

*Original Research***Seasonal Dynamics in the Prevalence of *Rhipicephalus (Boophilus) microplus* on Cattle of Coastal Odisha****M. Dehuri*, M. R. Panda, B. N. Mohanty, A. Hembram and P. Arukha¹**Department of Veterinary Parasitology, College of Veterinary Science & Animal Husbandry,
OUAT, Bhubaneswar, Odisha, INDIA¹VAS, Fisheries and Animal Resources Department, Odisha, INDIA***Corresponding author:** manaswini2003@yahoo.com

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Abstract

Rhipicephalus (Boophilus) microplus is an economically important one host tick species infesting cattle worldwide. The study was conducted for a period of one year (February 2016 to January 2017) in four districts of coastal Odisha during which 2918 cattle were examined and the prevalence of tick was found to be 24.64%. There was a higher abundance of ticks during monsoon, followed by pre-monsoon/summer, post monsoon and winter. Correlation analysis with climatic factors showed positive correlation with significance ($p < 0.01$) for rainfall and relative humidity.

Key words: *Rhipicephalus (Boophilus) microplus*, Monsoon, Prevalence**How to cite:** Dehuri, M., Panda, M., Mohanty, B., Hembram, A., & Arukha, P. (2018). Seasonal Dynamics in the Prevalence of *Rhipicephalus (Boophilus) microplus* on Cattle of Coastal Odisha. International Journal of Livestock Research, 8(6), 133-138. doi: 10.5455/ijlr.20171115121311**Introduction**

Around 80% of the world cattle population is infested with ticks, while reports from Food and Agricultural Organization have estimated the global losses due to hard tick infestation to be US \$ 7.0 billion annually (Harrow *et al.*, 1991). *Rhipicephalus (Boophilus) microplus* is one of the most dominant ixodid ticks found in different parts of India (Khan, 1994; Singh, 2007) as well as world (Estrada Pena *et al.*, 2006; Canevari *et al.*, 2017). It is a one host cattle tick that transmits important parasitic diseases like babesiosis and anaplasmosis. The economic losses in cattle production caused by the parasitism of *R. (B.) microplus* are associated with decreases in weight gain and milk production, hide damage as well as the ensuing control costs. The life cycle of this tick involves both parasitic (feeding of developmental stages, moulting and dropping off for oviposition) and non parasitic (oviposition, incubation and host

seeking) phases, in which the duration of parasitic phase is constant but duration of non parasitic phase varies depending on various environmental factors (Nunez *et al.*, 1982). The state of Odisha has tropical climate, characterized by high temperature, high humidity, medium to high rainfall and short and mild winters. Studies concerning the host related factors governing tick distribution have been documented, but those regarding effect of environmental factors like climate are scanty in our region. It is essential to know the seasonal dynamics of the ticks for better control strategies like acaricide application. Therefore the study has been designed to know the seasonal variation and effect of climatic factors on the prevalence of the ticks in coastal Odisha.

Materials and Methods

In this study, a total of 2918 cattle of both sex and varying age groups (< 1 year and >1 year) randomly selected from different villages of four districts (Puri, Jagatsinghpur, Kendrapada and Khurda) of coastal Odisha (Map-1). The cattle population were investigated for tick infestation for a period of one year (February 2016 to January 2017), the year being divided into four seasons; winter (January, February) summer/ Pre-monsoon (March to May), Monsoon (June to September) and Post monsoon (October to December). The animals were carefully examined all over starting from skin to various other parts of the body for presence of ticks. The collected ticks were kept in vials containing 70% alcohol with 5% glycerol for preservation and labelled with information about the host (age, sex, and breed) and locality. Ticks were identified under a stereomicroscope using the standard identification keys (Walker *et al.*, 2003). Meteorological data like temperature, rainfall and relative humidity were obtained from the Department of Agrometeorology in the University campus. Statistical analysis was performed by SPSS 13.0 and correlation studies with statistical differences ($p < 0.01$ and $p < 0.05$) were calculated.

