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Research Article

# OCCURRENCE OF BLOOD PROTOZOAN IN NATIVE CROSSBRED COWS OF KASHMIR VALLEY

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**Abstract:** The study of 197 clinically suspected native crossbred cows of Kashmir Valley were examined to identify the blood protozoan infections among them. Out of 197 samples screened, 23 cases were found positive for one or other blood protozoa with occurrence of 11.67%, out of which 19 cases (9.64%) accounted for babesiosis, 3 cases (1.52%) for theileriosis and 1 case (05.1%) for anaplasmosis. Animals suffered more during warmer seasons, recording highest incidence of 16.676% for summer followed by 8.69%, 7.50% and 4.67% in Autum, Spring and Winter season respectively. Among 23 positive animals 19 (82.60%) were above 5 years of age and remaining 4 (17.40%) aged between 2 to 4 years. Treatment with Buparvaqunone for theileriosis, Diamazene aceturate for babesiosis and Oxytetracycline for Anaplasmosis with supportive therapy was found to be highly effective. Present observations constitute the first report on the presence of vector borne blood protozoan diseases in native crossbred cows of Kashmir valley.

**Keywords:** *Babesia, Theileria, Kashmir Valley, Occurrence*

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## Introduction

In India blood protozoan diseases inflict great economic losses to the livestock industry by causing mortality and decline in production capacity of the animals. *Theileria* spp., *Babesia* spp. and *Anaplasma* spp. are the most common blood protozoan of livestock. These parasites are transmitted by arthropod vectors such as ticks and flies. The high prevalence of tick borne diseases usually occurs during hot and humid climate as the tick infestation and their population is influenced by temperature, rainfall and relative humidity [1, 2, 3]. Blood protozoan diseases in crossbred cattle have been reported from different geographical regions of the country with prevalence rate of 45.4% for theileriosis in Uttarakhand [4], 37% for theileriosis, 10.41% for babesiosis and 2.82% for anaplasmosis in Gujarat [5], 16% and 0.6%, for *babasia* and *theilaria* respectively in Kerala [6], 74% in Orisha [7]. Perusal of the literatures indicate that tick born blood protozoan diseases in Kashmir Valley used to be encountered sporadically in the dairy cows recently imported from the neighbouring state of Punjab, Haryana and Himachal Pradesh where prevalence of such diseases in cattle has been reported to be about 60.00% , 27.88% and 29.56% respectively [8 – 10]. Such imported animals would have been incubating the infection that could later flair up due to the transient stress. The incidence of the tick borne blood protozoan diseases among the native crossbred cattle of Kashmir has been almost negligible during the past years. But in the recent time there has been increase in temperature due to global warming and valley too has observed a climatic alteration that favoured the proliferation of vectors leading to increase in the prevalence of vector borne diseases. Present communication elucidates the prevalence of blood protozoan diseases in native crossbred cattle of Kashmir Valley and constitutes the first report on such study.

## Materials and Methods

A total of 197 clinical cases of native cross breed cattle exhibiting clinical signs of pale conjunctival mucus membrane, pyrexia, with or without haematuria or enlarged superficial lymph nodes were screened for blood protozoan infections during the period of one year (September 2017 to August 2018). Blood collected from ear tip of suspected crossbred cattles of various areas of Kashmir valley was used to prepare peripheral blood smear. Subsequently methanol was used to fix the blood smears for 5 minutes and then stained by using Giemsa's stain for 30 minutes and observed under oil immersion lens (1000x magnification) for presence of haemoprotozoan. These samples were screened at Disease Investigation Laboratory Srinagar. The parasites were identified on the basis of characteristic morphology. Even the presence of a few piroplasms was considered to be positive. The occurrence rate of blood protozoan was calculated in percentage with respect to age group of animals and season of the year. The efficacy of the drugs includes Oxytetracyclin, Buparvaquone and Diminazine aceturate were also studied at standardized dosages.

## Results

Out of 197 samples screened during the course of study 23 cases were found positive for one or more blood protozoan infections recording an overall incidence rate of 11.67%. Out of which 19 cases (9.64%) accounted for babesiosis, 3 cases (1.52%) for theileriosis and 1 case (5.1%) for anaplasmosis [Fig-1-3][Table-1].

