RESEARCH ARTICLE

Prevalence of Haemoprotozoan Infection in Gir Cattle in and around Junagadh, Gujarat

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Abstract

The study was carried out on a total of 250 Gir cattle, which covered those presented to the Veterinary Clinical Complex of the College in Junagadh (Gujarat) for therapeutic measures and some from Gaushala near to Junagadh region. The animals were screened for common hemoprotozoan infection based on blood smear examination to record the prevalence rate of infection. The overall prevalence of hemoprotozoan infections recorded on the basis of microscopic examination of blood smears was 35.20 %. Out of these, 64 (25.60%) were positive for *Theileria spp.*, 20 (8%) for *Babesia spp.*, and 4 (1.6%) for *Anaplasma spp.* the highest prevalence was recorded in April (64.70%), followed by March (57.14%) and February (42.85%). The lowest prevalence was recorded in the month of December (5.88%). The highest prevalence was recorded in the summer season (40.71%), followed by rainy (34.37%) and winter season (19.56%). The highest prevalence of hemoprotozoan infection (41.86%) was recorded in Gir cattle of 3 to 8 years age group followed by 32.35% in 6 months to 3 years age group, and the lowest prevalence was recorded (24.32%) in older animals 8 years and above age group.

Keywords: Age, Gir cattle, Haemoprotozoan infection, Prevalence, Season.

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Introduction

Tick-borne diseases (TBD) affect 80% of the world's cattle population and are a significant threat to global food security. Continuous change in climatic conditions in the past few decades resulting in high environmental temperature and humidity has favored tick multiplication and thereby a gradual surge in the incidence of tick-borne menace (Kohli *et al*., 2014). Increased population and introduction of the exotic/crossbred cattle population, especially in the endemic areas, has magnified susceptibility to hemoprotozoan infection. Haemoprotozoan infection causes heavy losses due to mortality, decreased production, and lowered the working efficiency of infected animals. Cross-breeding increases the susceptibility of vector-borne hemoprotozoan diseases. The agro-ecological and geo-climatic conditions of the Indian region are highly favorable for growth and multiplication of ticks, which act as natural vectors of disease transmission. The hot and humid climate is highly favorable for the development and survival of ticks (Kohli *et al*., 2014). In India, cattle and buffaloes are frequently heavily infested with different species of ticks, which, apart from transmitting diseases such as theileriosis, babesiosis, and anaplasmosis, also cause extensive damage to the livestock health and production. This study was aimed to know the prevalence of hemoprotozoan infection in Gir cattle in and around Junagadh in Gujarat.

Material and methods

The study was carried out around the year from May 2018 to April 2019. A total of 250 Gir cattle of different age groups were screened for common haemoprotozoan infections, which included those presented at the VCC of the College of Veterinary Science and AH, JAU, Junagadh (Gujarat) and some were also sampled from Gaushala near to Junagadh region. Peripheral blood smears were prepared and fixed with methanol. All blood smears were stained by using Giemsa stain and observed under a microscope for the detection of haemoprotozoan infection. The age and month/season-wise percent prevalence of haemoprotozoan infection was then calculated.

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Result and discussion

The overall prevalence of haemoprotozoan infection recorded based on microscopic examination of blood smears was 35.20 %. Out of these, 64 (25.60%) animals were positive for *Theileria spp.*, 20 (8%) for *Babesia* spp. and 4 (1.6%) for *Anaplasma* spp. (Table 1). None of the case was found positive for *Trypanosoma* spp. The present overall prevalence of theileriosis recorded as 25.6 % was in the range of 20 to 40 % reported by previous workers (Kohli *et al.,* 2014; Ananda and Adeppa, 2016; Madhukar *et al.,* 2016; Maharana *et al*., 2016; Naik *et al.,* 2016; Dadhich *et al.,* 2017).

Month wise prevalence of hemoprotozoan infections is given in Table 2. The highest prevalence was recorded in the month of April (64.70%) followed by March (57.14%) and February (42.85%), and the lowest prevalence was in the month of December (5.88%). Among the total cases, the highest frequency was found in the June, followed by May and the lowest in December, which can be attributed mainly to the monthly cases examined, which varied a lot in our study.

