

Rhipicephalus sanguineus (Acari: Ixodidae), the brown dog tick, parasitizing humans in Brazil

Rhipicephalus sanguineus (Acari: Ixodidae), o carrapato vermelho do cão, parasitando humanos no Brasil

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ABSTRACT

The objective of this paper is to describe four cases of human parasitism by *Rhipicephalus sanguineus* (Latreille) in Brazil. During an investigation regarding the species of ectoparasites of domestic dogs from the metropolitan region of Recife, Pernambuco state, four dog owners were found to be parasitized by ticks. The ticks were collected from these individuals and their dogs. All the ticks were identified as *Rhipicephalus sanguineus*. These are, to our knowledge, the first four cases of human parasitism by this tick species in Brazil. The possible implications of this finding are discussed here.

Key-words: Brown dog tick. Human parasitism. Tick-borne diseases. Epidemiology.

RESUMO

O objetivo deste artigo é descrever quatro casos de parasitismo humano por *Rhipicephalus sanguineus* (Latreille) no Brasil. Durante uma investigação sobre as espécies de ectoparasitas de cães domésticos provenientes da Região Metropolitana de Recife, Pernambuco, quatro proprietários de cães foram encontrados parasitados por carrapatos. Foram coletados carrapatos dos indivíduos e de seus cães. Todos os carrapatos foram identificados como *Rhipicephalus sanguineus*, sendo, portanto, descritos os primeiros quatro casos de parasitismo humano por esta espécie de carrapato, no Brasil. Neste trabalho, são discutidas as possíveis implicações epidemiológicas deste achado.

Palavras-chaves: Carrapato vermelho do cão. Parasitismo humano. Doenças transmitidas por carrapatos. Epidemiologia.

The relationship between man and dog has been established for thousand of years³⁵. Due to this old and close relationship, eventually, some ectoparasites of domestic dogs may be seen parasitizing man. This parasitism, though unusual, might be responsible for a simple skin lesion or for the transmission of infectious agents.

Rhipicephalus sanguineus (Latreille), commonly called the brown dog tick or kennel tick, is one of the most widely distributed of all ticks¹⁴. This tick was introduced from the Afrotropical Region to many countries in the world, probably by the importation of infested domestic dogs, its preferred host¹⁵. For dogs, the brown dog tick can produce debilitating effects due to both blood loss and the transmission of infectious agents³⁴.

In Brazil, *R. sanguineus* is usually found on dogs from both urban and rural environments. Additionally, there are reports of *R. sanguineus* parasitizing other animals, such as rabbits, cats^{2,3}, the Norway rat³⁸, pigeons¹³, and wild canids²³.

The brown dog tick is an ectoparasite of public health interest²⁹, due its capacity to carry and transmit a number of pathogens to humans. Despite being unusual, there are a number of reports regarding human parasitism by *R. sanguineus* in the world^{5,7,14,16,20,21,22,28,33,36}. However, historically human parasitism by this tick species occurs occasionally in the Mediterranean region, Central America, and more rarely in the United States. In Europe, human parasitism by *R. sanguineus* is of particular importance because this tick is both the vector

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and reservoir of *Rickettsia conorii*, the causative agent of boutonneuse fever (also known as Mediterranean spotted fever)³⁷.

Until last year, there was no record of human parasitism by *R. sanguineus* in Brazil²³. However, at the beginning of 2005, we briefly reported the first description of human parasitism by this species of ixodid tick¹¹. The aim of this paper is to further describe the three cases reported previously¹¹ as well as to record a new case of human parasitism by *R. sanguineus*. Additionally, the possible burden to public health of this occurrence in Brazil is discussed.

MATERIAL AND METHODS

Study area. The investigation was carried out in three houses located in two municipalities of the metropolitan region of Recife, Pernambuco State, Northeastern Brazil (Figure 1). According to Köppen's classification, this region has a tropical climate with the rains concentrated from autumn to winter (February to June). The annual average temperature is 25.8°C, varying from 24 to 26°C, while the relative humidity varies from 72.5 to 85%, and the annual pluviometer index is over 1,600 millimeters¹.

Tick collection. During a previous investigation regarding the ectoparasites of domestic dogs from the metropolitan region of Recife¹², three dog owners were found to be parasitized by ticks. Hence, we manually collected the ticks encountered on these subjects and also on their dogs. A few months later, another dog owner complained that she had found a tick attached to her body and sent us the specimen for identification. All the ticks collected were preserved in 70% ethanol.

Identification of collected ticks. Identification was realized under a stereomicroscope, 100x magnification, by comparison with characteristics presented in the taxonomic key^{2,3,4,8}. Two of the collected specimens examined here were deposited in the Entomological Collection of Instituto Oswaldo Cruz, Rio de Janeiro, RJ, Brazil. The others remain deposited in the personal collection of the first author of this paper (F.D.T.).

RESULTS AND DISCUSSION

Both tick and subject data are shown in Table 1. All the individuals found the ticks attached in their inferior limbs during the summer (December to March). All the ticks examined were identified as *R. sanguineus*. The tick/person ratio documented in the present study was 1:1, as reported in Argentina where only a single adult male *R. sanguineus* was found on a girl from the city of Salta²¹.

Table 1 - Human parasitism by *Rhipicephalus sanguineus* in Pernambuco, Brazil.

Subject data			Tick data			
Age	Sex	Job	n	Collected in	Collected by	Stage
24	male	veterinarian	1	Olinda	FD.T.	adult male
22	female	student	1	Olinda	FD.T.	adult male
28	female	dentist	1	Olinda	*	adult male
24	female	veterinarian	1	Recife	FD.T.	adult male

*Collected by the subject.

