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Study of occurrence of theileriosis in cattle from Parbhani district, Maharashtra, India

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Abstract

The present study was carried out to study occurrence of theileriosis in dairy cattle from Parbhani district of Maharashtra. The inclusion criteria involved examining suspected cattle for theileriosis based on the clinical signs like elevated body temperature, enlargement of superficial lymph nodes, conjunctival petechiae and presence of ticks on body of animal. Confirmation of theileriosis was done by peripheral blood smear examination and lymph node biopsy by Giemsa's staining method and blood smear was taken as gold standard to study occurrence. In total 67 suspected cattle were screened during which fifteen cattle were found positive for *Theileria annulata* infection. Overall occurrence of theileriosis was found 22.38%, however, age-wise occurrence was higher in below 6 month of age group (33.33%) followed by 6 month to 2 year age group (25.00%) and least in above 2 year age group. Sex wise occurrence revealed 40.00% in males and 20.96% in female. Whereas, breed wise occurrence was higher in Jersey breed (28.57%) as compared to Holstein Freisian cattle and no case of theileriosis found in indigenous cattle. Month wise occurrence revealed highest occurrence was in the month of May (33.33%) followed by April (26.66%), March (20.00%) and least occurrence was observed in the month of January, February and June (6.66%).

Keywords: Theileriosis, cattle, occurrence, blood smear examination, lymph node biopsy

Introduction

Theileriosis is an arthropod transmitted economically important haemoprotozoan disease of tropical and subtropical regions of the World caused by *Theileria* spp. belongs to Apicomplexa group. It is responsible for heavy production losses and mortality in dairy industry. Hemoprotozoan infections represent the major problem in cattle breeding due to severe economic losses which leads to lowered animal production and increase in both susceptibility to other secondary bacterial infections and mortalities. The *Theileria* spp. was firstly reported by Arnald Theiler and Dschunkowsky who first described the disease in 1904 (Kumar, *et al.*, 2018) [6]. *Theileria* spp. is an intracellular parasite that infect both wild and domestic bovidae all over the world and some species also infect small ruminants. They are transmitted by *Ixodid* ticks and have complex life cycle in vertebrate as well as invertebrate hosts, (OIE, 2014) [9].

Globally, the important species causing bovine theileriosis are *T. parva*. and *T. annulata* that are transmitted transstadially with the help of *Ixodid* ticks (three-host tick *Hyalomma anatolicum* in central-western Asia and northeastern Africa, and by the two-host tick *H. detritum* in the Mediterranean basin). The disease has been major constraint to livestock improvement programs in many parts of Middle East and Asian countries and around one sixth cattle population is at risk. The estimated annual losses due to *T. annulata* in India is 384.3 million US dollar. The recent estimate of 498.7 million US dollar per annum has been calculated as the cost of TTBD's in India (Kumar, *et al.*, 2018) [6].

Materials and methods

The screening of theileriosis was carried out at Teaching Veterinary Clinical Complex, Livestock Farm Complex, COVAS, Parbhani and area around Parbhani district. Total 67 suspected cattle were screened showing clinical symptoms like elevated body temperature, enlargement of superficial lymph nodes, conjunctival petechiae, presence of ticks on body of animal and haemoglobin level more than 6 g/dl with the help of peripheral blood smear examination and lymph node biopsy. The occurrence rate was calculated in percentage with respect to overall occurrence, age, sex, breed and month.

Results and Discussion

Overall occurrence of theileriosis

Out of 67 cattle suspected for theileriosis showing clinical symptoms and haemoglobin > 6 g/dl were screened with the help of blood smear examination and lymph node biopsy. On the basis of blood smear examination 15 were found positive for theileriosis contributing overall occurrence of 22.38%. Our findings are in agreement with Kohli *et al.* (2014) [5], Dadhich *et al.*, (2017) [1], Naik *et al.*, (2016) [8] and Siddiqui *et al.*, (2017) [10].

Age wise occurrence of theileriosis

The higher occurrence of theileriosis was found in cattle below 6 month of age (33.33%) followed by 6 month to 2 years age group (25%) and the lowest occurrence was observed above 2 years of age group (21.66%). The present findings are in agreement with Dadhich *et al.*, (2017) [1] who had reported 30% occurrence in below 1 year age group, 21.73% in 1 to 3 year age group and 18.43% above 3 year age group. The age wise occurrence is depicted in Table 1.

