



ISSN: 2456-2912

NAAS Rating (2025): 4.61

VET 2025; 10(10): 92-95

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www.veterinarypaper.com

Received: 05-07-2025

Accepted: 09-08-2025

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Prevalence of intracellular hemoprotozoal diseases in large ruminants in Banaskantha District, Gujarat, India

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DOI: <https://www.doi.org/10.22271/veterinary.2025.v10.i10b.2611>

Abstract

The seasonal incidence of haemoprotozoal diseases in large ruminants was investigated by analyzing 46,724 blood smears collected from multiple veterinary sub-centres in Banaskantha district, Gujarat, spanning March 2020 to February 2023. Blood samples were obtained from large ruminants, including cattle and buffaloes showing tick infestation and other clinical signs, for haemoparasite screening. Examination of field-stained blood smears using conventional optical microscopy revealed infection rates of 42.82%, 38.73%, and 40.51% in the years 2020-21, 2021-22, and 2022-23, respectively, with haemoprotozoan parasites such as *Anaplasma marginale*, *Babesia bigemina*, and *Theileria annulata*. The study documented a higher occurrence of haemoprotozoal diseases in large ruminants during the summer and monsoon seasons. Specifically, 6,965 out of 16,267, 6,078 out of 15,694, and 5,981 out of 14,763 blood smears tested positive for haemoprotozoal infection during 2020-21, 2021-22, and 2022-23, respectively. Notably, the incidence of theileriosis (16.6%, 15.45%, and 16.85%) exceeded that of anaplasmosis (16.15%, 11.1%, and 12.29%) and babesiosis (4.7%, 5.33%, and 5.45%) across the corresponding years. In addition, the study emphasized a thorough review of relevant literature from databases such as Google Scholar, ScienceDirect, and PubMed, using standardized keywords including tropical theileriosis, haemoprotozoan, North Gujarat, and prevalence. These articles were thoroughly examined to update understanding, obtain fresh perspectives, and raise new questions about these diseases.

Keywords: Banaskantha, haemoprotozoal, *Anaplasma marginale*, *Babesia bigemina*, *Theileria annulata*

Introduction

Haemoprotozoan infections are prevalent among large ruminants and result in substantial losses for the livestock sector globally. The combination of widespread infection and inadequate management practices contributes to significant economic impacts (Ayadi *et al.* 2016; Kerario *et al.* 2018; Elsheikha *et al.* 2019) [2, 8, 3]. Ticks serve as principal vectors for multiple diseases affecting both animals and humans, ranking as critical disease carriers after mosquitoes. Marked seasonal variations are evident in the occurrence of blood parasite-caused diseases in large ruminants, with environmental factors such as rainfall, temperature, and relative humidity playing crucial roles in tick infestation and proliferation. Studies report that indigenous breeds tend to demonstrate greater resistance to certain infections, even without specialized management, and are generally less susceptible to protozoan diseases than crossbred cattle (Ghosh *et al.*, 2018) [4].

The incidence of haemoprotozoan diseases peaks during the monsoon season, as the warmth and humidity during this period promote tick proliferation and enhance parasite transmission (Vahora *et al.*, 2012) [17]. Heavy tick infestations result in considerable blood loss, leaving cattle weakened and stunted. Ticks are recognized as a significant threat, causing not only stress and hypersensitivity but also reducing skin value, inducing immunodepression, weight loss, and tick-induced toxicosis in cattle (Lorusso *et al.*, 2013) [9]. They commonly infest regions with rich blood supply, such as the inguinal or groin areas and external genitals, where thinner and shorter hair allows for easier penetration of tick mouthparts into the vascular skin.

(Sajid, 2007) [14]. Globally, dairy cattle continually contend with infectious threats (Haque *et al.* 2018; Pervez *et al.* 2018) [5, 11], among which Bovine Theileriosis (BTH) is considered the most impactful parasitic disease (Jenkins, 2018) [7].