Results and Discussion

Rhipicephalus (Boophilus) microplus infestation was observed in 719 out of a total of 2918 cattle examined (24.64%). Pure infestation with *Boophilus* was observed in 458 cattle while mixed with other ixodid ticks were recorded in 261 cattle. Our reports on prevalence percentage are in conformity with reports from Andhra Pradesh (Rajendran and Hafeez, 2003) and Turkey (Ica *et al.*, 2007). However a higher rate of abundance (> 40%) has been documented by Vatsya *et al.*, 2007; Patel *et al.*, 2013 and Kaur *et al.*, 2015 from different parts of the country. The differences in the rate of prevalence could be due to various geographical or other biotic factors in the study area. There was continued presence of the tick throughout the year though with varying abundances, which has been previously described by Tandon, 1990; Khan, 1994 and Singh *et al.*, 2007. A higher prevalence of *Rhipicephalus (Boophilus) microplus* during monsoon (June to September) with a peak during July followed by summer/pre-

monsoon, post monsoon and winter as depicted in Fig.1 corroborates with findings elsewhere by Singh *et al.*, 2007;Haque *et al.*, 2011;Singh and Rath,2013 and Kaur *et al.*, 2015 indicating a important role of humidity as a microclimatic factor in seasonal variation.

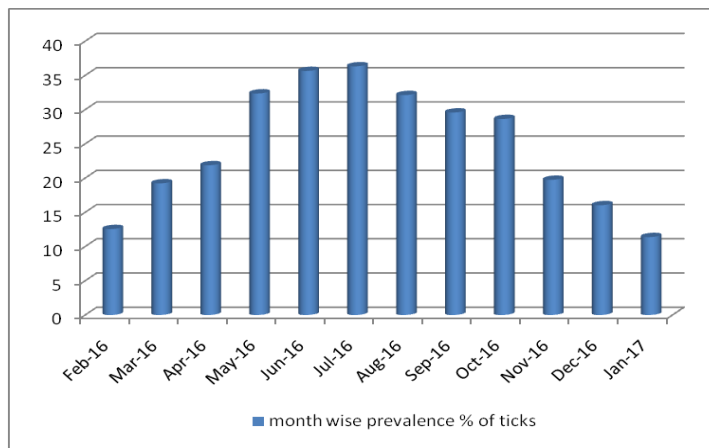


Fig.1: Month wise prevalence percentage of tick

During the monsoon, the various climatic factors are optimally more favourable for propagation of life cycle of ticks. A lower presence during winter, when there is low temperature may be attributed to delayed morphogenesis and reduced tick activity with the tick moving to underlying shelters. An optimum temperature of 31-38°C is desirable for attachment of *Rhipicephalus (Boophilus) microplus* larva on host (Doub and Kemp, 1979). The correlation study of tick count with different climatic parameters like temperature, relative humidity and rainfall showed a high correlation (Fig.2&3) with statistical significance ($P < 0.01$) for rainfall ($r=0.896$) and relative humidity ($r=0.731$) but low correlation without statistical significance (Fig. 4) was observed for average temperature ($r=0.506$).Our findings are in consonance with observation by Bekele ,2002 who documented positive correlation with rainfall and relative humidity in Ethiopia.

