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Rhipicephalus sanguineus tick prevalence in *Ehrlichia canis* infected Dogs

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Abstract
Rhipicephalus sanguineus ticks are the most important group of arthropod vectors responsible for transmission of *Ehrlichia canis* and causing canine ehrlichiosis in dogs. In the present study, 20 ticks were collected from 40 dogs in TVCC, LUVAS, Hisar, India. Species identification under a stereoscopic microscope was performed. A total of 17 (42.50%) out of 40 dogs harbored clinical tick infestation. Among dogs with clinical tick infestation, the overall prevalence of *Rhipicephalus sanguineus* was recorded as 70.58%.

Keywords: prevalence, age, breed wise

Introduction
Tick infestation in dogs is one of the most frequently encountered problems at clinics in tropical countries like India. Improper housing practices and an under developed vector population control strategies are responsible for the increased susceptibility of dogs towards recurrent tick infestation. Ticks infestation in dogs include *Rhiphicephalus* spp., *Dermacentor* spp., *Ixodes* spp., etc., and are responsible for dermatological manifestation (e.g., tick-bite dermatitis) as well as for transmission of haemoprotozoan diseases. *Rhipicephalus sanguineus*, the brown dog tick, is the most widely distributed ixodid tick that infests human as well as canine dwellings [7]. Three different developmental stages (larvae, nymphs and adults) of *R. sanguineus* usually feed on dogs [6]. The *Rhipicephalus sanguineus* ticks are responsible for transmission of *Ehrlichia canis* organisms which causes 'Canine Ehrlichiosis' [8]. It was found that the prevalence of *Rhipicephalus sanguineus* is correlated with that of canine ehrlichiosis in dogs [3]. Different studies have been carried out in various parts of country but no such study was performed in Haryana region. So this study was performed to have a glance of correlation between *Rhipicephalus sanguineus* and *Ehrlichia canis* infection occurrence.

Materials and Methods
A total of 40 domesticated dogs were examined clinically at TVCC, LUVAS, Hisar, India during the year 2015 to 2016. Species identification of ticks under stereoscopic microscope after permanent mounting was carried out while detection of positive cases of canine ehrlichiosis was carried out using nested-PCR. Factors such as breed, age and sex were evaluated in order to report prevalence of *Rhipicephalus sanguineus* ticks in dogs. Seven breeds of dogs (viz., German shepherd, Labrador retriever, Rottweiler, Lhasa Apso, Pomeranian, Pug and Gaddi) were studied with tick infestation. Grouping of animals was done on the basis of sex, (i.e., Male and Female) age-groups, viz., (i) Age between 0 to 6 months, (ii) Age between 6 to 12 months, and (iii) Age > 1 year. Hand picking method for collection of ticks was used for individual animal. A total of 20 ticks were collected. Tick collection, permanent mounting and identification of *Rhipicephalus sanguineus* ticks (Figures 3, 1 and 2) was carried out as per the method described by Kikani (1988) under stereoscopic microscope. Nested PCR was used for diagnostic confirmation of canine ehrlichiosis in dogs [1]. Percentage prevalence rates of tick infestation in dogs by *Rhipicephalus sanguineus* species of ticks and canine ehrlichiosis were correlated. Numbering of figures is from the right side Fig 1, 2 and 3.

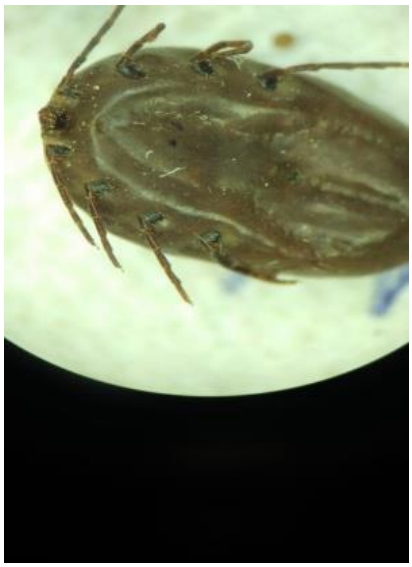

Fig 1: Stereoscopic view of *Rhipicephalus sanguineus* tick before mounting on glass slide.

Fig 2: Stereoscopic view of tick after mounting of tick.

Fig 3: Tick collection from tick infested dogs.

Results and Discussion

Out of 40 domesticated dogs were examined clinically at TVCC, LUVAS, Hisar, 17 (42.50%) dogs were reported with tick infestation. Out of 17, a total of 12 (70.58%) were harboring *Rhipicephalus sanguineus* ticks, as identified under stereoscopic microscope. This percentage prevalence is higher than the reported prevalence of 19.70% by [12] and 63.70% by [9] while it is lower than reported prevalence of 100.00% by [11], 98.33% by [10] and 74.76% by [3].

Breed-wise prevalence of ehrlichiosis amongst 17 naturally infected dogs was higher in Labrador retriever (45%), Pug and Pomerarian (12.5%), German Shepherd (20%), Rottweiler (5%), Lhaso Apso and Gaddi (2.5%) respectively. Higher prevalence rate of Labrador retriever breed of dog was in contrary with the findings of [4, 5, 2] who reported German shepherd as most affected breed. This may be due to more availability of the breed in the region. Sex-wise prevalence of tick infestation with *Rhipicephalus sanguineus* was recorded higher in males (51.52%) than females (48.48%) which was contrary to Bhadesiya and Modi (2015). Age-wise prevalence of *Rhipicephalus sanguineus* was recorded highest (45.46%) in dogs with age > 2 years followed by dogs with age < 1 year (30.30%) and dogs between 1 to 2 years of age (27.28%) groups. This finding was contrary to [3] who have recorded 33.33%, 38.89% and 27.28% prevalence in respective age groups of > 2 years, < 1 year and 1 to 2 years.

Dogs with tick infestation by *Rhipicephalus sanguineus* were screened for molecular detection by nested PCR and out of which, 18 (54.55%) showed positive titers to *Ehrlichia canis* infection.

Conclusion

The prevalence was found to be 70.58% which shows a higher degree of correlation between *Rhipicephalus sanguineus* and *Ehrlichia canis*. Breed wise prevalence was higher in Labrador retriever and age wise prevalence was highest in age group of dogs having age greater than 2 years.

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