The current study documented the month-wise prevalence of *Theileriosis*, *Babesiosis* and *Anaplasmosis* in large ruminants, primarily diagnosed through clinical observations and microscopic examination. Tropical theileriosis tends to be more severe in exotic and crossbred cattle (*Bos Taurus*) than in indigenous cattle (*Bos indicus*), reflecting differences in breed susceptibility. *Theileria annulata* was first identified in Transcaucasian cattle in 1904, initially named *Piroplasma annulatum*, but was later reclassified as *T. annulata* following the discovery of its schizont stage in its life cycle (Weir, 2006) [18]. Among the various species, *T. annulata* is considered the most pathogenic and is the predominant species reported in India (Spickler, 2010) [16]. The primary vector responsible for transmitting *Theileria* infections is the *Hyalomma* tick, accounting for approximately 80% of transmission cases. Additionally, the pooled prevalence estimate for *B. bigemina* infection in India is higher at 7%, compared to *B. bovis*, which has a prevalence of about 1% (Jacob *et al.*, 2022) [6].

Material and Methods

All animals were clinically examined to record various physiological parameters such as body temperature, the color of the conjunctival and vaginal mucous membranes, and any enlargement of superficial lymph nodes before sample collection. Approximately 5 ml of blood was aseptically drawn from the jugular vein into K₃EDTA tubes. Thin blood smears were prepared from these samples and examined under a microscope at 100× magnification using an oil immersion lens to detect haemoprotozoan parasites, following

the procedure described by Soulsby (1982) [15]. The blood samples were collected from clinical cases attended by veterinary officers at different centers, exclusively by the Banas Dairy veterinary staff, from large ruminants exhibiting severe tick infestations and other clinical signs; therefore, no separate ethical approval was required. The study was conducted in the Banaskantha district of Gujarat, covering four talukas Palanpur, Vadgam, Amirgadh and Danta between March 2020 and February 2023. A total of 46,724 blood samples were collected from large ruminants across these regions. The collected blood samples were used to prepare thin smears, which were fixed with absolute methanol, stained using the field stain method, and examined under a 100× oil immersion microscope for the detection of haemoprotozoan organisms.

Results and Discussion

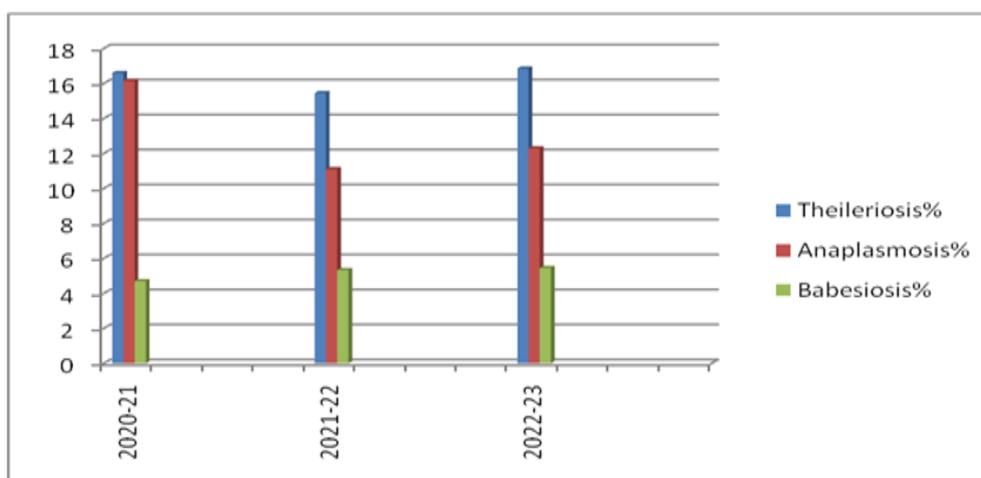
Seasons: The incidence of disease was compared across four seasons summer, monsoon, post-monsoon and winter following the standard seasonal classification provided by the Indian Meteorological Department (IMD), Government of India.

Season	Months
Summer	March, April, May
Monsoon	June, July, August, September
Post Monsoon	October, November
Winter	December, January, February

Theileriosis and babesiosis were most prevalent in the monsoon, followed by summer, with lower rates in winter and post-monsoon. Anaplasmosis peaked in monsoon, then post-monsoon and winter. Mixed infections were highest in the monsoon (Table 1).

