ISSN: 2456-2912
VET 2020; 5(1): 36-38

www.veterinarypaper.com
Received: 17-11-2019
Accepted: 21-12-2019

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A study on cattle tick of Chitwan district of Nepal in different seasons

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Abstract
Hard ticks are more prevalent in the terai belt of Nepal. Ticks themselves suck blood from the animal body and act as vector for various pathogen causing diseases like babesiosis, anaplasmosis etc. To understand the pattern of seasonal prevalence of ticks a survey was done in the Madi, Chitwan in two different seasons i.e. summer and winter. Tick samples were collected manually and stored in ethanol (70%) and glycerin (5%) mixture. And identified with the guideline of MAFF (1998) and Walker *et al*. (2003). A total of 134 samples were collected out of which 82 (61.19%) were collected in summer and 52 (38.81%) in winter. Tick infestation in summer was higher than that of the winter. Statistically the result was non-significant. Similarly, among tick samples collected from various parts of cattle body, dewlap was found with highest infestation of 39.55% which was followed by followed by perineum and udder (23.88%), ear (16.42%), abdomen (8.21%), tail base (8.21%) and withers (3,73%). This relation was statistically non-significant. But scientifically the infestation is itself significant to cause negative impact in the health of cattle and its productivity.

Keywords: Tick, Chitwan, Nepal, Seasonal, Prevalence, Babesiosis, Anaplasmosis

Introduction
Ticks have effective and negative impact in the productivity of cattle. They act as vector to different disease pathogens that occur in the cattle, that can be protozoan, bacterial, viral etc. Ticks fed upon the blood of cattle. They rely on the blood as their source of energy and during that different stages pathogens are exchanged between the tick and cattle. During heavy infestation of the tick in the cattle can be dangerous due to loss of blood from the circulation.

Rhipicephalus microplus is also known as Asian blue tick. Heavy infestation of this hard tick can damage hides. This tick can transmit babesiosis, anaplasmosis etc. This is single host tick as its lifecycle is completed in single animal. Adult and mated female detach from the cattle and deposits many eggs to the environment. Female tick dies after ovipositing the eggs in the environment. They undergo developmental stages: larva, nymph and adult. The larva is usually found in the soft skin. The larva molts to form nymph after feeding. Then adult is formed from the nymph after feeding once.

There are different genera of *Haemaphysalis* i.e. *H. longicornis, H. punctate, H. leachi, H. sulcate. Haemaphysalis* is the vector of diseases like theileriosis, babesiosis etc. Female ticks lay eggs in the environment which are hatched into larva in 60-90 days. Larva then attaches to vegetation and stick to the skin of cattle and remains there for feeding. Then the larva enlarges and drops to the ground. And undergoes moulting for 30 days in damp and moist place to develop into nymph. Again, attaches to the animal and matures.

Lxodes sp. do have numerous genera. *Lxodes* act as vector for many diseases in animal and human. In animal it is associated with diseases like babesiosis, anaplasmosis etc. Its lifecycle is similar to that of *Haemaphysalis*, but the maturity of the nymph occurs in the ground taking time before adhering the cattle.

Amblyomma sp. are hard ticks that are vector for many diseases in cattle. Lifecycle is similar to that of *Haemaphysalis* in the different stages of life i.e. eggs, larva, nymph, adult. It takes 2 years to complete its lifecycle.

Materials and methodology Region of study

The tick samples were collected from the cattle of Madi of Chitwan district of Nepal with the exact location of 27.446625° N, 84.344922° E. The study region is the western region of district and consists of the tropical climate. The samples were taken from the region in two seasons separately. A total of 134 samples were collected from the region.

Sample collection

Ticks were collected manually. The collected ticks were stored in container with ethanol (70%) and glycerin (5%).

Identification of ticks

Guideline of MAFF (1986) [12] and Walker *et al*. (2003) [6] were used for the identification of collected ticks.

Data analysis

Obtained data was entered in MS Excel 2016 and analyzed in IBM SPSS version 25.

Results

Table 1: Ticks identified in cattle in different season in Chitwan district of Nepal

Season	No. of cattle with Rhipicephalus (Boophilus) microplus (% within species of tick)	No. of cattle with Haemaphysalis sp. (% within species of tick)	No. of cattle with Lxodes sp. (% within species of tick)	No. of cattle with Amblyomma sp. (% within species of tick)	Total tick in a season (% between season)
Summer	75 (59.06%)	4 (100%)	2 (100%)	1 (100%)	82 (61.19%)
Winter	52 (40.94%)	0 (100%)	0 (100%)	0 (100%)	52 (38.81%)
Total	127 (100%)	4 (100%)	2 (100%)	1 (100%)	134 (100%)

Table 2: Ticks identified in different body parts of cattle in Chitwan district of Nepal.

