

INCIDENCE OF CANINE TICK BORNE BLOOD PARASITES IN CAUVERY DELTA REGION OF TAMIL NADU, INDIA

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Abstract: The present study is reported for the incidence of major canine tick borne haemoparasites in the Cauvery Delta Region of Tamil Nadu, India. A total of 100 canine peripheral blood samples collected from Thanjavur, Trichy, Thiruvarur and Pudukkottai districts (25 samples each) of Cauvery delta region were examined for haemoparasitic infections by conventional Giemsa's staining method. Microscopic examination of blood smears revealed the presence of parasites namely *Babesia gibsoni*, *Babesia canis*, *Ehrlichia canis*, *Hepatozoon canis* and *Anaplasma platys*. Among the total 36 positive haemoprotozoan cases, *B. gibsoni* was the most predominant species (61.11%), followed by *E. canis* (19.44%), *B. canis* (13.88%), *H. canis* (2.78%) and *A. platys* (2.78%). In this study, district-wise analysis showed that Thanjavur recorded the highest incidence, followed by Trichy, Thiruvarur and Pudukkottai. *B. gibsoni* was the predominant haemoprotozoan in all districts, while *A. platys* infection was observed in Thanjavur and *H. canis* in Pudukkottai region. The results indicate that *B. gibsoni* remains the most widespread and endemic haemoprotozoan of dogs in the Cauvery Delta region, underscoring the need for integrated tick control and molecular diagnostic surveillance.

Keywords: *Babesia* spp., Canine haemoparasites, *Ehrlichia canis*, *Hepatozoon canis*, *Anaplasma platys*, Tamil Nadu, Ticks

INTRODUCTION

Canine haemoparasites generally comprise the genera of *Babesia*, *Ehrlichia*, *Hepatozoon*, *Trypanosoma*, *Anaplasma*, and haemotropic *Mycoplasma* are globally important vector-borne pathogens that cause a spectrum of clinical disease in dogs ranging from subclinical infections to severe, life-threatening haemolytic anemia, thrombocytopenia and systemic inflammatory syndromes (Rani *et al.*, 2010). These agents are transmitted primarily by ixodid ticks (for example *Rhipicephalus sanguineus* group and various *Haemaphysalis* spp.) except *Trypanosoma* which is transmitted by biting flies. Haemoparasitic co-infections are common and complicate clinical presentation and diagnosis in animals (Manoj *et al.*, 2020). Tropical and subtropical climate of India with dense stray dog populations and mixed urban–rural

landscapes create favourable conditions for tick survival and year-round transmission of canine tick-borne haemoparasites. Multiple cross-sectional and retrospective studies from different Indian states have documented high and variable prevalence of these pathogens in both owned and stray dog populations, with *Ehrlichia* and *Hepatozoon* often recorded as among the most frequently detected agents (Parthiban *et al.*, 2024) and *Babesia* spp. producing important clinical outbreaks in many regions (Mittal *et al.*, 2019). Molecular surveys have further revealed diversity in circulating strains and frequent co-circulation of multiple lineages.

Regional surveillance is critical because incidence in a particular region, seasonal prevalence over the period, species composition and risk factors show strong spatial heterogeneity: local climate, presence of vectors species, dog management and seasonality all influence the incidence. The Cauvery delta agro-climatic zone of Tamil Nadu is an agriculturally intensive, humid region where people and domestic animals are in frequent contact with peri-domestic vectors; haemoparasites have been documented in livestock in this region (Jayalakshmi *et al.*, 2019) and recent canine-focused molecular data now indicate the presence of *Babesia* spp. in local dog populations (Latchumikanthan *et al.*, 2024). The current study focuses on the incidence of blood parasites among canine population in four districts of Cauvery delta region of Tamil Nadu, India.

MATERIALS AND METHODS

The present investigation on canine haemoprotozoan infections was carried out during the period January'2025 to October'2025 from the dogs clinically suspected for haemoprotozoan infection and presented to the Small Animal Medicine Referral Clinic, Veterinary Clinical Complex, Veterinary College and Research Institute, Orathanadu, Thanjavur, Tamil Nadu Veterinary and Animal Sciences University, Tamil Nadu. The study encompassed dogs originating from Orathanadu block, as well as from various regions of Thanjavur. A total of 25 dog blood samples collected from Thanjavur district. Similarly blood samples were collected from Veterinary Polyclinics located at Trichy, Nagapattinam and Thiruvarur districts which fall under the Cauvery Delta Agro-Climatic Zone, 25 samples in each districts making a total samples as 100 numbers. Thin blood smears were prepared by collecting a drop of blood from the ear vein and were fixed with methanol for 1 minute and stained using Giemsa's stain (1:9 dilution with PBS) for 40 minutes. The stained smears were examined under oil immersion objective lens of compound light microscope for identifying the haemoprotozoan parasites as morphology given by Soulsby (1982).