Table-1 Species wise occurrence of haemoprotozoan

| Types of haemoprotozoan | Total number of sample | Number of positive cases | Percent positivity (%) |
|---|---|---|---|
| *Babesia* spp. | 197 | 19 | 9.64 |
| *Theileria* spp. | 197 | 03 | 1.52 |
| *Anaplasma* spp. | 197 | 01 | 0.51 |

Animals suffered more during warmer seasons recording highest positive in summer (16.676%) followed by Autum (8.69%), Spring (7.50%) and Winter (4.67%) season [Table-2]. The animals which were positive for theileriosis were treated with a single dose of buparvaqunone @ 2.5mg/kg b.wt. through intramuscular route along with long acting oxytetracyclin (Intamycin-LA) @ 20 mg/kg b.wt. as a single dose. The animals positive for babesiosis were treated with diminazene aceturate @ 1gm/100kgb.wt. i/m.

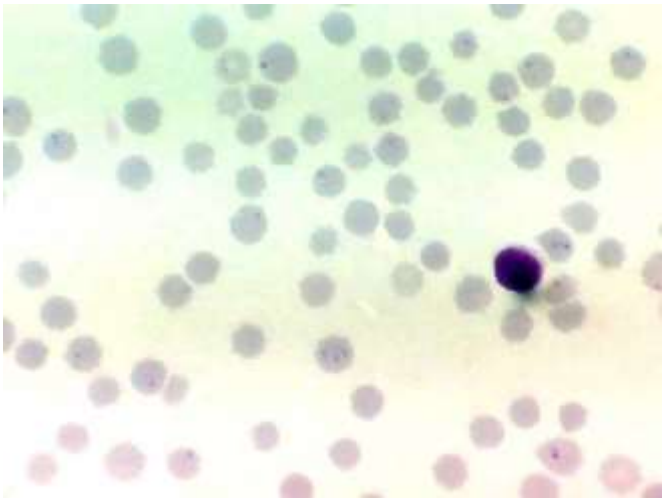

Fig-1 Photomicrograph of the blood smear showing piroplasm of *Theileria* spp. in the RBCs (Leishman's Stain, 1000x)

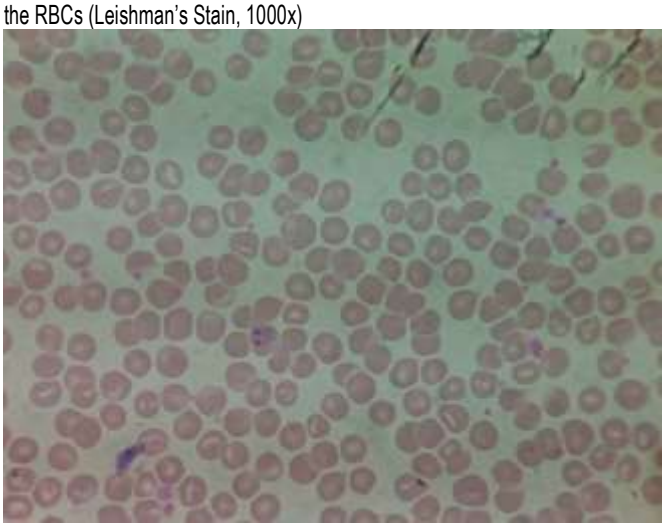

Fig-2 Photomicrograph of the blood smear showing piroplasm of *Babesia* spp. (Leishman's Stain, 1000x)

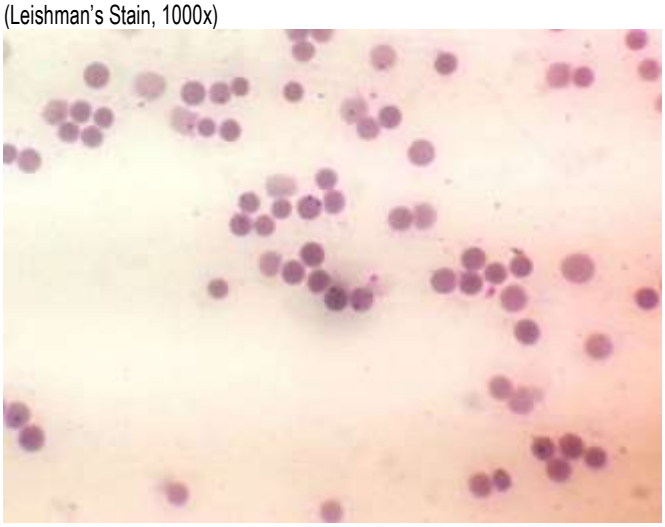

Fig-3 Photomicrograph of the blood smear showing *Anaplasma* spp. (Giemsa stain, 1000x)

