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Epidemiology of Canine Haemoprotozoan Diseases in Chennai, India

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ABSTRACT

Background: Haemoprotozoan infections are common in canine in tropical countries. The present work was based on retrospective study of 11,000 blood smears of dogs received over a period of nine years (2010 to 2019) in and around Chennai at Madras Veterinary College Teaching Hospital.

Methods: The year-wise incidence, percentage increase year-wise, season-wise, breed-wise and age-wise prevalence and spatial distribution were recorded from the case reports. Diagnosis was made by whole blood and buffy coat smear examination using Geimsa's stain, wet film examination was done for cases suspected for *Trypanosoma sp.* and PCR for ruling out *Babesia, E.canis* and *Trypanosoma sp.* The collected data were entered into Excel sheets, which were imported and analyzed using Descriptive statistics (frequency and percentage).

Result: On blood smear examination 3,844 blood smears were found to be positive for various Haemoprotozoan diseases. Among the recorded positive Haemoprotozoan diseases, the highest incidence was of *Ehrlichia canis* of 2167 cases (56.37%) followed by *Babesia gibsoni* with 837 cases (21.77%), *Hepatozoan canis* with 399 cases (10.37%), *Babesia canis* with 350 cases (9.10%), *Trypanosoma sp.* With 46 cases (1.19%), Microfilaria with 45 cases (1.12%). The prevalence of Canine Haemoprotozoan diseases were highest in Non-descript Dogs (ND) with 1948 cases (50.67%), Labrador retriever 1665 cases (43.31%), Spitz 909 cases (23.64%), German Shepherd 543 cases (14.12%) and others 219 cases (5.69%) respectively. Maximum number of cases reported were 43.7% in the age group of 2-6 years followed by 38% cases in 0-2 years, 10.58% cases in 6-10 years and 7.51% cases above 10 years of age. Maximum number of cases were recorded during Monsoon season (June to September) with 1337 cases (34.78%) followed by 1001 cases (26.04%) during Summer season (March to May), 838 cases (21.80%) during winter season (December to February) and 668 cases (17.37%) Autumn season (October and November). The percentage change in occurrence of Canine Haemoprotozoan diseases follow the pattern of 2012 (-31.9%), 2013 (-23.11%), 2014 (+19.3%), 2015 (+39.06%), 2016 (+12.05%), 2017 (+104.11%), 2018 (+22.64%) and 2019 (+16.81%). The spatial distribution of the same diseases was plotted in Chennai geographical map. The epidemiological study would help the veterinary physician to identify the trends in occurrence of disease and clinical pattern followed by the protozoa, which helps in treatment and control of haemoprotozoan diseases in dogs.

Key words: Canine, Chennai, Epidemiology, Haemoprotozoan diseases, Percentages, Spatial distribution.

INTRODUCTION

The Indian dog population is estimated at 25 million of which 5 million are pets and the rest 80% are family, community or feral dogs (Megat Abd Rani *et al.,* 2010). Canine haemoprotozoan diseases is the most common threat faced by pet parents in this decade in tropical countries. Most of the haemoprotozoan diseases are transmitted by vectors like ticks and mosquitoes amongst which Canine Ehrlichiosis is the major threat. In Indian Subcontinent, Canine monocytic ehrlichiosis (CME) caused by the obligatory intracellular pleomorphic rickettsia, *Ehrlichia canis*, is considered to be of global importance in canines (Senthil *et al.,* 2020). Another major protozoan disease in canine is Canine Babesiosis caused by two organisms *Babesia gibsoni* and *B. canis* causing disease in ocular, neural and anaemic forms of clinical manifestation. The other haemoprotozoans posing a threat to canine population of Indian-Subcontinent are *Hepatazoan canis, Trypanosoma evansi* and *Dirofilaria imitis.* This distribution change may also be attributed to increase in dog breeding practices, importation of new breeds of dogs and along with it new species of parasites as well. (Vairamuthu *et al.,* 2014).