RESULTS AND DISCUSSION

A total of 36 canine blood samples from different districts of the Cauvery Delta region were found positive for haemoparasitic infections. In this study, microscopic examination of blood smears by Giemsa's staining method detected the haemoparasites namely *Babesia gibsoni* (Fig. 1), *Babesia canis* in RBCs (Fig. 2), *Ehrlichia canis* in monocyte (Fig. 3), *Hepatozoon canis* in neutrophil (Fig. 4) and *Anaplasma platys* in platelets (Fig. 5). Among the total positive samples, *B. gibsoni* was the most common species accounting for 22 cases showing incidence of 61.11% followed by *E. canis* in 7 cases (19.44%), *B. canis* in 5 cases (13.88%), *H. canis* in 1 case (2.78%) and *A. platys* in 1 case (2.78%) (Table.1).

District-wise analysis showed that Thanjavur had the highest number of haemoparasitic infections followed by Trichy, Thiruvarur and Pudukkottai. *Babesia gibsoni* was the predominant species across all districts, with *Ehrlichia canis* and *Babesia canis* occurring less frequently. *Hepatozoon canis* was confined to 1 dog in Pudukkottai, while *Anaplasma platys* was detected in one dog in Thanjavur. Overall, *B. gibsoni* emerged as the predominant haemoparasite across all districts, indicating its widespread endemicity in the Cauvery Delta region. *E. canis* infections were more frequent in Trichy and Thiruvarur, whereas *H. canis* was confined to Pudukkottai and *A. platys* occurred only in Thanjavur.

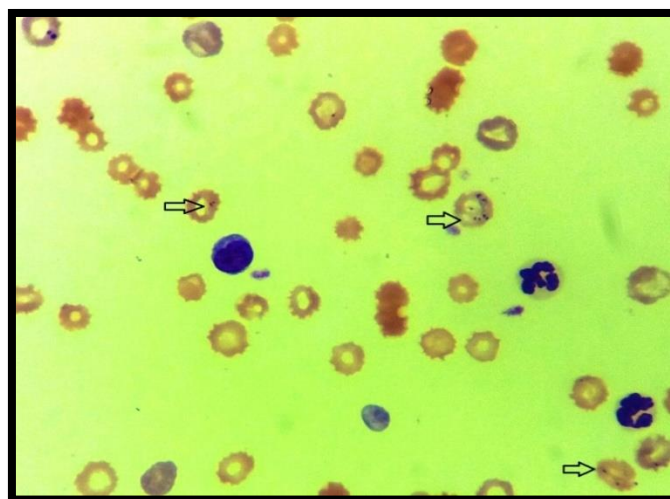


Fig. 1. Dog blood smear showing signet ring shaped piroplasms (arrows) of *Babesia gibsoni* in RBCs - Giemsa's staining (x1000)

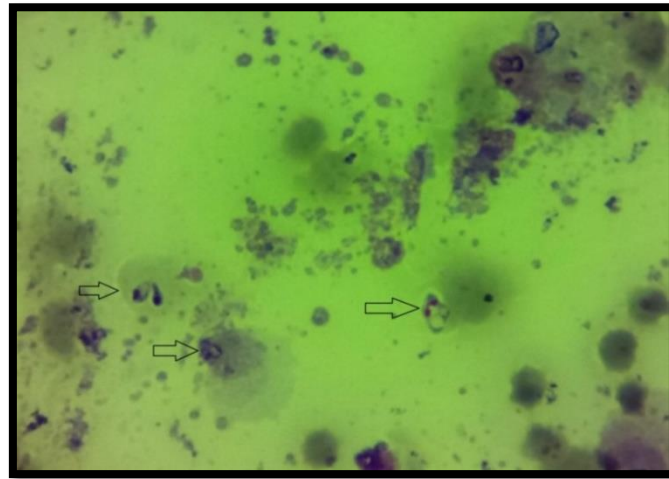


Fig. 2. Dog blood smear showing pear shaped piroplasms (arrows) of *Babesia canis* in a RBC - Giemsa's staining (x1000)

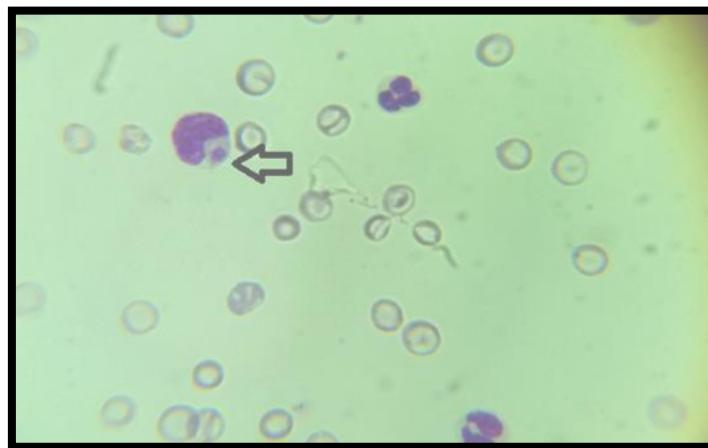


Fig. 3. Dog blood smear showing morula of *Ehrlichia canis* (arrow) in a monocyte - Giemsa's staining (x1000)



