**INTRODUCTION**

Tick infestation in dogs is one of the most frequently encountered entities at clinics in tropical countries like India. Ticks involved with dogs include *Rhipicephalus spp.*, *Dermacentor spp.*, *Ixodes spp.*, etc., and are responsible for dermatological manifestation (e.g., tick-bite dermatitis) as well as for transmission of *haemoproteozoan* diseases. Improper housing practices and an under developed vector population control strategies are responsible for increased susceptibility of dogs towards recurrent tick infestation. The present study was undertaken in order to report prevalence status...
of *Rhipicephalus sanguineus* ticks among dog population in nine different localities of Middle Gujarat. *Rhipicephalus sanguineus* ticks are responsible for transmission of *Ehrlichia canis* organisms which cause a disease termed as ‘Canine Ehrlichiosis’ (Lewis et al., 1977). The prevalence of *Rhipicephalus sanguineus* is correlated with that of canine ehrlichiosis in dogs.

**MATERIALS AND METHODS**

In the present study, a total of 74 domesticated dogs were examined clinically from nine different localities in and around Anand district (*viz.*, TVCC-AAU, Anand town area, Borsad, Gamdi, Gana, Gandhinagar, Sandesar, Sunav and Vallabh Vidyanagar) of Middle Gujarat, India. Species identification of ticks under stereoscopic microscope after permanent mounting (Figure 1) was carried out at Department of Veterinary Parasitology while detection of positive cases of canine ehrlichiosis was carried out at Department of Veterinary Medicine, CVSAH, AAU, Anand. Factors such as breed, age and sex of dog as well as housing pattern for dogs were evaluated in order to report prevalence of *Rhipicephalus sanguineus* ticks in dogs. The study included ten breeds of dogs (*viz.*, Non-descript breed, German shepherd, Labrador retriever, Saint Bernard, Doberman pinscher, Pomeranian, Great Dane, Pug, English Mastiff and Golden retriever) with tick infestation. Each animal was grouped on the basis of sex, *i.e.*, Male and Female. Dogs were categorized under three age-groups, *viz.*, (i) Age < 1 year, (ii) Age between 1 to 2 years, and (iii) Age > 2 years. Types of housing patterns for dogs based on observation comprised three groups, *viz.*, (i) Kachha house and field, (ii) Pakka house, and (iii) Kachcha house with access to open areas. The collection of ticks was done by hand picking from individual animal. A total of 104 ticks were collected. Permanent mounting and identification of *Rhipicephalus sanguineus* ticks (Figures 2 and 3) was carried out as per the method described by Kikani (1988) under stereoscopic microscope. A Dot-ELISA based Immunocomb® rapid diagnostic kit (BiogalGaled Lab., Israel) was used for diagnostic confirmation of canine ehrlichiosis in dogs (Figure 4) with
Rhipicephalus sanguineus ticks. For this, blood and serum samples were collected from dogs and diagnostic procedure was followed as per the manufacturer’s guidelines. The test detects
anti-\textit{Ehrlichia canis} antibodies in blood, serum or plasma samples. Percentage prevalence rates of tick infestation in dogs by \textit{Rhipicephalus sanguineus} species of ticks and canine ehrlichiosis were correlated.

**RESULTS AND DISCUSSION**

Out of 74 domesticated dogs were examined clinically, 43 (58.11\%) dogs were reported with tick infestation. Out of 43, a total of 33 (76.74\%) were harboring \textit{Rhipicephalus sanguineus} ticks, as identified under stereoscopic microscope. This percentage prevalence is higher than the reported prevalence of 19.70\% by Tringali \textit{et al.} (1986) and 63.70\% by Melo \textit{et al.} (2011) while it is lower than reported prevalence of 100.00\% by Pedro Paulo \textit{et al.} (2010) and 98.33\% by Murtazul-Hasan \textit{et al.} (2012). Breed-wise prevalence of \textit{Rhipicephalus sanguineus} ticks (33 of 43 dogs) was recorded highest (33.33\%) in Labrador retriever followed by Non-descript breed (15.16\%), German shepherd (12.12\%), Saint bernard (12.12\%), Doberman pinscher (09.09\%), Pomeranian (06.06\%), Great Dane (03.03\%), Pug (03.03\%), English Mastiff (03.03\%) and Golden Retriever (03.03\%) breeds of dog. To the author’s knowledge, breed-wise prevalence rates of \textit{Rhipicephalus sanguineus} in dogs are not reported on large scale. Sex-wise prevalence of tick infestation with \textit{Rhipicephalus sanguineus} was recorded higher in males (51.52\%) than females (48.48\%). To the author’s knowledge, there is no available literature on the impact of sex of dog on tick infestation by \textit{Rhipicephalus sanguineus} on large scale. Age-wise prevalence of \textit{Rhipicephalus sanguineus} was recorded highest (45.46\%) in dogs with age > 2 years followed by dogs with age < 1 year (30.30\%) and

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dogs between 1 to 2 years of age (24.24%) group. There is no available literature on the impact of age of dogs on tick infestation by individual species. Housing pattern-wise prevalence of *Rhipicephalus sanguineus* was recorded highest (57.58%) in dogs kept in pakka house with access to open areas followed by dogs kept in kachcha house and field (24.24%) and dogs kept in pakka house (18.18%). Little information in literature is available on the impact of housing patterns for dog on tick infestation by individual species. The results suggest that *Rhipicephalus sanguineus* ticks are associated with dogs kept in pakka house along with access to open areas (e.g., gardens) which is in agreement with findings of Shimada *et al.* (2003).

Dogs with tick infestation by *Rhipicephalus sanguineus* were screened for qualitative detection of titers of anti-*Ehrlichia canis* antibodies using Immunocomb® rapid diagnostic kit; out of which, 18 (54.55%) showed positive titers to *Ehrlichia canis* infection. Breed-wise prevalence of ehrlichiosis amongst 18 naturally infected dogs was higher in German shepherd and Saint Bernard breeds of dogs (22.22%, each). Higher prevalence rate in German shepherd breed of dog was in correlation with findings of Bindu *et al.* (2006), Choudhary *et al.* (2012) and Bhardwaj (2013). Huxsoll *et al.* (1972) stated that German shepherd breed of dog is more predisposed due to inherent breed inability of blast formation and leucocyte migration inhibition factor. Low breed-wise prevalence in other breeds may be the result of lower numbers of dogs belonging to different breeds screened. Sex-wise prevalence of ehrlichiosis amongst 18 naturally infected dogs was higher (38.89%) among dogs with age < 1 year followed by dogs with age > 2 years (33.33%) and dogs between 1 to 2 years of age (27.28%) groups. Housing pattern-wise prevalence of ehrlichiosis was recorded was recorded higher (50.00%) from dogs kept in pakka house with access to open areas as compared to dogs kept in kachcha house and field (38.89%) and dogs kept in pakka houses (11.11%).

**CONCLUSION**

Prevalence of tick infestation in dog population studied by *Rhipicephalus sanguineus* was 76.74%. Higher breed-wise, age-wise, sex-wise and housing pattern-wise percentage prevalence of *Rhipicephalus sanguineus* was reported in Labrador retriever breed of dog, dogs under age > 2 years group, males and in dogs kept in pakka house with an access to open areas, respectively. Canine ehrlichiosis was present in 54.55% (n = 18) dogs infested with *Rhipicephalus sanguineus*. The infection rate and its correlation with tick infestation reported in the present study suggests possibilities of subclinical infection in the populations studied pointing to the need for further studies involving larger samples of the vector, taking into account seasonal variations as well as specific details about the clinical stage of the disease in the dogs examined.

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**REFERENCES**


