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Prevalence of *Rhipicephalus sanguineus* on dogs in Chennai, Tamil Nadu

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Abstract

Dog ticks are the most widespread ticks in the world and are well-recognized vectors of many pathogens affecting dogs and occasionally humans. A total of 352 dogs of different breeds were examined for the presence of ticks from June 2009 to May 2011 in Chennai, Tamil Nadu. The collected ticks were identified as *Rhipicephalus sanguineus*. The overall prevalence of ticks was 58.52%. Among the seasons, highest prevalence of *R. sanguineus* was observed in northeast monsoon (34.46%) followed by southwest monsoon (30.10%), summer (23.79%) and lowest level in winter (11.65%). Adult dogs were heavily infested with *R. sanguineus* ticks than the puppies (67.96 % vs 32.04%). Male dogs were highly infested (74.76%) than the female dogs (25.24 %). Among the breeds, Spitz was highly infested (28.16 %) followed by mongrels (24.76%), Labrador (17.48%), German shepherd (12.44%) and Doberman (4.37%). Other breeds were infested with very low levels ranging from 0.49 % to 2.43 %. Hairy breeds (Spitz, Labrador, German shepherd, Lhasa Apso, Border collie, Golden Retriever and Pomeranian) were heavily infested with ticks (61.17 %) than the non-hairy breeds (38.83 %).

Keywords: Tick, *Rhipicephalus sanguineus*, Prevalence, Dogs, Chennai, Tamil Nadu.

Introduction

Rhipicephalus sanguineus is an endophilic, monotropic, three-host tick species and the most widespread tick in the world. It is a well-recognized vector of many pathogens affecting dogs and occasionally humans (Pegram *et al*., 1987; Dantas-Torres, 2010). It acts as a vector for transmission of *Ehrlichia canis, Babesia vogeli* and *Hepatozoon canis* in canines and *Rickettsia conorii* and *R. rickettsia* in human (Otranto *et al.,* 2012). Dogs are the main hosts of both adult and pre-adult parasitic stages of the tick. Adult *R. sanguineus* can also feed on many other mammals, such as goats (Valls, 2008), sheep (Okoli *et al*., 2006; Biu *et al*., 2012), cattle, buffaloes (Chhillar *et al*., 2014), horses, ungulates, wild carnivores, cats (Filippova,1997; Ogden *et al*., 2000), hares and hedgehogs.Pre-adult ticks were found on shrews and many rodents (Walker *et al*., 2000). It also occurs in human beings (Mentz *et al*., 2016). This paper reports the prevalence of *R. sanguineus* on different breeds of dogs in Chennai, Tamil Nadu.

Materials and Methods

A total of 352 tick infested dogs (German Shepherd, Doberman, Dalmatian, Dachshund, Great Dane, Golden Retriever, Labrador, Lhasa Apso, Pug, Boxer, Border collie, Spitz, Pomeranian, Rottweiler and Mongrel) were examined at small animal private clinics, Perambur, Chennai, Tamil Nadu from June 2009 to May 2011 to know the seasonal prevalence of ticks in Chennai, Tamil Nadu. The ticks were collected and examined after clearing them with 10% sodium hydroxide (Sloss, 1970) and identified based on morphological features by

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microscopical examination (Soulsby, 1982). Statistical analysis for the data was carried out using SPSS tools, Version 2017.

Results and Discussion

The overall prevalence of *R. sanguineus* was 58.52% (Table 1). Nithikathkul *et al*.(2005) and Otranto *et al*. (2005) reported 80% and 39.4% prevalence of *R. sanguineus* on dogs in north-eastern Thailand and Italy, respectively. Contrary to this, Goldberg *et al*. (2002) and Dantas-Torres *et al*. (2009) reported lowest prevalence of 3.8% and 5.4% *R. sanguineus* infestation on dogs of North West Georgia (USA) and North eastern Brazil respectively.

Table 1. Breed wise prevalence of *R. sanguineus* on dogs in Chennai.

Sl. No.	Breed	Skin	Season				Age		Sex		Overall %
			S	SWM	NEM	W	Puppy	Adult	M	F	
1	Boxer	Non-hairy	33.33 (1)	0.00(0)	67.67 (2)	0.00 (0)	0.00 (0)	100 (3)	66.67 (2)	33.33 (1)	1.46 (3)
2	Dalmatian	Non-hairy	0.00 (0)	100 (1)	0.00 (0)	0.00 (0)	0.00 (0)	100 (1)	100 (1)	0.00 (0)	0.49 (1)
3	Dachshund	Non-hairy	33.33 (1)	0.00 (0)	66.67 (2)	0.00 (0)	0.00 (0)	100 (3)	100 (3)	0.00 (0)	1.46 (3)
4	Doberman	Non-hairy	55.56 (5)	0.00 (0)	22.22 (2)	22.22 (2)	44.44 (4)	55.56 (5)	88.89 (8)	11.11 (1)	4.37 (9)
5	Great Dane	Non-hairy	0.00 (0)	33.33 (1)	66.67 (2)	0.00 (0)	66.67 (2)	33.33 (1)	66.67 (2)	33.33 (1)	1.46 (3)
6	Rottweiler	Non-hairy	0.00 (0)	40.00 (2)	40.00(2)	20.00 (1)	20.00 (1)	80.00 (4)	80.00 (4)	20.00 (1)	2.43 (5)
7	Pug	Non-hairy	0.00 (0)	0.00 (0)	80.00 (4)	20.00 (1)	40.00 (2)	60.00 (3)	80.00 (4)	10.00 (1)	2.43 (5)
8	Mongrel	Non-hairy	27.45 (14)	25.50 (13)	7.25 (19)	9.80 (5)	33.33 (17)	66.67 (34)	82.35 (42)	17.65 (9)	24.76 (51)
9	Border collie	Hairy	0.00 (0)	0.00 (0)	100 (1)	0.00 (0)	0.00 (0)	100 (1)	100 (1)	0.00 (0)	0.49 (1)
10	Golden Retriever	Hairy	0.00 (0)	0.00 (0)	100 (1)	0.00 (0)	100 (1)	0.00 (0)	100 (1)	0.00 (0)	0.49 (1)
11	German Shepard	Hairy	4.00 (1)	60.00 (15)	28.00 (7)	8.00 (2)	40.00 (10)	60.00 (15)	64.00 (16)	36.00 (9)	12.14 (25)
12	Lhasa Apso	Hairy	0.00 (0)	75.00 (3)	25.00 (1)	0.00 (0)	25.00 (1)	75.00 (3)	75.00 (3)	25.00 (1)	1.94 (4)
13	Labrador	Hairy	30.56 (11)	33.33 (12)	25.00 (9)	11.11 (4)	30.55 (11)	66.44 (25)	80.56 (29)	19.44 (7)	17.48 (36)
14	Pomeranian	Hairy	0.00 (0)	0.00 (0)	100 (1)	0.00 (0)	0.00 (0)	100 (1)	100 (1)	0.00 (0)	0.49 (1)
15	Spitz	Hairy	27.59 (16)	25.86 (15)	31.03 (18)	15.52 (9)	29.31 (17)	70.69 (41)	63.79 (37)	36.21 (21)	28.16 (58)
	Total		23.79 (49)	30.10 (62)	34.46 (71)	11.65 (24)	32.04 (66)	67.96 (140)	77.76 (154)	25.24 (52)	58.52 (206)

