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ORIGINAL ARTICLE

# Prevalence of Haemoprotozoan infections in bovines of Shimoga region of Karnataka state

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**Abstract** A study was conducted to record the prevalence of Haemoprotozoan infections in bovines of Shimoga region for a period of 1 year from April 2012 to March 2013. A total of 300 blood samples were examined for the presence of haemoprotozoan parasites, of which 215 from cattle and 85 from buffaloes were examined by Giemsa staining technique. Out of 300 blood samples examined, 130 (43.3 %) were found positive for Haemoprotozoan infections. Out of 215 cattle blood samples examined, 62 (28.8 %) were positive for *Theileria annulata*, 27 (12.5 %) were harbored *Babesia bigemina,* 15 (6.9 %) were found positive for *Trypanosoma evansi* and 06 (2.7 %) samples showed *Anaplasma marginale*. Among 85 buffalo samples examined, 11 (12.9 %) were showed *Theileria* spp, 04 (4.7 %) found positive for *B. bigemina*, 03 (3.5 %) were found positive for *T. evansi* and 02 (2.3 %) were positive for *A. marginale*. Among haemoprotozoan parasites, the highest prevalence was observed with *T. annulata* followed by *B. bigemina* and *T. evansi* infection. The lowest prevalence was observed with *A. marginale* infection.

**Keywords** Prevalence · Haemoprotozoan infection · Livestock · Shimoga

## Introduction

Haemoprotozoan diseases such as *Babesiosis, Theileriosis* and *Anaplasmosis* are tick borne protozoan infections of cattle and buffaloes. The *Trypanosomosis* is transmitted mechanically by the bites of haematophagous flies, such as *Tabanus* and *Stomoxys* results in anorexia, weakness and emaciation, lead to lowered milk and meat production, poor traction power, abortion and death. These diseases have a serious economic impact on dairy industry and cause innumerable losses and pose major constraints to the dairy industry throughout the world.

In the absence of appropriate control strategies, the haemoprotozoan diseases lead to great economic losses in terms of mortality, reduced milk yield and lowered animal draft power which presents a major constraint to bovine production and survival of cross bred cattle thus hindering agricultural and socio-economical development of vast area in India (Suryanarayana 1999).

Devendra (1995) reported the annual loss of US $800 million due to tropical theileriosis in India. The hot and humid climate of Shimoga, Karnataka is favorable for growth, multiplication and survival of arthropod parasites, which serves as vector for haemoprotozoan parasites. Epidemiological surveillance is the most important aspect to control these vector borne diseases, therefore a study was undertaken to investigate the prevalence of haemoprotozoan parasites in cattle and buffaloes in Shimoga of malnad region of Karnataka state.

## Materials and methods

### Sample collection

A total of 300 bovine blood samples which includes 215 from cattle and 85 from buffaloes, suspected for haemoprotozoan infections on the basis of clinical signs viz., high temperature, anaemia, enlargement of lymph nodes, haemo-globinuria, circling movements, respiratory distress, grinding of

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teeth, sudden drop in milk yield and abortion, were collected for a period of 1 year during April 2012 to March 2013 from different places of Shimoga, Karnataka. A minimum of 2 ml of blood sample from each animal were collected aseptically from jugular vein in Ethylene diamine tetra acetate (EDTA) vials. Then the blood samples were immediately brought to the laboratory for the detection of haemoprotozoan parasites by Giemsa's stained blood smear examination.

Examination of blood smears

A thin blood smear was prepared and stained with Giemsa's stain as per the standard protocol (Benjamin Maxine 2005).The slides were allowed to dry in air and then examined by using built in illuminated compound microscope under oil immersion. The blood samples were examined on the same day and the season, breed and species wise prevalence was recorded. The species of haemoprotozoan parasites were identified on the basis of morphology (Soulsby 1982; Bowmann and Dwight 2009).

