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## Epidemiological analysis of *Ehrlichia canis* among dog population of Jammu division

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### Abstract

Epidemiological studies on canine vector borne diseases (CVBD) in Jammu were conducted during July, 2012 to June, 2013. 172 cases suspected for suffering from vector borne disease, exhibiting clinical signs of pyrexia and tick infestation formed study population. Overall 22.09 per cent prevalence of Ehrlichiosis was recorded taking buffy coat smear as examination as standard. Season wise prevalence was highest in monsoon as 35.18 per cent, and least in summers as 13.88 per cent, age wise prevalence of Ehrlichiosis was seen highest in < 1year age group as 44.68 per cent. Among breeds German shepherd was seen mostly affected with prevalence of 40.812 per cent and minimum in Doberman as 10 per cent.

**Keywords:** Buffy coat, Doberman, German shepherd, tick, vector

### 1. Introduction

India with wide range of climatic zones, from mountainous (cold, wet alpine) and semi-arid regions to the wet tropics, which makes it suitable for a diverse range of vector borne diseases whose geographic distribution and transmission is closely related to the regional temperature, rainfall and humidity. The common haemoprotozoan infections which are transmitted by vectors distressing the canine population in tropical and sub-tropical regions of the world caused by *Ehrlichia* spp, *Babesia* spp., *Hepatozoon* spp. are of significant point of view of pathogenesis causing fever, anaemia, thrombocytopaenia, jaundice in canines [10]. *Ehrlichia canis* (obligatory intracellular pleomorphic rickettsia) is considered to be of global importance in canines causing Canine monocytic ehrlichiosis (CME), transmitted by the bite of the brown dog tick, *Rhipicephalus sanguineus*, and leads to severe clinical manifestations in affected animals [4]. Information regarding the canine vector borne diseases in India is still scarce [6], so in view of global prevalence of the diseases throughout the world and increased movement of dogs to different places, it is likely that these ailments may be reported with more frequency in times to come. Therefore, in view of stated fact, the present study was undertaken.

### 2. Materials and Methods

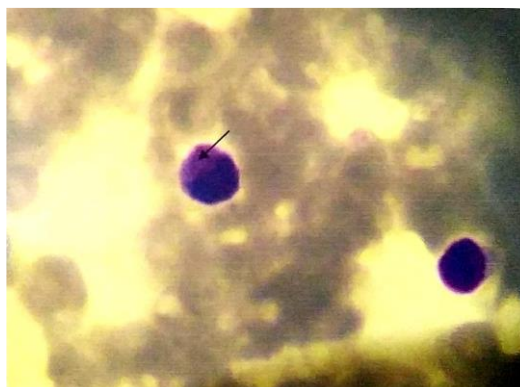
The present study was a retrospective study carried out on 172 dogs of different breeds (German shepherd, Labrador, Pomerian, Doberman, Bakerwali and Non-Descriptive) brought for treatment to Teaching Veterinary Clinical Complex (TVCC), Faculty of Veterinary Sciences and Animal Husbandry, R.S. Pura and private pet clinics in and around Jammu division with a history of pyrexia of un-known origin, non-responsiveness to treatment along with history of tick infestation during the course of disease. The study period being July 2012-June 2013.

### 2.1 Proceedings

Case history of each dog was ascertained admitted for cure before undertaking clinical examination which included age, sex, breed, vaccination status, thermal reaction, feed intake, vomition, diarrhoea, epistaxis, nervous signs ad weight loss (if any). Further the dogs were examined clinically for temperature, tick infestation (if any), anaemia (status of mucous membrane), general body condition, dehydration status, heart rate, respiratory rate, lymphadenopathy, haemoglobinuria.

## 2.2 Preparation of buffy coat smear and its examination

Microhaematocrit tubes were filled 2/3<sup>rd</sup> with blood treated with di-potassium salt of Ethylene diamine tetra acetic acid (K<sub>2</sub>EDTA) and the other end was sealed. The tubes were centrifuged at 3000 rpm for 5 min and then broken 1 mm below buffy layer. The contents of tube containing buffy coat were tapped out onto a glass slide and a smear was made, which was further stained with Giemsa stain and observed under microscope.



**Fig 1:** Giemsa Stained (100X) buffy coat smear showing *E. canis* morula in a monocyte (arrow marked)

## 3. Results and Discussion

After thorough examination and further confirmation of presence of *E. canis* infection using buffy coat smear as mentioned in the above section, comparative prevalence of vector borne disease Ehrlichiosis varying with the season, sex, breed and age groups were studied and recorded.

### 3.1 Month-wise prevalence of *Ehrlichia canis* infection

Out of total 172 blood samples screened for *E. canis* 38 blood samples were found positive making up 22.09 per cent overall prevalence. Prevalence of Ehrlichia infection was found to be highest during July followed by November and least in April with the figures as 53.33 per cent, 33.33 per cent, 4.76 per cent respectively as depicted in the Table 1. Our results are in close agreement with the previous studies conducted<sup>[1, 11]</sup>.