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MATERIALS AND METHODS

The present work was based on retrospective study of 11,000 blood smears of dogs received over a period of nine years (2010 to 2019) in and around Chennai at Madras Veterinary College Teaching Hospital. The year-wise incidence, percentage increase year-wise, season-wise, breed-wise and age-wise prevalence and spatial distribution were recorded from the case reports. Diagnosis was made by whole blood and buffy coat smear examination using

Geimsa's stain, wet film examination is done for cases suspected for *Trypanosoma sp.* and PCR for ruling out *Babesia, E.canis* and *Trypanosoma sp.* (Coles 1986). The collected data were entered into Excel sheets, which were imported and analyzed using Descriptive statistics (frequency and percentage). The spatial distribution of various canine haemoprotozoan diseases were plotted digitally in Chennai geographical map. The primer used for Polymerase Chain Reaction is depicted below Table 1.

RESULTS AND DISCUSSION

On blood smear examination 3,844 blood smears were found to be positive for various Haemoprotozoan diseases. Among the recorded positive Haemoprotozoan diseases, the highest incidence was of *Ehrlichia canis* of 2167 cases (56.37%) followed by *Babesia gibsoni* with 837 cases (21.77%), *Hepatozoan canis* with 399 cases (10.3%), *Babesia canis* with 350 cases (9.10%), *Trypanosoma sp.* With 46 cases (1.19%), Microfilaria with 28 cases (0.72%), *Mycoplasma sp.* with 10 cases (0.26%) and *H.columbae* with 7 cases (0.18%). The prevalence of Canine Haemoprotozoan diseases were highest in Non-descript Dogs (ND) with 1948 cases (50.67%), Labrador retriever 1665 cases (43.31%), Spitz 909 cases (23.64%), German Shepherd 543 cases (14.12%) and others 219 cases (5.69%) respectively. There is no scientific evidence for breed wise predisposition for haemoprotozoan diseases however the higher numbers of particular breed directly accounts to the breed popularity over the region in a particular period of time (Senthil *et al.,* 2020, Abullahi *et al.*, 1990 and Samradhni *et al.,* 2005).

Maximum cases reported were 43.7% in the age group of 2-6 years followed by 38% cases in 0-2 years, 10.58% cases in 6-10 years and 7.51% cases above 10 years of age. This increased incidence during 0-6 years of age can be accounted for increased activity and vices during young ages leading to increased exposure to vector. However previous studies haven't reported any difference in predisposition of canine haemoprotozoan diseases among based on sex, age and breed or fertility status (Liddell *et al.,* 2003).

Maximum number of cases were recorded during Monsoon season (June to September) with 1337 cases (34.78%) followed by 1001 cases (26.04%) during Summer season (March to May), 838 cases (21.80%) during winter season (December to February) and 668 cases (17.37%) Autumn season (October and November). The reason of higher number of positive cases of Canine Ehrlichiosis during Monsoon season is due to maximum temperature and relative humidity which accounts to the increased tick activity during the period (Bansal *et al.,* 1985).

The percentage change in occurrence of Canine Haemoprotozoan diseases follow the pattern of 2012 (-31.9%), 2013 (-23.11%), 2014 (+19.3%), 2015 (+39.06%), 2016 (+12.05%), 2017 (+104.11%), 2018 (+22.64%) and 2019 (+16.81%). The spatial distribution of the same diseases was plotted in Chennai geographical map (Fig 1-7).

Table 1: Primer used for PCR reactions in experiment.

Parasite	Primers	Amplicon size
Regular PCR primers		
Babesia sp.	Partial 18S rRNA gene	450 bp
	FP- 5′ AGGGAGCCTGAGAGACGGCTACC 3′	
	RP- 5′ TTAAATACGAATGCCCCCAAC 3′	
Ehrlichia canis	Partial 16S rRNA gene	457 bp
	FP- 5′ TTATAGCCTCTGGCTATAGG 3′	
	RP- 5′ CACTTTTAACTTACTAGTCC 3′	
Trypanosoma evansi	Partial VSG gene	257 bp
	TR3 5′ GCGCGGATTCTTTGCAGACGA 3′ (21)	
	TR4 5′ TGCAGACACTGGAATGTTACT 3′ (21)	

