

Prevalence of tick infestation

(Rhipicephalus sanguineus and Hyalomma anatolicum anatolicum) in dogs in Punjab, Pakistan

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Summary

This study was conducted to identify ticks that infest dogs in the Rawalpindi region of Punjab, Pakistan. A total of 525 dogs were examined between June and September 2010. Of these, 60 (11.42%) were infested with ticks. The morphological features of the ticks were identified by using a stereomicroscope to confirm their identity using morphological keys. Two species were observed, namely: *Rhipicephalus sanguineus* and *Hyalomma anatolicum anatolicum*. The prevalence rate of these species was 98.33% and 1.66%, respectively. Of the 508 specimens collected, 265 male, 224 female ticks and 19 nymphs were identified. No larvae were collected from the infested dogs during the study period. There was no significant difference observed during the study months.

Keywords

Hyalomma anatolicum anatolicum, Prevalence, Pakistan, Punjab, *Rhipicephalus sanguineus*, Tick.

Prevalenza di infestazioni da zecche (*Rhipicephalus sanguineus* e *Hyalomma anatolicum anatolicum*) in cani della regione del Punjab in Pakistan

Riassunto

Questo studio è stato condotto al fine di identificare le zecche che infestano i cani nella regione del Punjab Rawalpindi, in Pakistan. E' stato esaminato un totale di 525 cani tra giugno e settembre 2010. Di questi, 60 pari al 11,42% sono risultati positivi per infestazione da zecche. Le caratteristiche morfologiche delle zecche sono state identificate utilizzando uno stereomicroscopio per confermare la loro identità usando le chiavi morfologiche. Sono state osservate due specie di zecche (*Rhipicephalus sanguineus* e *Hyalomma anatolicum anatolicum*). Il tasso di prevalenza di queste specie è stata rispettivamente del 98,33% e del 1,66%. Su 508 campioni prelevati, di cui 265 maschi e 224 femmine sono stati identificate 19 ninfe. Nessuna presenza di larve è stata osservata nei cani infestati, durante il periodo del test. Non è stata osservata alcuna differenza significativa durante i mesi di studio.

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Parole chiave

Hyalomma anatolicum anatolicum, Prevalenza, Pakistan, Punjab, *Rhipicephalus sanguineus*, Zecca.

Introduction

Ecto- and endoparasites cause major veterinary problems in Pakistan (3) and in the other Asian countries in the region. These parasites transmit a number of communicable diseases to other animals and also to humans. Among these ectoparasites, ticks currently give cause for most concern.

Concerns regarding the potential impact of climate change and the increased movement of people and companion animals between countries on the distribution of ectoparasites, highlight the need for an accurate understanding of existing prevalence patterns. Without these, future changes will not be detected (7).

Ticks are the most important group of arthropod vectors of diseases transmissible to animals and humans. They transmit pathogens such as bacteria, spirochetes, rickettsia, protozoa, viruses and nematodes. They can also produce toxins. Among the diseases most commonly transmitted to human beings are Lyme disease, ehrlichiosis, babesiosis, Rocky Mountain fever, Colorado tick fever, tularemia, Q fever, tick paralysis, spotted fever and tick encephalitis. Likewise, ticks can be associated with the transmission of zoonoses, since they may be found in homes where they can come into contact with humans while searching for favourable conditions in the environment to subsist (6).

The aim of this study was to estimate the prevalence of tick infestation (*Rhipicephalus sanguineus* and *Hyalomma anatolicum anatolicum*) in dogs from the Rawalpindi region in Punjab, Pakistan.

Materials and methods

Study area and population

Our study was performed between June and September 2010 in the Rawalpindi. A total of 525 dogs were randomly selected from the

study area and examined for the prevalence of ticks.

For the collection of ticks, the dogs were examined thoroughly (head, neck, back and belly) and ticks were collected with forceps and then immediately preserved in 70% alcohol with the relevant information.

Morphological characteristics

The samples collected were transported to the Laboratory of the Department of Veterinary Parasitology and Public Health at the University of Bari in Italy. The samples were examined for morphological features under a stereomicroscope (Leica MS5, Leica, Heidelberg) to confirm their identity by morphological keys (9) and stored in ethanol 70% until molecular processing.