**Table 1:** Month-wise prevalence of *Ehrlichia canis* infection from July, 2012 to June, 2013.

Month (2012-2013)	Total Cases	
	Suspected cases of vector borne diseases	<i>E. canis</i> infected*
July	15	8 (53.33)
August	21	6 (28.77)
September	18	5 (27.77)
October	12	3 (25.00)
November	6	2 (33.33)
December	8	1 (12.5)
January	11	2 (18.18)
February	9	2 (22.22)
March	18	2 (11.11)
April	21	1 (4.76)
May	14	3 (21.42)
June	19	4 (21.05)
Grand Total	172	38 (22.09)

\*Figures in parenthesis denote percentage

### 3.2 Age-wise prevalence of *Ehrlichia canis* infection

The prevalence of *E. canis* infection was found to be highest in the age group of less than 1 year followed by age group 1-2 years and least was recorded in the age group above 8 years

## 2.3 Epidemiological Analysis

Keeping age, sex, breed and season from July, 2012-June, 2013 as criteria, epidemiological study on vector borne pathogen in canines of Jammu brought to TVCC, F.V.Sc & A.H., SKUAST-J and private pet clinics around Jammu with history of tick infestation along with other signs found in Canine Vector Borne Diseases (CVBDs), confirmed using buffy coat smear examination for the presence of the organisms *E. canis* as depicted in the below given figure 1.

with figures as 44.68 per cent, 15.38 per cent, 7.14 per cent respectively as depicted in Table 2. Our results are in close proximity to the previous findings<sup>[3, 7, 8, 11, 13]</sup>. The higher susceptibility of young animals can be attributed to the under developed immune system and more susceptibility to the effect of parasites than adult ones.

**Table 2:** Age-wise prevalence of *Ehrlichia canis* infection

Age groups (in years)	Total cases	Positive	Percentage
<1	47	21	44.68
1-2	52	8	15.38
2-4	42	6	14.20
4-8	17	2	11.70
>8	14	1	7.14
Total	172	38	22.09

### 3.3 Sex-wise prevalence of *Ehrlichia canis* infection

Much difference in the prevalence of *E. canis* infection in males and females was not observed as it was 22.98 per cent in males and 21.17 per cent females therefore in males there is slight higher prevalence than females as shown in the Table 3. Our findings stand in agreement with the previous studies<sup>[5, 9]</sup>.

**Table 3:** Sex-wise prevalence of *Ehrlichia canis* infection in canines

Sex	Total cases	Positive	Percentage
Male	87	20	22.98
Female	85	18	21.17
Total	172	38	22.09

### 3.4 Breed-wise prevalence of *Ehrlichia canis* infection

German shepherds were found to be having highest prevalence followed by Bakerwali, then Non-descript and Pomeranian and least in Doberman with the values as 40.81 per cent, 37.50 per cent, 25.00 per cent, 14.63 per cent, 10.00 per cent respectively, also mentioned in Table 4. There's variation in breed wise prevalence of Ehrlichiosis in dogs possibly due to variation in breed population in an area as

advocated by previous studies [3, 9]. More susceptibility of German shepherd and Spitz to *E. canis* is attributed to the long hair coat in such breeds [7].

**Table 4:** Breed-wise prevalence of *Ehrlichia canis* infection in canines

Breeds	Total cases	Positive	Percentage
German Shepherd	49	20	40.81
Bakerwali	8	3	37.50
Non-Descript	4	1	25.00
Pomeranian	41	6	14.63
Labrador	60	7	11.66
Doberman	10	1	10.00
Total	172	38	22.09

### 3.5 Season-wise prevalence of *Ehrlichia canis* infection

Prevalence of *E. canis* infection was recorded highest in monsoon followed by post-monsoon, winter, and least in summer with the figures as 35.18 per cent, 27.77 per cent, 14.28 per cent and 13.88 per cent respectively as also depicted in Table 5. Our results are in consonance with the findings of [1, 2, 11]. Monsoon being favourable for the activity of vector population, thus infectivity of canine vector borne diseases therefore there is increased surge in the incidence of the CVBDs in monsoon period followed by the post-monsoon and least in the summer period due to the unfavourable temperature and dry climate resulting in low infection during this period [12].

**Table 5:** Season-wise prevalence of *Ehrlichia canis* infection in canines

Season	Total cases	Positive	Percentage
Monsoon (July-September)	54	19	35.18
Post-Monsoon (October-November)	18	5	27.77
Winter (December- February)	28	4	14.28
Summer (March-June)	72	10	13.88
Total	172	38	22.09

### 4. Acknowledgement

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