## Results and discussion

In the present study, a total of 300 bovines blood smears examined, 130 were found positive with an overall prevalence of 43.3 percent. Out of 215 cattle and 85 buffaloes screened, 110 (51.1 %) and 20 (23.5 %) were found positive for haemoprotozoan infections respectively. This finding is in agreement with Ananda et al. (2009) who reported almost similar overall prevalence of 43.1 % in crossbred cattle from Bangalore region of Karnataka.

Among 215 cattle blood smears examined, 62 (28.83 %) were found positive for *Theileria annulata* (Fig. 1), 27 (12.5 %) harbored *Babesia bigemina* (Fig. 2), 15 (6.9 %) showed *Trypanosoma evansi* and 06 (2.79 %) blood samples had *Anaplasma marginale* (Fig. 3, Table 1). In the present study, the highest prevalence of *T. annulata* infection was observed followed by *B. bigemina* and *T. evansi* infection with a lowest prevalence of *A. marginale* infection. Similar observations were made by Ananda et al. (2009) who reported 31.0 % prevalence of *T. annulata* followed by 12 % Babesiosis in crossbred cattle from Bangalore region of Karnataka. In another study Ananda et al.(2014) reported almost similar prevalence of 29.68 % of *T. annulata*, but relatively higher prevalence of *B. bigemina* (45.31 %) and *A. marginale* (12.5 %) in cattle and buffaloes from Shimoga region. The variation in the prevalence might be due to of the study period.

Among 85 buffalo blood smears examined, 11 (12.9 %) were found positive for *Theileria* spp, 04 (4.7 %) found positive for *B. bigemina*, 03 (3.5 %) showed *T. evansi* and 02 (2.4 %) samples had *A. marginale* (Table 1). In

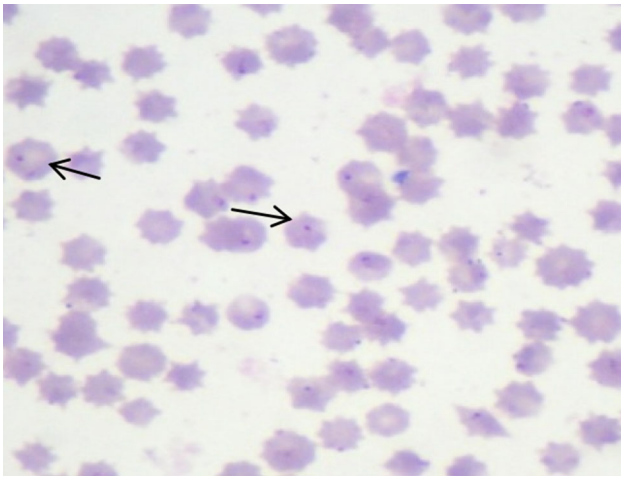

**Fig. 1** *Arrow* indicates *Theileria annulata* (100×)

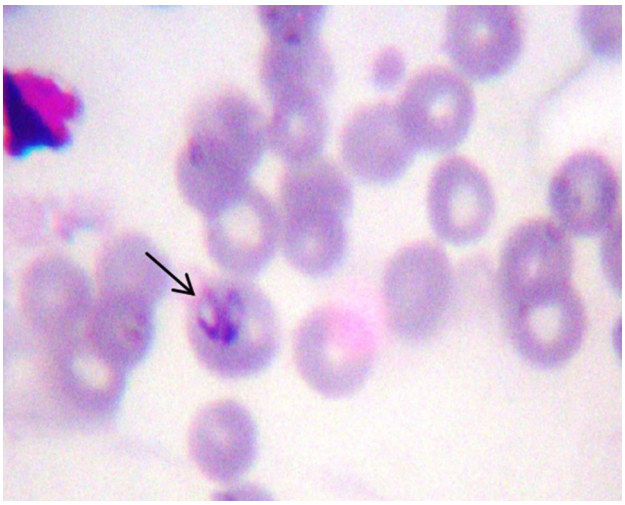

**Fig. 2** *Arrow* indicates *Babesia bigemina* (100×)

buffaloes, the higher prevalence of *Theileriosis* followed by *Babesiosis*, *Trypanosomosis* and *Anaplasmosis* was observed similar to that of cattle.