The supportive treatment of Imferon-10ml, Belamyl-12ml and stadren-10ml i/m,were given for both type of cases. Moreover, animals positive for anaplasmosis were treated with long acting oxytetracyclin (Intamycin-LA) @ 20 mg/kg b.wt. as a single dose and repeated after 7 days. All the treated cases were followed for 1 month after treatment through telephonically and found improvement in all the treated cases.

Table-2 Season wise occurrence of haemoprotozoans

| Season | Total number of animals screened | Number of animals positive for haemoprotozoan | Percent positivity (%) |
|---|---|---|---|
| Spring (March April, May) | 40 | 03 | 7.5 |
| Summer (June, July, August) | 90 | 15 | 16.66 |
| Autum (September, October, November) | 46 | 04 | 8.69 |
| Winter (December, January, February) | 21 | 01 | 4.67 |
| Total | 197 | 23 | 11.67 |

## Discussion

Present finding corroborates with the observations made by earlier researcher [11], who recorded highest prevalence in summer months. Higher prevalence of diseases during warmer seasons might be attributed to the higher temperature and humidity that favors the proliferation of vectors leading to the higher occurrence of vector borne diseases. Among 23 positive animals, 19 (82.60%) were above 5 years of age and remaining 4 (17.40%) aged between 2 to 4 years. This observation falls in line with the earlier reports [12]. Most of the cross-breed cows aged above 5 years were in the stage of third or fourth lactation as peak milk yielders. The weakening of immunity during high milk yielding stage coupled with genetic makeup and seasonal stress could be reason for high susceptibility to the Blood protozoan infections [13]. The incidence of vector borne blood protozoan diseases was not previously reported in the native crossbred and indigenous cattle of Kashmir Valley. However, sporadic cases of such infections have been reported in animals (carriers) imported from the neighbouring states where these diseases are highly prevalent. Defined by its geographical location, Kashmir valley in fact had a moderate climate which could be described as cool in Spring and Autum, mild in Summer and cold in winter, thus valley did not have endemic tick species capable of transmitting blood protozoan diseases among the animals. Import of animals from the disease prevalent states has been on rise since last few years providing a flip to ingress of vectors into valley. Secondly, the temperature on average has shown rise of 1.45 0C in Kashmir during last two decades [14]. Consequently, valley has observed long heat spells and change in precipitation patterns. Warmer temperatures might have induced suitability of valleys climate for invasive vector species that might have increased the chances of survival of the invasive vectors in the valley and interns their capability to spread the Blood protozoan diseases among the native livestock reported in the present study as reported earlier that increased temperatures reduces the restriction on insect distribution and allowed them to flourish in the areas previously not fit for their survival which resulted in extension of geographical range of vector borne diseases to the areas they were not present earlier [15].

## Conclusion

From present observations and other relevant reports, it can be inferred that Kashmir valley tends to become endemic zone for vector borne haemoprotozoan diseases. A detailed study with diversified parameters on the type of blood protozoans and vector species involved needs to be carried out. To control the spread of disease special focus needs to be laid on tick control measures at farm and field level and awareness among the people for the same need to increase.

**Application of research:** Research can be used for diagnosis and treatment of blood protozoan infection in cattle.

**Research Category:** Veterinary Science

**Abbreviations:** body weight (b.wt). Intra muscular ( i/m)

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Research project name or number: Research station trials

**Author Contributions: All author equally contributed**

**Author statement:** All authors read, reviewed, agree and approved the final manuscript

**Conflict of Interest: None declared**

**Sample Collection:** Clinically suspected native crossbred cows of Kashmir Valley, Animal Husbandry Department, Srinagar, 190 019

**Ethical approval:** Ethical approval taken from Animal Husbandry Department, Srinagar, 190 019.

**Ethical Committee Approval Number: Nil**

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