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Occurrence of ticks in bovine benign theileriosis in cattle of puducherry region

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Abstract

The present study was aimed to find the occurrence of tick infestation in bovine benign theileriosis in cattle of Puducherry region. *Theileria orientalis* was confirmed by clinical manifestation and PCR. The ticks from the *Theileria orientalis* infected cattle were identified based on the morphological characterization described by Sen and Fletcher. Out of 100 theileriosis cattle, 45 cattle (45%) were infected with *Rhipicephalus haemaphysaloides* and *Haemaphysalis bispinosa*. In 45 percent tick infested animals, 44.44 percent animals had *R. haemaphysaloides*, 22.22 percent animals had *H. bispinosa* and 33.33 percent of cattle had both species of ticks. Therefore ticks like *R. haemaphysaloides* and *H. bispinosa* are common in Pondicherry and transmit *T. Orientalis* in cattle.

Keywords: *Rhipicephalus haemaphysaloides*, *Haemaphysalis bispinosa*, *Theileria orientalis*

1. Introduction

Ticks are the obligate ectoparasites of livestock, birds and humans and they play a vital role in transmit various organisms like blood-borne diseases such as tropical theileriosis, anaplasmosis and babesiosis [2, 4]. In tropical and sub-tropical countries, the climatic conditions was conducive for the growth and multiplication of ticks, so in that region ticks were the most important ectoparasites for livestock [4]. Ilhan *et al.* [7] reported that the carrier state plays a vital role in the maintenance of the lifecycle by alternate tick/cattle challenge and might be necessary for maintenance of immunity. Jaenson *et al.* [9] reported the tick and tick borne diseases and its distribution due alteration in the climatic conditions. Burger *et al.* [1] in his study, identified 904 tick species in worldwide and 80 per cent of the tick species comes under the family Ixodidae or hard ticks (705 species). But in India there were 109 tick species identified under 12 genera and the most dominant tick species identified were *Rhipicephalus* and *Hyalomma*. The climate pattern in India is conducive for the growth and multiplication of ticks and the direct injuries caused by ixodid ticks are severe in tropical region [6]. The prevalence and morphological studies on *Rhipicephalus haemaphysaloides* was done by different states of India including Andhra Pradesh, Kerala and Tamil Nadu [5, 12, 14, 15].

T. buffeli/T. orientalis and *T. sergenti* were found worldwide and cause Benign tropical theileriosis in cattle and it's transmitted by the tick, *Haemaphysalis* spp. [13]. The pathogenic genotypes of *T. orientalis* were manifested with high rise in temperature, weakness, anaemia, lethargy, jaundice, abortion and some cases mortality and it is transmitted by *Haemaphysalis* tick which was infected with the organism [8, 10]. Uilenberg [19] stated that *Theileria sergenti* / *buffeli* / *orientalis* cause mild form or asymptomatic form of disease in cattle known as bovine benign theileriosis. Therefore the aim of the present study was to find the occurrence of tick infestation in bovine benign theileriosis of Puducherry region.

2. Materials and Methods

Occurrence of tick infestation in cattle with bovine benign theileriosis was studied for a period of ten months from January 2013 to October 2014. Cattle shows the clinical manifestation indicative of theileriosis like anorexia, fever, lethargy, congested / pale mucosa, lymphadenomegaly, bruxism, lameness and tick infestation were screened and included under clinical study. Blood was collected for DNA extraction for PCR detection of theileriosis in cattle. PCR was done by using genus specific (*Theileria*-18S ribosomal RNA gene) and species specific primers (*T. orientalis*-MPSP major piroplasm surface protein like gene) as directed by Oliveira *et al.* [11] and Tanaka *et al.* [18], respectively.

2.1 Tick Identification

The ticks from cattle were collected by picking it with the forceps and put into the glass bottle, closed by a rubber cap and a needle was placed in the rubber cap for air circulation. The specimens were taken to Department of Veterinary Parasitology for identification. A clean glass slide was taken, put one or two drops of dense liquid, with help of forceps the ticks were taken out and immersed in the dense liquid to prevent the activities. Then the slide was placed on 4X dissecting microscope for examination and final confirmation was done after examined under the 10X and 40X compound microscope as per Sen and Fletcher ^[16] morphology descriptions.

2.2 Statistical Analysis

The data obtained in the study were subjected to statistical analysis as described by Snedecor and Cochran ^[17] for calculating mean and percentage of infection.

3. Results and Discussion

By PCR analysis, the organism was identified as *Theileria orientalis*, which is responsible for causing Bovine Benign theileriosis in cattle of Puducherry region. Out of 100 theileriosis cattle, 45 (45%) animals had severe tick infestation. The ticks from the theileriosis cattle were identified based on the morphological features as *Rhipicephalus haemaphysaloides* and *Haemaphysalis bispinosa*, which is agreement with studies of McFadden *et al.* ^[10], Radostits *et al.* ^[13], Izzo *et al.* ^[8], who stated that *T. orientalis* causes benign tropical theileriosis and transmitted by *Haemaphysalis* species of tick. Whereas Ghosh *et al.* ^[6] reported that *Rhipicephalus* and *Hyalomma* are most dominant species of ticks in India, but in Puducherry the existing species of ticks are *R. haemaphysaloides* and *H. bispinosa*, which are accountable for transmission of Bovine benign theileriosis in cattle. The prevalence and the morphological feature of *R. haemaphysaloides* was carried out by different authors in different states of India like Andhra Pradesh, Kerala and Tamil Nadu ^[5, 14, 12, 15]. Ghosh *et al.*, ^[6] reports correlates with present study that the climatic changes in tropical region are conducive for the growth and multiplication of the ticks and the severity of infection lead to direct injuries caused by hard ticks. In 45 percent tick infested animals, 44.44 percent animals infested by *R. haemaphysaloides*, 22.22 percent animals infested by *H. bispinosa* and 33.33 percent of cattle infested by both species of ticks. In Andhra Pradesh and in Tamil Nadu the prevalence rate of *R. haemaphysaloides* were 3.29 in crossbred cattle and 3.13 percent in goats by Rajendran and Hafeez ^[14] and Soundararajan *et al.* ^[15] respectively. The reports of Diyes and Rajakaruna, ^[3] stated that in Sri Lanka, *R. haemaphysaloides* was the most abundant species of tick affects the cattle. But Prakasan and Ramani ^[12] studied the occurrence of *R. haemaphysaloides* in cattle, buffaloes, goats and pigs in Kerala state.

4. Conclusion

From the study we concluded that the *Theileria orientalis* is prevalent species in Puducherry and the ticks like *Rhipicephalus haemaphysaloides* and *Haemaphysalis bispinosa* are responsible for transmission of Bovine benign theileriosis in cattle.

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