The present study recorded highest prevalence of 66.6 and 43.4 % during monsoon months (June to September) followed by summer 58.9 and 30.0 % and a lower prevalence during winter season of 27.1 and 3.1 % in cattle and buffalo respectively. This is in accordance with the observation made by Vahora et al. (2012), Radostits et al. (1994), Roy et al. (2004), Ananda et al. (2009, 2014) who have reported the highest prevalence of haemoprotozoan infection in monsoon months. The reason may be due to high abundance of vector population during the monsoon season as compared to other seasons in a year.

Among haemoprotozoan infections, the highest prevalence of theileriosis (66.6 and 43.4 %) was observed during

**Table 1** Prevalence of Haemoprotozoan diseases in cattle and buffalo in Shimoga region of Karnataka state

| Host species | Season | Theileriosis | Babesiosis | Anaplasmosis | Trypanosomosis | No. positive | Total examined | Seasonal prevalence |
|---|---|---|---|---|---|---|---|---|
| Cattle | Summer | 21 | 11 | 02 | 09 | 43 | 73 | 58.9 |
| | Monsoon | 31 | 12 | 02 | 03 | 48 | 72 | 66.6 |
| | Winter | 10 | 04 | 02 | 03 | 19 | 70 | 27.1 |
| Total | | 62 | 27 | 06 | 15 | 110 | 215 | 51.1 |
| Total prevalence | | 28.8 % | 12.5 % | 2.7 % | 6.9 % | – | – | 51.1 |
| Buffalo | Summer | 05 | 02 | 00 | 02 | 09 | 30 | 30.0 |
| | Monsoon | 06 | 02 | 02 | 00 | 10 | 23 | 43.4 |
| | Winter | 00 | 00 | 00 | 01 | 01 | 32 | 3.1 |
| Total | | 11 | 04 | 02 | 03 | 20 | 85 | 23.5 |
| Total prevalence | | 12.9 % | 4.7 % | 2.3 % | 3.5 % | 130 (C + B) | 300 (C + B) | 43.3 (C + B) |

*C + B* Total of Cattle and Buffalo

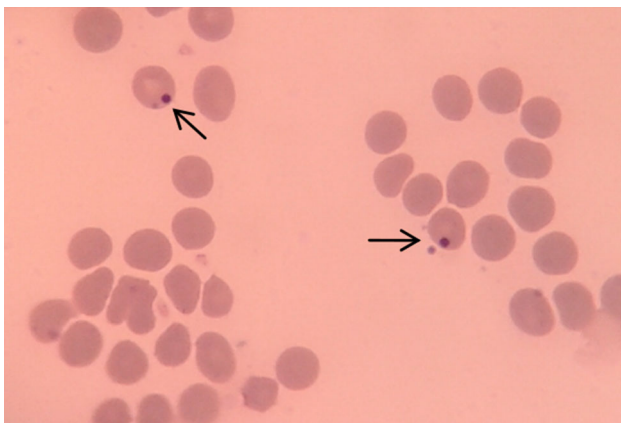

**Fig. 3** *Arrow* showing *Anaplasma marginale* (100×)

monsoon months in crossbred cattle and buffalos respectively. Similar trend of high prevalence (82.9 and 84.2 %) of theileriosis reported by Vahora et al. (2012) during monsoon season in crossbred cattle and buffalo respectively in Kaira and Anand districts of Gujarat compared to other haemoprotozoan infections. The differences in the prevalence rate might be due to variation in the number of samples included in the study and geographical and climatic conditions.

As per host's species-wise study the highest prevalence was recorded in cows (51.1 %) followed by buffaloes (23.5 %). This is in accordance with the observations of Chaudhri et al. (2013) who reported higher incidence of haemoprotozoan infection in cows than buffaloes in eastern Haryana.

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