Table 1: Data analysis of haemoprotozoal infection cases in large ruminants in Banaskantha district during the year 2020-23

Year	Seasons	Theileriosis	Babesiosis	Anaplasmosis	Mixed Infection	Negative For Haemoprotozoal Disease	Total Blood Smear Examined
2020-21	Summer	660	68	376	94	2032	3248
2020-21	Monsoon	1266	362	1032	330	4110	7139
2020-21	Post Monsoon	394	119	568	173	1420	2698
2020-21	Winter	380	213	652	278	1635	3182
2021-22	Summer	557	256	366	329	2805	4324
2021-22	Monsoon	1113	312	627	418	3391	5870
2021-22	Post Monsoon	455	115	382	183	2040	3204
2021-22	Winter	300	153	366	146	1325	2296
2022-23	Summer	556	213	393	174	2502	3856
2022-23	Monsoon	1199	289	618	267	3972	6360
2022-23	Post Monsoon	367	135	341	172	948	1971
2022-23	Winter	366	167	462	262	1307	2576



- In the study from March 2020 to February 2023, 46724 large ruminants were included from the four talukas of Banaskantha district. Based on clinical symptoms, 2700, 2425 and 2488 (16.6%, 15.45% and 16.85%) cases were suspected of Theileriosis, 762, 836, and 804 (4.7%, 5.33% and 5.45%) cases were suspected of Babesiosis, 2628, 1741 and 1814 (16.15%, 11.1% and 12.29%) cases were suspected of Anaplasmosis infection. Out of them, 27,487 (58.83%) samples were found negative for haemoprotozoan in blood smear examination.
- Year-wise incidence of haemoprotozoal infection cases in large ruminants in Banaskantha district during the years 2020 to 2023, showing that the incidence of Theileriosis is found to be higher, followed by Anaplasmosis and Babesiosis in each year. Cases of babesiosis were increased every year, but Incidence of Theileriosis was increased only in the last year & Anaplasmosis incidence was decreased during the last two years.
- Higher incidences of haemoprotozoal diseases in large ruminants are reported during June to September, which is in accordance with the observation made by Radostits *et al.* (1994) ^[12], Vahora *et al.* (2012) ^[17], Roy *et al.* (2004) ^[13], and Ananda *et al.* (2009) ^[1]. They found the highest prevalence of haemoprotozoal infection in monsoon months.
- The high prevalence in the monsoon season might be due to the high tick population in the hot and humid environment. The incidence of theileriosis was not seasonal but occurred irregularly throughout the year due to the prevailing macroclimate, which is needed to spread the disease (Palanivel *et al.*, 2006) ^[10].
- Prophylactic measures, vaccination, tick eradication, selection of tick-resistant cattle breeds, chemotherapy, immunization, etc.

Conclusion

The study detailed the distribution of haemoprotozoan infections in large ruminants in Banaskantha district, highlighting an increasing disease prevalence in Gujarat that challenges existing haemoprotozoa and tick control strategies. With climate change threatening to expand tick habitats, a reassessment of tick control measures is urgently needed. The investigation assessed factors influencing tick disease outbreaks, emphasizing their significant economic impact on cattle farmers through mortality, reduced productivity, and higher medical costs. Since many farmers rely on cattle as a safety net during crises like crop failure, their welfare must be prioritized. Effective control measures addressing both abiotic and biotic factors are essential to mitigate tick-borne diseases. Understanding seasonal disease dynamics can support early warning systems to lessen risks in livestock rearing. Future policies should target controlled crossbreeding, closely monitored medication programs, and robust tick control strategies to reduce disease prevalence.

Suggestions

- Haemoprotozoal disease mainly occurs due to ticks, so we should scientifically conduct a tick control program.
- Nowadays, Resistance is found against routinely used acaricidal drugs like deltamethrin & cypermethrin, so we should use other drugs for tick control.