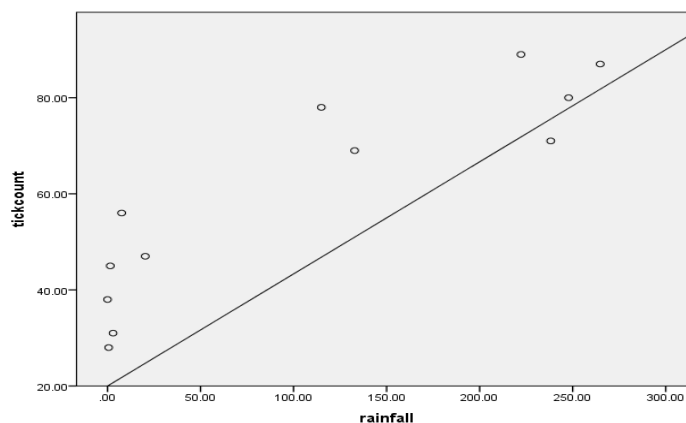


Fig.2: Scatter plot of correlation between rainfall and tick count

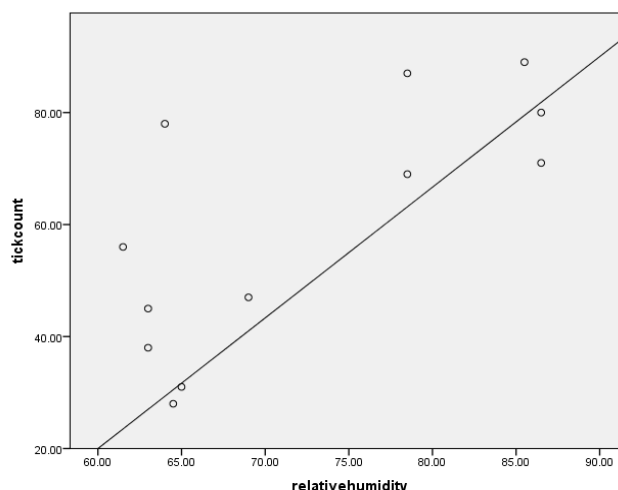


Fig.3: Scatter plot of correlation between relative humidity and tick count

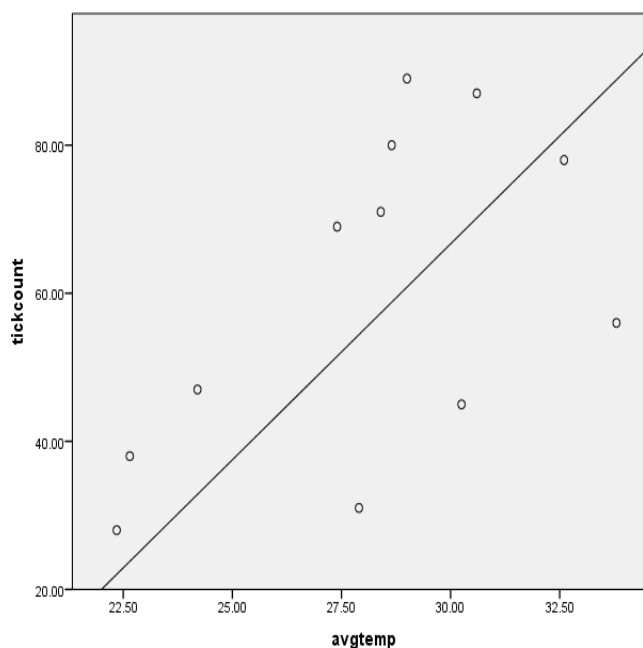


Fig. 4: Scatter plot of correlation between average temperature and tick count

Positive correlation with rainfall has been described by Rawlins,1979 ; Lima *et al.*, 2000; Alvarez *et al.*,2003 ; Vatsya *et al.*,2007 and Jyotika *et al.*, 2008 .There is maximum egg production in case of *Rhipicephalus (Boophilus) microplus* at 25-30°C while the egg production ceases below 10 °C . There is also shrinkage and failure of hatching when humidity lies between 20-40% (Khan, 1994). Da costa *et al.*,2014 in a study revealed temperature to be the only climatic factor that correlated significantly with the tick population levels while Punyua *et al.*,1991 observed no significant correlation of population

changes with the climatic factors but with managerial factors in . These differences could be ascribed to the differences in climatic effects in different study areas.

Conclusion

Our study depicts the presence of *Rhipicephalus(Boophilus) microplus* throughout the year but with varying intensity and being influenced by microclimatic conditions like rainfall and relative humidity. It is recommended to use acaricides on the onset of monsoon to control tick and tick borne diseases.

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