INCIDENCE OF VARIOUS HAEMOPROTOZOAN DISEASES IN BUFFALOES

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ABSTRACT

The present study was carried out at Veterinary Clinical Complex (V.C.C.), College of Veterinary Science and Animal Husbandry, Mhow. The present investigation was undertaken to study the Epidemiology of Haemoprotozoan Diseases in Buffaloes using Giemsa's staining technique and also to correlate the meteorological parameter with the incidence of haemoprotozoan diseases. The samples were collected from the randomly selected buffaloes belonging to three districts *viz* Indore, Dhar and Alirajpur of Madhya Pradesh. A total of 756 samples were collected from different buffaloes in which 252 samples were collected from each selected district. The incidence of haemoprotozoan diseases was recorded in three districts as 58.32% in Indore district followed by 29.75% and 28.56% in Alirajpur and Dhar district respectively. The highest prevalence was found in adult's age, followed by in heifers and lowest in calves in all three districts.

Keywords: *Bubalus bubalis*, buffaloes, epidemiology, giemsa's staining, haemoprotozoan, incidence

INTRODUCTION

The global population of buffaloes *(Bubalus bubalis)* is estimated to be approximately 177.247 million of which 97% (171 million) are found in Asia. India has 98.7 million buffalo heads which constitute approximately 55.7% of the total world buffalo population (Singh *et al*., 2012). According to India's most recent up to date, buffalo constitutes approximately one-third of India's total bovine population. Many Indian livestock farmers prefer buffalo production over other livestock like cow's because due to premium pricing for buffalo milk, because of its higher fat content, and a bigger export market pace for carabeef products derived from bulls, bull calves, and unproductive buffalo cows. India could be a leading supplier of carabeef export markets thanks to price competiveness.

Piroplasmosis caused by different tick-borne haemoprotozoan parasites of the genera *Theileria* and *Babesia* inflicts a major burden in domestic animal production and

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wildlife preservation in tropical and subtropical environments worldwide (Gebrekidan *et al*., 2009). If affected animals are don't seems to treat properly and efficiently, mortality rates become high. The haemoparasites include *Babesia, Theileria*, *Anaplasma* and *Trypanosoma* etc. but the foremost important are *Babesia, Theileria* and *Anaplasma*. These protozoa are transmitted through ticks. Among various blood protozoan diseases, bovine babesiosis and theileriosis are reported as diseases of major economic importance, as they cause heavy losses because of mortality, decreased production and lowered working efficiency of affected animals within the tropics and subtropics of the world. (Zahid *et al*., 2005). Morbidity and mortality vary with the host's susceptibility and also the strain of the parasite. The morbidity rate for tropical theileriosis in bovine vary from 3% to 90% looking on the strain of parasite and also the susceptibility of the animals (Pipano, 1989).

MATERIALS AND METHODS

Location of study

The present study was carried out at Veterinary Clinical Complex (V.C.C.), College of Veterinary Science and Animal Husbandry, Mhow. The present investigation was undertaken to study the epidemiology of haemoprptozoan diseases and economical losses in buffaloes using Giemsa's staining technique and also to correlate the meteorological parameter with the incidence of haemoprotozoan diseases. The present study was carried out at Veterinary Clinical Complex (V.C.C.), College of Veterinary Science and Animal Husbandry, Mhow. The present investigation was undertaken to study the epidemiology of haemoprptozoan diseases and economical losses in buffaloes using Giemsa's staining technique and also to correlate the meteorological parameter with the incidence of haemoprotozoan diseases.

Source of animals

The samples were collected randomly from the selected buffaloes belonging to three districts *viz* Indore, Dhar and Alirajpur of Madhya Pradesh. A total of 756 samples were collected from different buffaloes, in which 252 samples were collected from each selected district. The animals presented at VCC, college dairy farm and nearby villages were also used for the incidence/ prevalence study.

Prevalence study

A total of 756 buffaloes were screened on the premise of conventional optical microscopy of Giemsa's-stained blood smears. The samples were collected from the randomly selected buffaloes belonging to 3 districts *viz* Indore, Dhar and Alirajpur. A total of 756 samples were collected from different buffaloes in which 252 samples were collected from different villages each selected district. The buffaloes presented at TVCC, college dairy farm, nearby villages were also used for the study. The prevalence was calculated age wise and breed wise. The prevalence was calculated by using following formula

$$\text{Blood protozoan Prevalence (\%)} = \frac{\text{Total No. of animals positive for}}{\text{Total number of buffaloes under study}} \times 100$$

Examination of blood smear

Blood smear was examined by conventional optical microscopy of Giemsa's-stained blood films.

