

# Prevalence and Epidemiological Aspects of *Rhipicephalus Sanguineus* in and Around Areas of Anand, Gujarat

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**Abstract:** The brown tick of dogs (*Rhipicephalus sanguineus*) is a well-recognized arthropod vector of many pathogens affecting dogs and occasionally humans. It is the most widespread tick in dog population and can be found in rural as well as urban areas. In the present study, 104 ticks were collected from 74 dogs clinically examined in and around different areas of Anand, Gujarat (India). The overall prevalence of tick infestation was recorded as 58.11% (43 of 74). Among different species of ticks identified from 43 dogs with tick infestation, 76.74% (n=33) dogs were reported to have tick infestation by *Rhipicephalus sanguineus*. The epidemiological data of morbidity in dogs with tick infestation by *Rhipicephalus sanguineus* in correlation to various epidemiological parameters such as breed, sex, age and housing pattern were generated for development of the dog health surveillance in area. In the present article, some of these epidemiological aspects of *Rhipicephalus sanguineus* are discussed in domestic dog population examined.

**Keywords:** Tick infestation, *Rhipicephalus sanguineus*, epidemiological aspects, prevalence, dogs.

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## I. INTRODUCTION

The development of dog is as obscure as evolution of man himself and its presence as a pet has been increasing gradually in urban and rural households. Improper housing for dogs, exposure to open areas, grooming practices and other neglected management factors have been reported for increased susceptibility of dogs to various endoparasitic as well as ectoparasitic infestations. Among all, dermatological disorders and haemoprotozoan diseases associated with ectoparasites (especially ticks) are frequently observed entity at clinics [1]. Over the past several decades, tick-borne diseases caused by obligate intracellular organisms have emerged as important threats. Ticks and tick-borne diseases affect animal and human health worldwide and are the cause of significant economic losses. Approximately 10% of the currently known tick species act as vectors of a broad range of pathogens of domestic animals and humans and are also responsible for damage directly due to their feeding behavior [2].

Common species of ticks involved with dogs include *Rhipicephalus* spp., *Dermacentor* spp., *Otobius* spp., *Ixodes* spp., etc. Among them, *Rhipicephalus sanguineus* tick is widespread across tropical as well as subtropical regions. Dog is the primary host for this tick [3]. India has a wide range of climatic zones, from mountains (cold, wet alpine) and semi-arid regions to the wet tropics, which make it suitable for a diverse range of such ectoparasites or vectors [4]. Concerns regarding potential impacts of climate change and increased movement of people and companion animals on the distribution of ectoparasites highlight the need for an accurate understanding of existing prevalence patterns and distribution. Such information can be helpful to detect changes in tick prevalence patterns. In past, work is conducted mostly in domestic animals other than dogs. Fewer investigations have been made into the presence of tick infestation

specifically by *Rhipicephalus sanguineus* ticks among the dog population in India. The aim of this study was to consider the prevalence of *Rhipicephalus sanguineus* in a randomized sample of domestic dogs in and around different areas of Anand, Gujarat (India).

## II. MATERIALS AND METHODS

Study was undertaken at Teaching Veterinary Clinical Complex (TVCC), Veterinary College, Anand and at dog-owners' doorsteps in different areas around Anand. The information thus obtained included epidemiological surveillance, clinical examination and laboratory examination. During the period of work, a total of 74 domesticated dogs were examined clinically and 104 ticks were collected. The ticks were permanently mounted on microscopic slides and identified under stereoscopic microscope. Prevalence of tick infestation was recorded in 11 different breeds. All animals were grouped as per their age into three groups and prevalence of tick infestation was correlated with age.

1. Age < 1 year
2. Age between 1 to 2 years
3. Age > 2 years

Types of housing patterns for the dogs were recorded and classified into three groups as follows and prevalence of tick infestation was correlated with housing patterns.

1. Kachcha house and field
2. Pakka house
3. Kaccha house with access to open areas

### A) Collection of ticks:

The collection of ticks was done by hand picking from individual animal from different parts of body including face, ears, neck, legs, paw, abdomen, loin, thigh, perineal region etc. A total of 104 ticks were collected from 43 cases with tick infestation. Live ticks were killed and preserved in 70 percent alcohol.

### B) Permanent mounting of ticks:

Permanent mounting of ticks was carried out by methods described by Kikani [5].

- i. Ticks killed and preserved in 70 percent alcohol were kept in 10 percent potassium hydroxide (KOH) solution for 24 to 48 hours in petri dishes. KOH is responsible for dissolution of chitin and this period can vary depending on chitinisation in ticks.
- ii. Digested organs were removed by applying gentle pressure (crushing) with a blunt end of glass rod.
- iii. Ticks were then washed with 2 repeated changes of water, each for 15-30 minutes.
- iv. Specimens were dehydrated by different ascending grades of alcohol e.g. 30, 50, 70 percent and absolute alcohol keeping in each for 1 hour. Ticks can be preserved in 70 percent alcohol for an indefinite time.
- v. Second change of absolute alcohol was given for 30 minutes.
- vi. Clearing was done in xylene/carboxy-xylol (one part of carbolic acid and three parts of xylol) for 2-5 minutes.
- vii. Ticks were then mounted permanently on microscopic slides using D.P.X. and covered with cover slip. Mounted slides were kept for drying after which, ticks were identified based on their morphology and slides were labeled.