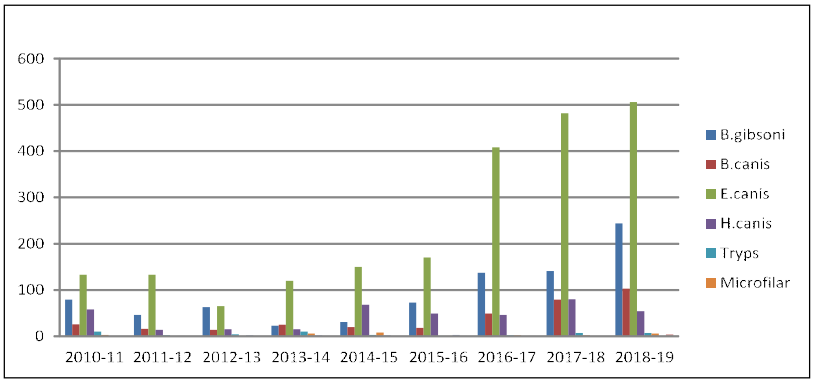


Fig 1: Prevalence of canine haemoprotozoan diseases in Chennai 2010-19.

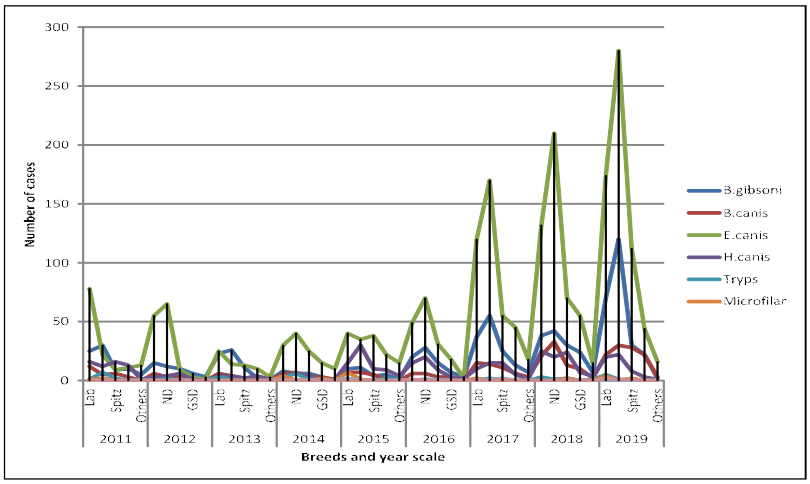
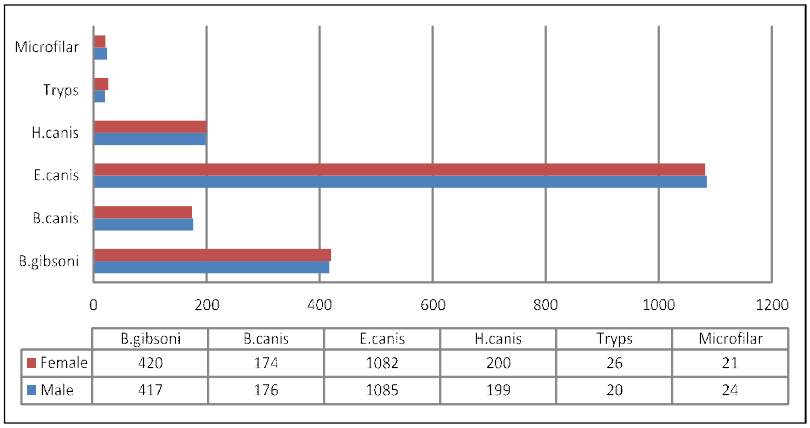


Fig 2: Breed-wise prevalence of canine haemoprotozoan diseases in Chennai from 2010-19.



	B.gibsoni	B.canis	E.canis	H.canis	Tryps	Microfilar
Female	420	174	1082	200	26	21
Male	417	176	1085	199	20	24

Fig 3: Sex-wise prevalence of canine haemoprotozoan diseases in Chennai 2010-19.