Part of body	No. of cattle with Rhipicephalus (Boophilus) microplus (% within species of tick)	No. of cattle with Haemaphysalis sp. (% within species of tick)	No. of cattle with Lxodes sp. (% within species of tick)	No. of cattle with Amblyomma sp. (% within species of tick)	Total tick in a body part (% between body parts)
Perineum and udder	31 (24.41%)	0 (0%)	1 (50%)	0 (0%)	32 (23.88%)
Abdomen	9 (7.07%)	2 (50%)	0 (0%)	0 (0%)	11 (8.21%)
Withers	5 (3.94%)	0 (0%)	0 (0%)	0 (0%)	5 (3.73%)
Dewlap	49 (38.58%)	2 (50%)	1 (50%)	1 (100%)	53 (39.55%)
Tail base	11 (8.67%)	0 (0%)	0 (0%)	0 (0%)	11 (8.21%)
Ear	22 (17.33%)	0 (0%)	0 (0%)	0 (0%)	22 (16.42%)
Total	127 (100%)	4 (100%)	2 (100%)	1 (100%)	134 (100%)

Discussion

In the region *Rhipicephalus microplus* was most abundant tick in both season and among different body parts of cattle. The cattle with ticks were higher in the summer (61.19%) than in the winter (38.81%). But statistically there was no significance in the availability of tick in cattle in two different seasons ($P>0.05$). Higher number of cattle with tick in the summer can be due to the optimum temperature for the growth of the tick in the summer. And the lifecycle of the pattern of ticks require debris or decomposed materials for the feeding in the different stages. Decomposition of organic material occur more in the summer season. This can be another reason for higher infestation in the summer than in the winter. Similar findings were obtained by Bohara *et al*. (2016) [5] which showed the invading of tick in the summer to be 58.7% and 41.3% in the winter. Our survey showed higher number of cattle with ticks in the dewlap (39.55%). Statistically this result was non-significant ($P>0.05$). Cattle with tick in the dewlap was followed by perineum and udder (23.88%), ear (16.42%), abdomen (8.21%), tail base (8.21%) and withers (3,73%). Our finding was in line with the finding of the Bohora *et al*. (2016) which showed the cattle with tick in the dewlap to be 41.29%. The findings of our research agreed with the findings of Bohora *et al*. (2016) and Atif *et al*. (2012) [2].

Conclusion

Tick's prevalence was higher in summer than in the winter. But there was no statistical significance in the relation between tick's prevalence and the season. And dewlap was found to have highest infestation of tick among various body parts of the cattle. Tick infestation have direct relation with the health of cattle and the productivity as well. There is knowledge gap in the proper use of drugs and other remedy methods for the elimination of the tick from the cattle. So, this topic requires more study, observation, research and extension.

Acknowledgement

I would like to express our gratitude to Prof. Dr. I.P. Dhakal, Vice-Chancellor, AFU; Prof. Dr. Sharda Thapaliya, Dean, FAVF, AFU; Prof. Dr. Naba Raj Devkota, Director, Directorate of Research and Extension; Prof. Dr. Bhuminand Devkota, HOD, Department of Therigenology; Prof. Dr. Hom Bahadur Basnet, HOD, Department of Veterinary Microbiology and Parasitology; Asst. Prof. Dr. Nirajan Bhattarai HOD, Department of Animal Breeding and Biotechnology; Prof. Dr. Asso. Prof. Dr. Dipesh Chhetri, Director, Veterinary Teaching Hospital; Asso. Prof. Dr. Krishna Kafle, HOD, Department of Theriogenology, IAAS, Paklihawa. I would like to acknowledge Prof. Dr. Mohan Sharma, Prof. Dr. Ram Prasad Poudel. We are indebted to Udit Lamichhane, Uday Lamichhane, Rakshya Adhikari, Dikshya Adhikari, Safal Adhikari, Diwas Kandel, Sachita Pokharel, Subash Sapkota, Roshan Ghimire, Kiran Bhandari, Naveen Pant, Mandeep Pokharel, Yasaswi Subedi, Pradip Bartaula, Sandesh Gaudel, Santosh Pokharel, Saroj Bista, Sachin Regmi. I am very much thankful for the help and support of Saroj Regmi during the research. I am also

indebted to our colleagues, seniors, juniors, farmers who cooperated with us during the study

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