Season wise prevalence of hemoprotozoan infections revealed the highest prevalence in summer (40.71%) season followed by rainy (34.37%) and winter season (19.56%). Among the total cases also, the same trend of seasonal occurrence of disease was noted (Table 3). Shekhar and Haque (2007) and Chaudhri *et al*. (2013) also reported maximum incidence in summer followed by rainy season, and minimum in winter, and stated that the disease was related to hot and humid climate and higher infectivity of vector ticks. Kumar *et al*. (2015) opined that theileriosis spread more in hot and humid weather. However, Safieldin *et al.* (2010) did not observe the effect of the season to be significant on the occurrence of blood parasites infection.

The highest prevalence of hemoprotozoan infection (43.20%) was recorded in Gir cattle of 3 to 8 years of age group, followed by 32.35% in 6 months to 3 years age group. The lowest prevalence was recorded (24.32%) in 8 years and above the age group of animals. Among the total cases, drastically, the highest prevalence of 21.60% seen in 3–8 years age group could be due to a maximum number of animals

Table 1: Species wise prevalence of hemoprotozoan infection based on blood smears examination

Sample collected	*Total Sample*	*Positive sample*	*Theileria*	*Anaplasma*	*Babesia*
VCC	145	53	38	4	11
Gaushala	105	35	26	0	9
Total	250	88	64*	4	20
Percentage	100.00	35.20	25.60	1.60	8.00

*p < 0.05 between *Theileria* and *Anaplasma*

Table 2: Month-wise prevalence of hemoprotozoan diseases by blood smear examination

Sr. No.	*Month*	*No. of samples screened (N)*	*Positive by smear examination (n)*	*% Prevalence based on Monthly cases (n/N)*	*Total cases (n/250)*
1	May-18	37	15	40.54	6.00
2	Jun-18	79	27	34.18	10.80
3	Jul-18	9	3	33.33	1.20
4	Aug-18	17	4	23.53	1.60
5	Sep-18	23	9	39.13	3.60
6	Oct-18	15	6	40.00	2.40
7	Nov-18	13	3	23.07	1.20
8	Dec-18	17	1	05.88	0.40
9	Jan-19	9	2	22.22	0.80
10	Feb-19	7	3	42.85	1.20
11	Mar-19	7	4	57.14	1.60
12	Apr-19	17	11	64.70	4.40
	Total	250	88	35.20	35.20

Table 3: Season wise prevalence of hemoprotozoan disease on blood smear examination

Particulars	*Summer season (Mar to June)*	*Rainy season (July to Oct)*	*Winter season (Nov to Feb)*	*Total*
Number of animals screened (N)	140	64	46	250
Number of positive cases (n)	57	22	9*	88
Prevalence percentage (n/N)	40.71	34.37	19.56	35.20
Prevalence percentage (n/250)	22.80	8.80	3.60	35.20

*p < 0.05 between summer and winter

Table 4: Age-wise prevalence of hemoprotozoan disease on blood smear examination

Age	*Total Sample (N)*	*Positive by smear examination (n)*	*% Prevalence (n/N)*	*% Prevalence (n/250)*
Up to 6 month	17	05	29.41	2.00
6 month to 3 years	34	11	32.35	4.40
3 years to 8 years	125*	54	43.20	21.60
8 years and above	74	18	24.32	7.20
Total	250	88	35.20	35.20

*$p < 0.05$ between 3-8 years and >8 years (χ^2 value = 6.741)

examined in this category and the lowest in young and older age group (Table 4). Similar finding of high prevalence in 2–7 years age group in crossbred animals has been recorded by Velusamy *et al*. (2014), Ananda and Adeppa (2016) and Abaker *et al*. (2017). In contrast, Tuli *et al*. (2015) reported a high prevalence in calves below 6 months of age.

From the study, it was concluded that microscopically, about 35 % of Gir cattle were found infected with hemoprotozoan parasites, and *Theileria* was the major parasite. The infection was found in all seasons and aged animals, but the highest infection was recorded in summer season and in 3–8 years old animals.

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