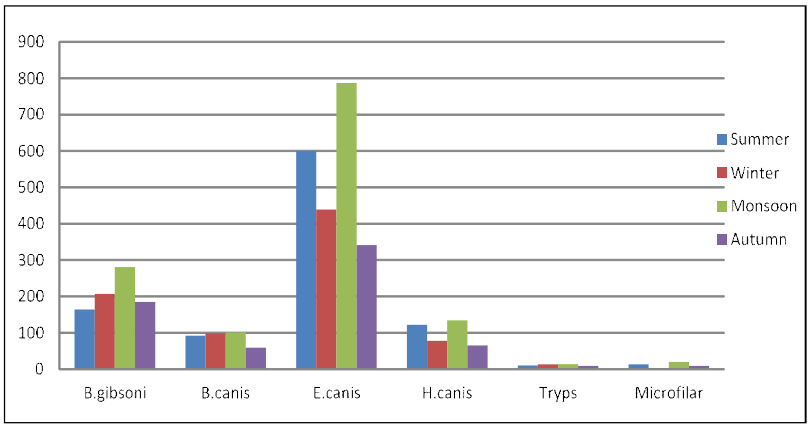


Fig 4: Season-wise prevalence of canine haeamoprotozoan diseases in Chennai from 2010-19.

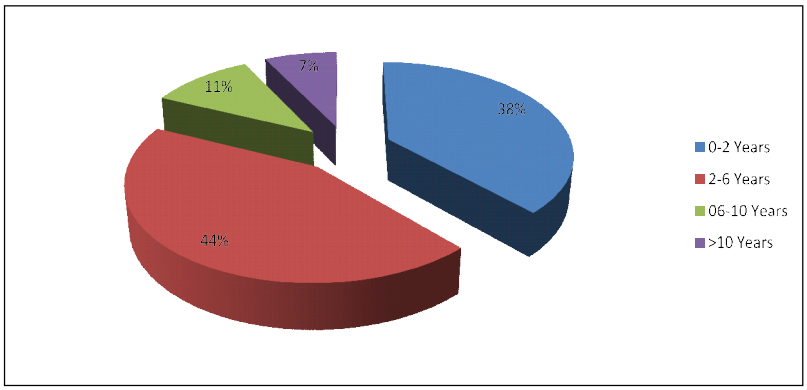
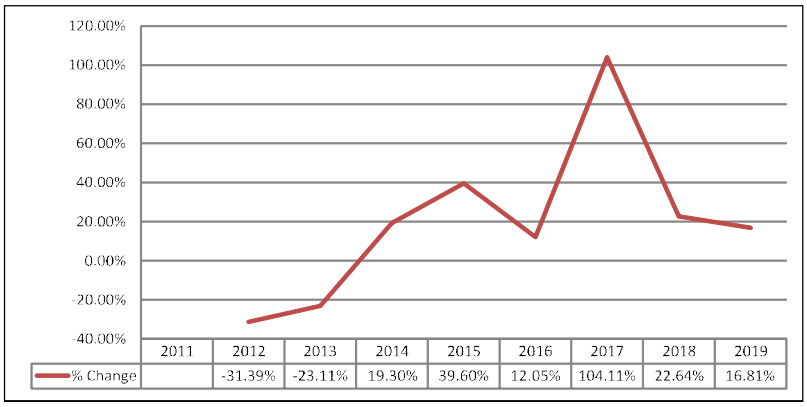


Fig 5: Age-wise prevalence of canine haemoprotozoan diseases in Chennai 2010-19.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
% Change		-31.39%	-23.11%	19.30%	39.60%	12.05%	104.11%	22.64%	16.81%

Fig 6: % Change in prevalence of Canine Haemoprotozoan diseases in Chennai 2010-19.