Preparation of blood smear

Blood smear was prepared pricking the ear

with pointy needle after the ear was clipped clean by alcohol, then dried. Immediately a tiny low drop of fresh blood was stocked to scrub slide then the tiny blood drop is rapidly spread into a fair thin film by a second clean slide held at 45 angle and immediately dried. The slide was labeled and kept in upright position during a special box and was carried to the laboratory. Each blood smear was made in duplicate (Kelly, 1984).

Microscopic examination

The presence of haemoprotozoans was examined with an oil immersion lens, total magnification of x1,000 The parasitized erythrocytes in stained blood smear were calculated by examining and classifying 400 to 500 erythrocytes in randomly selected microscopic fields.

Statistical analysis

Analysis was done as per the standard statistical method by application of Chi-Square test of independence (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

The incidence of haemoprotozoan diseases was recorded in three districts as 58.32% in Indore district followed by 29.75% and 28.56% in Alirajpur and Dhar district respectively. Among the haemoprotozoan diseases the highest prevalence of Theileriosis i.e. 19.84%, in Indore district followed by 11.40% and 9.92% in Dhar and Alirajpur respectively. While the highest prevalence of babesiosis was 9.92%, in Indore district followed by 15 5.95% and 5.95% in Dhar and Alirajpur respectively. The highest prevalence of anaplasmosis was 15.87%, in Indore district followed by 5.95% and 4.76%, in Alirajpurand Dhar respectively. While the highest prevalence of trypanosomiasis was 12.69% in Indore district followed by 7.93% and 5.95% in Dhar and Alirajpur respectively in present study while, Lalchandani (2001) reported 39.21% animal showing mixed diseases while diseases of theileriosis was prevalent in 58.82% buffaloes, Indicating slightly higher incidence of theileriosis due to different geographical location or climatic condition of this area. Jithendran (1997) also reported the highest prevalence of Theileria annulata (29.5%), followed by Babesia bigemina (18.5%) and Anaplasma marginale (4.5%). While Manun *et al*. (2010) reported the highest incidence of Anaplasma marginale (8.89%), followed by *Theileria* spp. (2.12%) and *Babesia* spp. (1.69%) indicating much lower prevalence rate it may be due to hilly area where the vector activity and density is much reduced.

While Rialch *et al.* (2013) reported the highest disease prevalence of anaplasmosis 33.52%, followed by babesiosis 7.64%, theileriosis 1.76% and trypanosomiasis 1.17% in uttarakhand indicating lower prevalence rate than Indore district but higher prevalence then Dhar and Alirajpur district in anaplasmosis and babesiosis diseases but higher prevalence of theileriosis and trypanosomiasis. The difference in the prevalence rate may probably be due to different topographic areas and veried vector reasons. Soundararajan and Rajavelu, (2006) also reported the incidence of blood protistaie. 32.4%, among the blood protista, 28.2% of *T. annulata* either as single or as mixed diseases with *A. marginale* and *E. Bovis* indicating lower rate of diseases may be due to different geographical location that favours the multiplication of vector ticks.

Terkawi *et al.* (2011) reported the overall prevalence of *B. bovis* and *B. bigemina* i.e., 11.2%

and 3.6% by nPCR, 14.7% and 5.9% by ELISA, and 16.8% and 5.6% by IFAT, respectively. Ibrahim *et al*. (2013) also reported prevalence of *B. bovis* and *B. bigemina* was 10.42% and 4.17% by nPCR and 15.63% and 11.46% by ELISA, respectively. Li *et al*. (2014) also recorded the incidence of *B. bovis* and *B. bigemina* in, water buffalos were 23.3% and 0% by nPCR, 37.2% and 9.3% by ELISA and 27.9% and 18.6% by IFAT, respectively. Gupta *et al*. (2006) also revealed the seroprevalence of tropical Theileriosis was found to be 56.78% and 66.08% in Haryana and western Rajasthan, respectively Singh *et al*. (2007) reported 21% sero-reactivity to antibodies of *B. bigemina* in buffaloes from Bareilly and Ludhiana. These higher rates of prevalence may be due to serodiagnostic methods adopted which is more sensitive and accurate.