S-Summer; SWM-Southwest monsoon, NEM-Northeast monsoon; W-Winter

Dog breed	Seasons				Age		Sex	
	Summer**	South-west monsoon**	North-east monsoon**	Winter*	Puppy**	Adult**	Male**	Female**
Non-hairy	10.5±0.5^{a}	8.5±0.5^{a}	16.5±0.5^{a}	4.5±0.5^{a}	13.0±1.0^{a}	27.0±1.0^{a}	33.0±2.0^{a}	7.0±1.0^{a}
Hairy	14.0±0.0^{b}	22.5±0.5^{b}	19.0±0.0^{b}	7.5±0.5^{b}	20.0±1.0^{b}	43.0±1.0^{b}	44.0±1.0^{b}	19.0±1.0^{b}

*P<0.05; **P<0.01 – Values bearing different superscript in a column differ significantly.

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Among the breeds, Spitz was highly infested (28.16%) with *R. sanguineus* followed by mongrels (24.76%), Labrador (17.48%), German shepherd(12.44%) and Doberman (4.37 %). Dantas-Torres *et al*. (2004) observed the higher prevalence of ticks in free ranging dogs than the house-trained dogs. Soares *et al*. (2006) reported that the tick prevalence was more in house living dogs with grassy yard when compared to the dogs kept in apartments. Okoli *et al*. (2006) reported that *R. sanguineus* infestation was more in Alsatian than mongrel. Louly *et al*. (2009) reported English Cocker Spaniel was more susceptible than other breeds. In our study, hairy breeds (Spitz, Labrador, German shepherd, Lhasa Apso, Border collie, Golden Retriever and Pomeranian) were found to be heavily infested with ticks (61.17 %) than the non-hairy breeds (38.83%). Tick infestation was significantly ($P<0.01$) higher in hairy breed than the non-hairy breed (Table 1)

Among the seasons, highest prevalence of *R. sanguineus* was observed in north-east monsoon (34.46%) followed by southwest monsoon (30.10%), summer (23.79%) and lowest in winter (11.65%). Highest prevalence of ticks was observed during monsoon months (64.56%) than the summer and winter seasons (Figure. 1). On the contrary, Okoli *et al*. (2006) has reported that *R. sanguineus* occurred during the early rainy season in the month of April and May. Chhillar *et al*. (2014) observed the occurrence of *R. sanguineus* throughout the year and reduced in winter in case of cattle and buffaloes.

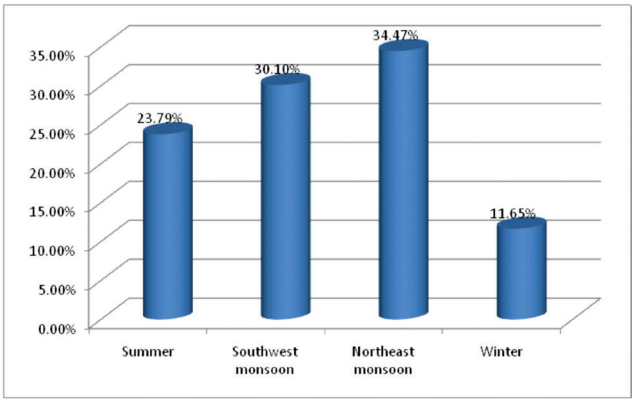


Fig. 1. Season wise prevalence of *R. sanguineus* on dogs in Chennai



Fig. 2. Heavy tick infestation on a dog



Fig. 3. Heavy tick infestation on ear of dog

Among the age groups, adult dogs were heavily infested with *R. sanguineus* ticks than the puppies (67.96 % vs 32.04%). In contrast, Tinoco-Gracia *et al*. (2009) reported higher prevalence in younger dogs. Among the sex, male dogs were highly infested (74.76%) than the female dogs (25.24 %) which is in similarity with report of Silveira *et al*. (2009). Sites of attachment were mostly on the ears, withers, face and perineum, especially under the heavy fur of the mane and in the inter-digital spaces (Fig. 2 and 3) which is similar to that of Okoli *et al*. (2006).

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