Results

A total of 525 dogs (282 male and 243 females) were screened for the prevalence of the tick infestation during the study period. Of these dogs, 60 (11.42%) were positive when examined for tick infestation (Table I).

Table I
Prevalence of ticks infestation in dogs in Punjab Province in 2010

Month	No. of dogs examined	Infested
June	210	25 (11.90 %)
July	153	17 (11.11 %)
August	132	15 (11.36 %)
September	30	03 (10.00 %)
Overall prevalence	525	60 (11.42 %)

Upon morphological examination, two species were identified, namely: *R. sanguineus* and *H. anatolicum anatolicum*. *R. sanguineus* was the species of tick most prevalent in dogs, despite the presence of *H. anatolicum anatolicum*.

Of the positive dogs, 59 (98.33 %) were infested with *R. sanguineus* whereas only 1 (1.66%) presented mixed infestation of *R. sanguineus* and *H. anatolicum anatolicum*. The study

showed that the preferred site of attachment of the ticks to the dog's body were the head, neck, back and belly of the affected dogs. There was no significant difference recorded in the prevalence of ticks in the different months under study.

The infestation percentages recorded in the study area during the months of June, July, August and September were 11.90%, 11.11%, 11.36% and 10.00%, respectively. Of the 508 specimens collected, 265 male, 224 female ticks and 19 nymphs were identified. No larvae were collected from the infested dogs during the study period. The infested individuals were anaemic, weak and emaciated. According to the observations of owners, the dogs did not feed properly due to the heavy infestation and their weak condition. On clinical examination, it was also observed that infested dog had a slightly elevated temperature.

Discussion

The data on tick infestation in dogs and the vector role in Pakistan is scanty. No investigations have been made into the presence of ticks among the dog population. This may be due to the fact that only a small percentage of the population likes to keep dogs as a companion animal. In a study conducted in the past, it was observed that *R. sanguineus* was a potential vector of canine *Babesiosis* (1).

Our study therefore provides a basis for epidemiological studies and also a starting point for a study on the exploration of the vector role of ticks. In the past, mostly the work is conducted in domestic animals but no attention has yet been paid to the dog. The results of the present study indicate that the prevalence of ticks in dogs partially concur with work published on the situation in Nigeria (19.5%) (8) and Bangladesh (27.4%) (4). In the present study, two species of hard tick were identified, namely: *R. sanguineus* and *H. anatolicum anatolicum*. However, the infestation rate of *R. sanguineus* was higher

than that of *H. a. anatolicum*. *R. sanguineus* is the species of tick most widely distributed in the world (5) and some workers have reported that the ticks principally infest dogs in the Asian region (4).

The prevalence of the *R. sanguineus* with regard to the climatic conditions is similar to the situation published by other workers in the world. In another report by Dantas-Torres (2), *R. sanguineus*, commonly known as the 'brown dog tick', is a three-host tick that feeds primarily on dogs and occasionally on other hosts, including humans. *R. sanguineus* ticks are widely distributed around the world and they are known vectors of pathogens, such as *Babesia canis*, *Ehrlichia canis* and *Rickettsia conorii*. The increasing number of cases of human parasitism caused by *R. sanguineus* ticks reported in the literature indicates that the interaction between humans and *R. sanguineus* ticks may be more common than it is actually recognised (7).

In a recent study in Great Britain, Smith *et al.* (7) examined a total of 3 534 dogs and found that 810 dogs were carrying at least one species of tick. *Ixodes ricinus* (Linnaeus) (Acari: Ixodidae) was identified in 72.1% of cases, *I. hexagonus* Leach in 21.7% and *I. canisuga* Johnston in 5.6% of cases. Five samples of *Dermacentor reticulatus* (Fabricius) (Acari: Ixodidae) were also found, adding to the growing evidence that an established population of *D. reticulatus* now exists in south-eastern England. Almost all the ticks found were adults. Overall, 19.2% of the veterinary practices reported no tick detections, 50% reported that $\geq 14.9\%$ of the dogs seen were infested and 14.6% reported that $>50\%$ of the dogs inspected carried ticks.

Conclusion

In view the results obtained from the present study, it is recommended that extensive investigations be conducted to determine the vector role of ticks in Punjab, Pakistan.

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