus sanguineus latu sensu* larvae found parasitizing *Rattus rattus* and *Rattus norvegicus*. b)Capitulum of *Rhipicephalus sanguineus latu sensu* larvae reared in laboratory.

This is the first study regarding the occurrence of *R. sanguineus sensu lato* larvae in *Rattus* sp. and, since there is no description of larvae in the bibliography, some diagnostic characteristics of adults were analyzed, them being: the presence of festoons (Figures 1a, b), basis capituli of hexagonal shape and short hypostome (Figures 2a, b). In addition to these structures, the chaetotaxy is identical in both the larvae collected from rodents and the larvae obtained in the laboratory.

In the laboratory, *R. sanguineus* larvae presented a high susceptibility of infection with *R. rickettsii* (LABRUNA et al., 2008; PIRANDA et al., 2011). Furthermore, this species has also been naturally infected by rickettsiae, from the spotted fever group (ROZENTAL et al., 2002; MORAES-FILHO et al., 2009), with a high prevalence in the Brazilian Southeast region, constituting a disease which is difficult to diagnose (DEL FIOL et al., 2010), since the symptoms may be confused with other diseases and, if not treated early, it can lead to death (LEMOS et al., 2002). There are records of Rocky Mountain spotted fever, during the period from 2005 to 2009, in Cerro Largo, Rio Grande do Sul, Brazil (BRASIL, 2004), located approximately 560km from Pelotas. Horses, dogs and human beings, seropositive for rickettsiae (from the spotted fever group), were found in the same city (SANGIONI et al., 2011).

Parasitism by *R. sanguineus* in human beings has been recorded in Brazil, and it can be caused both by immature and adult ticks (DANTAS-TORRES et al., 2006; SERRA-FREIRE, 2010). Studies have shown a predisposition to parasitize human beings when exposed to high temperatures (PAROLA et al., 2008), which may also be related to population growth and the availability of human hosts.

Thus, we conclude that it is relevant, from a public health perspective, to monitor both the population density of *Rhipicephalus sanguineus sensu lato* and the emergence and record in new hosts, as reported in this study. The record of synanthropic rodents of genus *Rattus* as hosts of this tick species becomes important, due to their high capacity for population growth within a short period of time, as well as to their interaction with other domestic animals living close to human beings.

In this context and given the incidence of this tick on dogs in this region, we intend to advance the studies by collecting *R. sanguineus* in urban dogs and rats to perform a molecular analysis of this tick on both hosts.

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