Age wise prevalence

The highest prevalence of haemoprotozoan diseases was found in adults 30.95%, followed by in heifers 17.46% and lowest in calves 9.92% in Indore district. The highest prevalence of haemoprotozoan was found in adults 15.87%, followed by in heifer 7.53% and lowest in calves 5.15% in Dhar district. The highest prevalence of haemoprotozoan was found in adults 15.87%, followed in heifer 7.53% and lowest in calves 5.15% in Alirajpur district respectively in present study. These finding were in favor of finding of Rani *et al*. (2015) who reported 88.88% were adults (>3 year) followed by 9.90% heifers (1 to 3 years) and 1.22% were calves (up to 12 months).

In Indore district the prevalence of theileriosis was found in adult, heifer, and calves as 11.90%, 4.76% and 3.17% respectively. While the prevalence of babesiosis in adult, heifer and calves was 5.55%, 2.77%, 1.58%. The prevalence of anaplasmosis was 7.5%, 5.1% and 3.17% in adult, heifer, and calves. While the prevalence of trypanosomiasis was 5.95%, 4.76% and 1.98% in adult, heifer, and calves (Table 1).

In Dhar district among the haemoprotozoan diseases the prevalence of theileriosis in adult, heifer and calves was found to be 7.14%, 2.77%, 1.98%. while the prevalence of babesiosis in adult, heifer and calves were found to be 2.77%, 1.98% and 1.19%. The prevalence of anaplasmosis in adult, heifer and calves was found to be 2.38%, 1.58%, 0.79%. While the prevalence of trypanosomiasis in adult, heifer and calves was found to be 3.57%, 1.19%, 1.19% (Table 2).

In Alirajpur district among the haemoprotozoan diseases the prevalence of theileriosis was found to be 5.95%, 2.38% and 1.58% in adult, heifer, calves. While the prevalence of babesiosis in adult, heifer, calves was found to be 2.77%, 1.98% and 1.19%. The prevalence of anaplasmosis in adult, heifer, calves was found to be 3.96%, 1.19% and 0.79%. While the prevalence of trypanosomiasis in adult, heifer and calves was found to be 3.57%, 2.77% and 1.58%. Similar observation was made by Fadly, (2012) who reported that adults (2 to 4 years) animal having high incidence of *Babesia* spp. (16%) and *Theileria* spp. (18%) by Giemsa-stained blood smears examination. Similar findings were given by Hazem *et al*. (2014) as reported higher incidence in adult animals (60%) as compared with calves (40%) infected by babesiosis. Singla *et al.* (2013) also reported similar result showing higher incidence in adults (50.47%) as compared to their calves (33.33%) of Trypanosomiasis. (Singh *et al*., 2012) also reported age wise prevalence of trypanosomiasis was significantly higher in older animal as compared to buffaloes less than 3 years old (15.6%). This observation indicated that adult animal are more susceptible then heifer and calves

Table 1. Age wise prevalence of haemoprotozoan diseases in buffaloes of Indore district.

S. No.	Age	Haemoprotozoandiseases	Theileriosis	Babesiosis	Anaplasmosis	Trypanosomiasis
1	Adult	30.95%	11.90%	5.55%	7.5%	5.95%
2	Heifer	17.46%	4.76%	2.77%	5.1%	4.76%
3	Calves	9.92%	3.17%	1.58%	3.17%	1.98%
4	Total	58.33%	19.83%	9.9%	15.77%	12.69%

Table 2. Age wise prevalence of haemoprotozoan diseases in buffaloes of Dhar district.

S. No.	Age	Haemoprotozoandiseases	Theileriosis	Babesiosis	Anaplasmosis	Trypanosomiasis
1	Adult	15.87%	7.14%	2.77%	2.38%	3.57%
2	Heifer	7.53%	2.77%	1.98%	1.58%	1.19%
3	Calves	5.15%	1.98%	1.19%	0.79%	1.19%
4	Total	28.55%	11.89%	5.94%	4.75%	5.95%

Table 3. Age wise prevalence of haemoprotozoan diseases in buffaloes of Alirajpur district.

S. No.	Age	Haemoprotozoandiseases	Theileriosis	Babesiosis	Anaplasmosis	Trypanosomiasis
1	Adult	16.26%	5.95%	2.77%	3.96%	3.57%
2	Heifer	8.33%	2.38%	1.98%	1.19%	2.77%
3	Calves	5.15%	1.58%	1.19%	0.79%	1.58%
4	Total	29.76%	9.91%	5.94%	5.94%	8.12%

for incidence of haemoprotozoan diseases (Table 3).

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