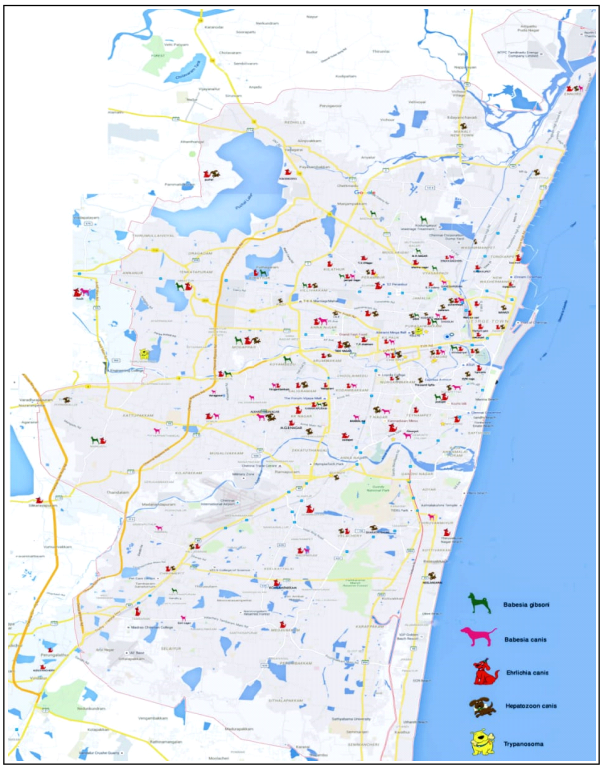


Fig 7: Spatial Distribution of Canine Haemoprotozoan diseases in Chennai (2010-19).

CONCLUSION

The epidemiological study would help the veterinary physician to identify the trends in occurrence of disease and clinical pattern followed by the protozoa, which helps in treatment and control of haemoprotozoan diseases in dogs. The spatial distribution attempted in this study would help to narrow down the diagnostic aspects of the haemoprotozoan disease by the veterinarian to certain extent. Thus reterospective studies must always conducted to record the disease pattern of particular pathogen in specific areas over a specified period of time and published so it serves as a guide for practicing veterinarian over particular locality.

REFERENCES

Abullahi, S.U., Mohammad, A.A. and Trimnell, A.R. (1990). Clinical and haematological finding in 70 naturally occurring cases of canine babesiosis. J. Small Anim. Practice. 31: 145-147.

Bansal, S.R., Gautam, O.P. and D.P. Banerjee (1985). Prevalence of *Babesia canis* and *Hepatozoan canis* infection in dogs of Hissar (Haryana) and Delhi and attempts to isolate Babesia from human being. Indian Vet. J. 62: 748-751.

Coles, E.H. (1986). Veterinary Clinical Pathology. 4th ed. WB Saunders Company London, UK, PP: 46-47.

Liddell, A.M., Stockham, S.L., Scott, M.A. Sumner, J.W. Paddock, C.D., Gaudreault-Keener, M., Arens, M.Q. and Storch, G.A. (2003). Predominance of *Ehrlichia ewingii* in Missouri Dogs. J. Clin. Microbiol. 41: 4617-4622.

Megat Abd Rani, P.A., Irwin, P.J., Gatne, M., Coleman, G.T., Traub, R.J. (2010). Canine vector-borne diseases in India: A review of literature and identification of existing knowledge gaps. Parasit Vectors. 3: 28.

Samaradni, D., Maske, D.K., Shobha, R. and Shinde, P.N. (2005). Bionomics and haemodynamics in blood protozoal infections in dogs from Nagpur (M.S.). Indian J. Anim. Health. 44: 57-66.

Senthil, N.R., Chakravarthi, R. and Vairamuthu, S. (2020). Epidemiology of Canine Ehrlichiosis from 2010-19 in Chennai, India (2020). The Pharma Innovation Journal. 9(8S): 01-03.

Vairamuthu, S., Ranju, R.S., Bhaskaran Ravi Latha, Dhivya, B. and Balachandran, C. (2014). A six year (2006-2011) retrospective study of hemoprotozoan parasites affecting dogs in Chennai, Tamil Nadu, India. J. Parasit. Dis. 38(2): 193-195.