FD.T.: Filipe Dantas-Torres

It is interesting to note that in our study only adult male ticks were encountered parasitizing humans. In Europe, adult brown dog ticks parasitize larger animals, like dogs, wild carnivores, ungulates and man, while the immature stages feed on rodents, hedgehogs and other small mammals¹⁴. In contrast, some authors reported that the immature stages of *R. sanguineus* are most commonly involved in human parasitism^{19,22,32}. This aspect is important due to the fact that the *R. sanguineus* nymphs are considered to be the main transmitters of *Rickettsia conorii*²¹. The immature stages are easily overlooked because of their small size²². Hence, it is generally believed that this tick feeds on humans more than previously recognized.

In Europe, most of the cases of boutonneuse fever are registered during the summer, when the tick vectors are highly active³⁰. Similarly, it was demonstrated that in United States human parasitism by the brown dog tick occurs predominantly during the summer and fall^{7,20}. Unfortunately, little is known regarding the biology of this tick species under Brazilian natural conditions. Indeed, studies on this subject are crucial for a better understanding of the tick-human interactions in our area.

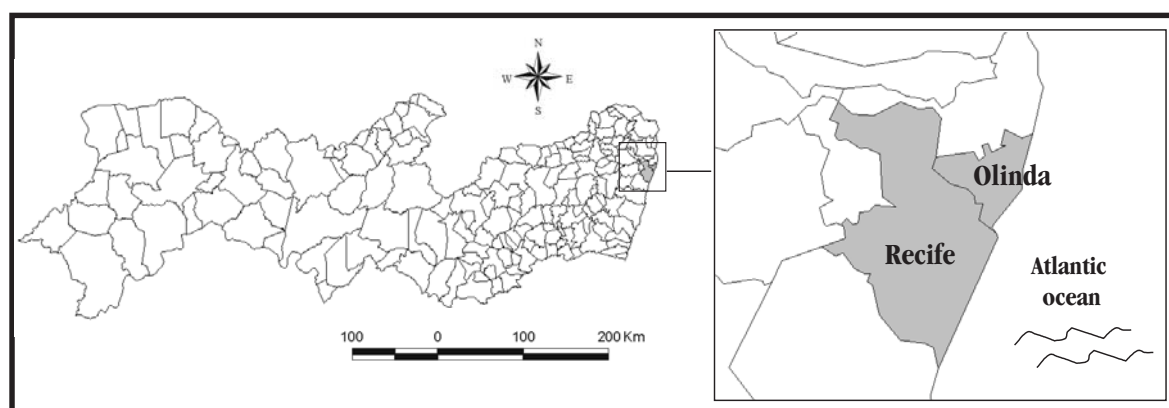


Figure 1 - Location of the two municipalities in the metropolitan region of Recife, Pernambuco, Brazil.

Dog parasitism by *R. sanguineus* is usually found in all Brazilian states^{2 3 4 12 15 17 23}. Although this tick has already been found parasitizing other animals in this country^{2 3 13 23 38}, which now include man, the domestic dog is definitely its preferred host. In the State of Pernambuco there are few researchers dedicated to studying ectoparasite species of either domestic or wild animals. However, it is already known that *R. sanguineus* is the most prevalent ectoparasite of dogs from the metropolitan region of Recife¹², where the four cases presented here are from. Additionally, pathogen microorganisms, e.g., *Ehrlichia canis*, *Babesia canis*, and *Anaplasma platys*, usually infect the domestic dogs of this region¹⁰.

During the present investigation, as expected for a nidicolous tick²³, several ticks were seen in the house, mainly on the sofa (Figure 2) and on the walls.



Figure 2 - A male *Rhipicephalus sanguineus* (arrow) found on the sofa of the residence of the case from Recife.

Our hypothesis is that any person who lives in an environment with highly parasitizing dogs (Figure 3) might be included in the group at risk for parasitism by *R. sanguineus*. Veterinarians are also included in this group, because they come into contact with infested dogs during their daily routine in endemic areas.

Tick-borne diseases are recognized as an emerging public health problem in many countries³⁰ and *R. sanguineus* has been linked to some of these diseases, such as boutonniuse fever. It



Figure 3 - A female adult dog highly parasitized by *R. sanguineus*.

is also known that *R. sanguineus* found on dogs from regions where *Rickettsia rickettsii* infection is endemic might be infected with spotted fever group rickettsiae^{24 34}. Thus, the present results, associated with the previous reports of cases of tick-borne rickettsial disease in Brazil^{6 26 27 32}, might highlight a new epidemiological situation for tick-borne diseases in this country.

It is well known that the role of *R. sanguineus* as a vector of the causative agent of canine ehrlichiosis and other infectious organisms to man might be underestimated⁷. Nevertheless, there is recent evidence indicating the role of this tick in the epidemiology of canine visceral leishmaniasis⁹. Consequently, there is an urgent need for further investigations with the aim of improving current understanding of the epidemiology of tick-borne diseases in Brazil, with emphasis on the possible vectors, reservoir hosts, causative agents and groups at risk. Similarly, studying the ecology and biology of *R. sanguineus* anthropophilic strains in our area will be a crucial step in the adoption of future control measures focused on this tick.

The presence of *R. sanguineus* in different hosts in Brazil demonstrates its eclectic feeding behavior and certainly reinforces the possibility of previous unreported cases of human parasitism by this species of tick in this country. In fact, the tick species usually involved in the human parasitism in Brazil are already known^{15 26 27}. However, both unusual and unreported tick-human interactions might be less uncommon than we think.

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