### C) Identification:

Forty three slides with permanent mounts of ticks were prepared and ticks were identified grossly as well as under stereoscopic microscope at Department of Veterinary Parasitology, College of Veterinary Science & Animal Husbandry, Anand based on their morphology as described by Soulsby [6].

### III. RESULTS AND DISCUSSION

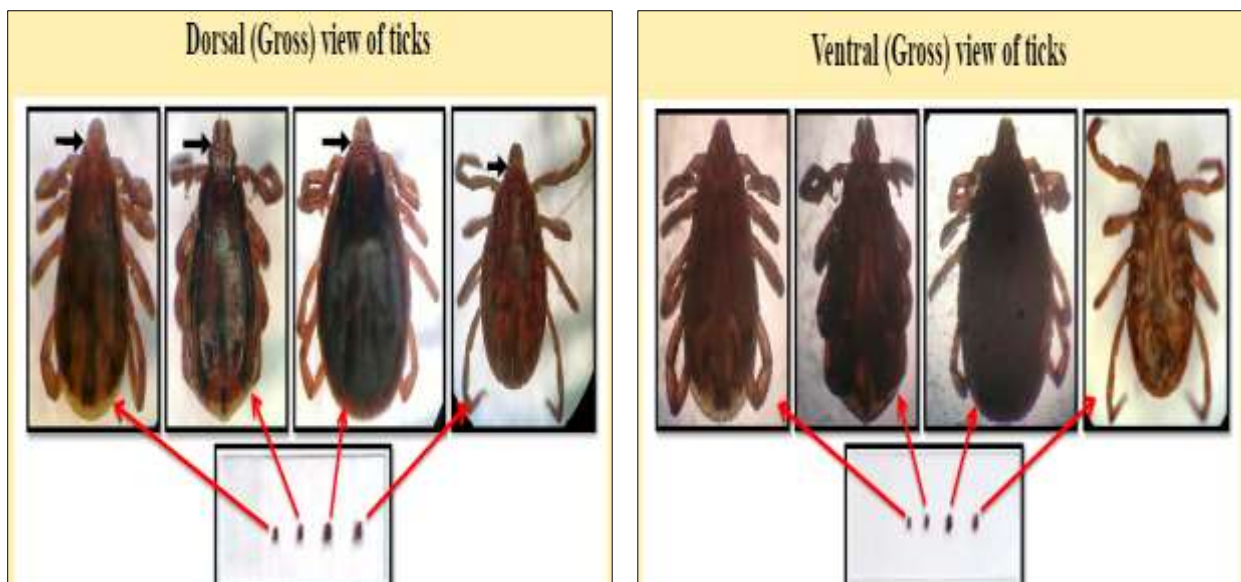
Out of 74 dogs clinically examined during the period of proposed work, 43 dogs were harboring tick infestation and overall prevalence of tick infestation was 58.11 per cent. *Rhipicephalus sanguineus* species of ticks was identified under stereoscopic microscope. Hexagonal basis capituli and comma shaped spiracles (black arrows in figures) are characteristic of this species. Prevalence of tick infestation by *Rhipicephalus sanguineus* species of ticks was 76.74% which is higher than the prevalence of 19.50% recorded by Ugochukwu and Nnadozie [7], 19.70% by Tringali *et al.* [8], 34.00% by Mumcuoglu *et al.* [9], 20.00% by Cruz-Vazquez and Garcia-Vazquez [10], 27.00% by Szabo *et al.* [11], 04.08% by Shimada *et al.* [12] and 19.30% (rural area) and 63.70% (urban area) recorded by Melo *et al.* [13] while it was lower than 98.33% as reported by Murtazul-Hasan *et al.* [14] and 100.00% by Tinoco-Gracia *et al.* [15].

Among 33 (N=43) dogs of various breeds with tick infestation by *Rhipicephalus sanguineus*, breed-wise prevalence 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. This is associated with the preference of dog owners to keep Labrador Retrievers as companions as compared to other breeds of dogs.

The sex-wise prevalence of tick infestation with *Rhipicephalus sanguineus* was recorded higher in males (51.52%) than females (48.48%). The age-wise prevalence was recorded highest (45.46%) in dogs with > 2 years of age followed by dogs < 1 year of age (30.30%) and dogs between 1 to 2 years of age (24.24%). The housing pattern-wise prevalence 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 of dog on tick infestation by individual species. The results suggest that *Rhipicephalus* species of ticks is associated with dogs kept in pakka house along with access to open areas which is in agreement with Shimada *et al.* [12].

### IV. CONCLUSIONS

Keeping dogs as companions is observed to be increased in urban as well as rural areas of Gujarat. The overall prevalence of tick infestation in dogs was 58.11 per cent. Prevalence of tick infestation by *Rhipicephalus sanguineus* was 76.74%. Higher prevalence was reported in Labrador Retriever breed of dog. Male dogs and those aged more than 2 years of age showed more prevalence rates. This species of tick is one of the chief responsible vectors for transmitting infectious diseases in dogs. Although this information is useful to ascertain current ecological distribution, a more comprehensive review of the prevalence of epidemiology of *Rhipicephalus sanguineus* is still required in the area in order to evaluate changes in the pattern of the disease transmission.



Features of *Rhipicephalus sanguineus* before mountingMicroscopic features of *Rhipicephalus sanguineus*

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