Fig. 4. Dog blood smear showing Gelatin capsule shape Gametocyte of *Hepatozoon canis* (arrow) in a Neutrophil - Giemsa's staining (x1000)

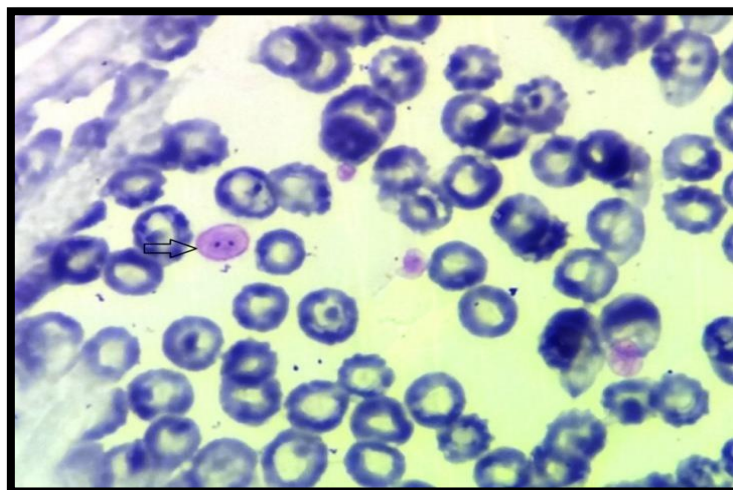


Fig. 5. Dog blood smear showing *Anaplasma platys* colonies in a thrombocyte – Giemsa's staining (x1000)

The present survey of haemoparasites in canines from the Cauvery Delta showed a clear dominance of *Babesia gibsoni* with lesser representation by *Ehrlichia canis*, *Babesia canis* and a single case of *Hepatozoon canis*. *Anaplasma platys* was only sporadically detected in Thanjavur district. This species distribution mirrors findings from other parts of Southern India where *B. gibsoni* is frequently the most commonly reported canine piroplasm (Sahithi *et al.*, 2024), supporting the conclusion that small piroplasms are widely endemic in the region and are a major cause of canine haemo-parasitoses in South India (Jain *et al.*, 2017).

The detection of *E. canis* as the second common agent aligns with an expanding body of molecular evidence showing that canine monocytic ehrlichiosis is endemic across India and often co-circulates with *Babesia* spp. and *Hepatozoon* spp. in areas where the brown dog tick complex (*Rhipicephalus sanguineus*) is abundant (Aziz *et al.*, 2022; Parthiban *et al.*, 2024). Vector ecology and local husbandry practices likely shape the district-level patterns we observed in the study. In tropical and peri-domestic environments like the Cauvery delta, the condition is favourable for survival and propagation of the brown dog tick *Rhipicephalus sanguineus* and various *Haemaphysalis* spp. dominate in dog infestations and are competent or suspected vectors for *E. canis*, *B. canis* and *B. gibsoni* (Latchumikanthan *et al.*, 2024). The focal detection of *A. platys* only in Thanjavur is consistent with other Southern India reports that first documented *A. platys* in Chennai (Dhivya *et al.*, 2017) and nearby areas, suggesting either low-level focal transmission of infectious canine thrombocytopenia.

Table 1. Canine Haemoparasitic Infections in Cauvery Delta Districts by Microscopy

District Name	<i>Babesia gibsoni</i>	<i>Babesia canis</i>	<i>Ehrlichia canis</i>	<i>Hepatozoon canis</i>	<i>Anaplasma platys</i>	Total (n=100)
Thanjavur	8	2	2	0	1	13 (13.0%)
Trichy	5	2	3	0	-	10 (10.0%)
Thiruvarur	5	1	2	1	-	9 (9.0%)
Pudukkottai	4	0	0	0	-	4 (4.0%)
Total positive	22 (61.11%)	5 (13.88%)	7 (19.44%)	1 (2.78%)	1 (2.78%)	36 (36.0%)

(Numbers in parenthesis indicates percentage)

CONCLUSION

The study highlights the predominance of *Babesia gibsoni* as the major canine haemoparasite in the Cauvery Delta region, with sporadic occurrences of *Ehrlichia canis*, *Babesia canis*, *Hepatozoon canis* and *Anaplasma platys*. Thanjavur district showed the highest incidence in comparison to other districts, suggesting favourable conditions for tick proliferation and transmission. The presence of *A. platys* only in Thanjavur corroborates earlier reports of its localized occurrence in Tamil Nadu. These findings emphasize the endemic nature of *B. gibsoni* infection and the importance of continuous monitoring and effective tick vector control to reduce haemoparasitic disease burden in canine populations.

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