Table 1: Age wise occurrence of theileriosis

Particulars	Age		
	Below 6 month	6 month to 2 year	Above 2 years
Number of suspected cattle screened for theileriosis	3	4	60
Number of cattle positive for theileriosis	1	1	13
Per cent occurrence	33.33%	25.00%	21.66%

Sex wise occurrence of theileriosis

Out of sixty seven animals suspected for theileriosis, 5 were male and 62 were females. Two animals from male and 13 from female were positive for theileriosis on the basis of blood smear examination. Thus, the occurrence in male was found to be 40% and 20.96% in female. Higher occurrence in

male over female were reported by Masare *et al.*, (2009) [7] who had reported higher occurrence in male (66.67%) than (33.33%) in female. Also the higher occurrence of males over females may be due to lesser number of male individual in the study. Sex wise occurrence of theileriosis is depicted in Table 2.

Table 2: Sex wise occurrence of theileriosis

Particulars	Sex	
	Male	Female
Number of suspected cattle screened for theileriosis	5	62
Number of cattle positive for theileriosis	2	13
Per cent occurrence	40.00%	20.96%

Breed wise occurrence of theileriosis

Total of 67 suspected cattle involved 58 cattle of Holstein Friseian, 7 Jersey cattle and two indigenous. Thirteen Holstein Friseian and two Jersey were found positive for *Theileria annualata* infection. No indigenous cattle was found positive in present study. We found 22.41% occurrence in Holstein

Friseian cattle and 28.57% in Jersey cattle. The breed wise occurrence was highest in crossbred animals as compared to indigenous. This might be due to higher susceptibility of disease to crossbred animals (Singh *et al.*, 2017) [11]. Breed wise occurrence of theileriosis is shown in Table 3.

Table 3: Breed wise occurrence of Theileriosis

Particulars	Breed		
	HF	Jersey	Indigenous
Number of suspected cattle screened for theileriosis	58	7	2
Number of cattle positive for theileriosis	13	2	0
Per cent occurrence	22.41%	28.57%	0.00%

Month wise occurrence of theileriosis

The present research work was carried out during January to June. The month wise occurrence of theileriosis in present study was 6.66% in the months of January, February and June. The highest occurrence was in the month of May (33.33%) followed by April (26.66%) and in the month of March (20.00%). In this study, higher occurrence of infection found in summer season which is similar to findings of

Velusamy *et al.*, (2014) [13], who reported 17.64% occurrence which might be attributed to high abundance of tick vector, due to high temperature and humidity is ideal for survival and breeding of ticks. Above findings are in accordance with Dharanisha *et al.* (2017), Velusamy *et al.*, (2014) [13], Kohli *et al.*, (2014) [5] and Dadhich *et al.*, (2017) [1]. The month wise occurrence of theileriosis is shown in Table 4.

Table 4: The month wise occurrence of theileriosis

Months	No of animals positive	Percent occurrence
January	1	6.66%
February	1	6.66%
March	3	20.00%
April	4	26.66%
May	5	33.33%
June	1	6.66%

Efficacy of blood smear examination and lymph node biopsy

Out of total 67 samples screened, blood smear examination revealed 22.38% cases positive and lymph node biopsy smear examination revealed 19.40% cases positive for theileriosis. The current findings are nearly similar with Dehkordi, *et al.*, (2012) [2] who reported blood smear examined 14.47% of cases and lymph node biopsy method examined 10.73%. However, Singh *et al.*, (2014) [12] reported 14.29% (3/21) schizonts parasitosis in mononuclear cells and 42.86% piroplasms in the RBCs in calves and 14.29% (3/21) were detected by both lymph node and blood smear examination. The occurrence by blood smear examination and lymph node biopsy is depicted in Table 5.

Table 5: Occurrence on the basis of blood smear examination and lymph node biopsy in theileriosis

Particulars	Blood smear examination	Lymph node biopsy
Total number of animals screened	67	67
Total positive animals	15	13
Percent occurrence	22.38%	19.40%

Conclusion

The overall occurrence of theileriosis in present study was 22.38% in suspected cattle. Young ones 33.33% (below 6 month) were found most susceptible as compared to 6 month to 2 years (25.00%) and above 2 years (21.66%). Breed wise occurrence was higher in Jersey (28.57%) followed by Holstein Frisian cattle (22.41%) that means it is higher in cross bred animals than indigenous one. Sex wise occurrence revealed male (40.00%) were more affected than female (20.96%). The highest occurrence of theileriosis was observed in the months of April and May (26.66%).

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