Acknowledgments

The facilities provided by Managing Director Shree, Banaskantha District Co-operative Milk Producers' Union Ltd., are highly appreciated

Conflict of Interest

Not available

Financial Support

Not available

Reference

1. Ananda KJ, D'Souza PE, Puttalakshamma GC. Prevalence of haemoprotozoan diseases in crossbred cattle in Bangalore North. *Vet World*. 2009;2(1):15-6.
2. Ayadi O, Gharbi M, Elfegoun MCB. Milk losses due to bovine tropical theileriosis (*Theileria annulata* infection) in Algeria. *Asian Pac J Trop Biomed*. 2016;6:801-2.
3. Elsheikha H. Management of ticks and tick-borne diseases: Challenges and opportunities. *Vet Nurse*. 2019;10:60-3.
4. Ghosh S, Patra G, Borthakur KS, Behera P, Tolenthomba TC, Deka A, *et al.* Prevalence of haemoprotozoa in cattle of Mizoram, India. *Biol Rhythm Res*. 2020;51(1):76-87.
5. Haque AS, Masood S, Akbar H. Prevalence of *Neospora caninum* using milk and serum ELISA and its hematological effect in dairy buffaloes. *Pak Vet J*. 2018;38:281-5.
6. Jacob SS, Sengupta PP, Krishnamoorthy P, Suresh KP, Patil SS, Chandu AGS, *et al.* Bovine babesiosis in India: Estimation of prevalence by systematic review and meta-analysis. *Exp Parasitol*. 2022;239:108318.
7. Jenkins C. Bovine theileriosis in Australia: a decade of disease. *Microbiol Aust*. 2018;39:215-9.
8. Kerario II, Simuunza M, Laisser EL, Chenyambuga S. Exploring knowledge and management practices on ticks and tick-borne diseases among agro-pastoral communities in Southern Highlands, Tanzania. *Vet World*. 2018;11:48-57.
9. Lorusso V, Picozzi K, Bronsvort DBMC, Majekodunmi A, Dongkum C, Balak G, *et al.* Ixodid ticks of traditionally managed cattle in central Nigeria: where *Rhipicephalus (Boophilus) microplus* does not dare (yet?). *Parasites Vectors*. 2013;6:171.
10. Palanivel KM, Ganpathy S, Nedunchellian S. Seroprevalence of theileria infection in crossbred calves. *Indian J Field Vet*. 2006;2:30-2.
11. Pervez A, Anjum FR, Bukhari AA, Anam S, Arshad MI. Isolation and virulence genes characterization of diarrheagenic *Escherichia coli* from calves. *Pak Vet J*. 2018;18:133-6.
12. Radostits OM, Blood DC, Gay CC. *Veterinary Medicine: A textbook of the diseases of cattle, sheep, pigs, goats, and horses*. 8th ed. London: ELBS Baillière Tindall; 1994.
13. Roy S, Tiwari A, Galdhar CN, Upadhyay SR, Ratre HK, SK, *et al.* *Indian J Vet Med*. 2004;24:5-7.
14. Sajid MS. Epidemiology and acaricidal resistance of tick population infesting domestic ruminants [Ph.D. Thesis]. Faisalabad (Pakistan): University of Agriculture; 2007.
15. Soulsby EJJ. *Helminths, arthropods and protozoa of domesticated animals*. 7th Ed. London: Bailliere Tindall; 1982, p. 729-735.
16. Spickler AR, Roth JA, Dvorak G. Emerging and exotic

diseases of animals. 4th Ed. Iowa (USA): CFSPH, Iowa State University; 2010, p. 283-285.

17. Vahora SP, Patel JV, Parel BB, Patel SB, Umale RH. Seasonal incidence of haemoprotozoan disease in crossbred cattle and buffalo in Kaira and Anand districts of Gujarat, India. *Vet World*. 2012;5(4):223-5.
18. Weir W. Genomic and population genetic studies on *Theileria annulata* [Ph.D. Thesis]. Scotland (UK): University of Glasgow; 2006.

How to Cite This Article

Mevada RB, Patel RM, Patel HM, Mansuri SM. Prevalence of intracellular hemoprotozoal diseases in large ruminants in Banaskantha District, Gujarat, India. *International Journal of Veterinary Sciences and Animal Husbandry*. 2025;10(10):92-95.

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