PREVALENCE OF IXODID TICKS IN CATTLE OF JAMMU REGION

R. Godara, R. Katoch and Anish Yadav
Division of Veterinary Parasitology, Faculty of Veterinary Sciences and Animal Husbandry
Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu, R.S. Pura-181 102, Jammu and Kashmir, India

Received on: 14.02.2018
Accepted on: 20.04.2018

ABSTRACT

To determine the prevalence of ixodid ticks, 1660 cattle were examined from organised and unorganised cattle farms from eight districts of Jammu region during July 2016 to June 2017. Out of these, 667 animals (40.18%) were found to be positive for ixodid tick infestation. Among the ixodid ticks, only one species i.e. *Rhipicephalus (Boophilus) microplus* was recorded. Among the various agro-climatic zones, the highest prevalence was recorded in low altitude sub-tropical zone. A significantly ($p<0.05$) higher prevalence was recorded in monsoon season as compared to other seasons. Agewise, the animals aged <6 months had the highest prevalence and the lowest was found in animals >1 year of age. Sexwise, the males had higher infestation rate than the females.

***Key words*:** Cattle, Jammu, prevalence, *Rhipicephalus (Boophilus) microplus*

Introduction

The tick infestation, especially in dairy animals is a serious problem throughout the world and is responsible for substantial economic losses in terms of hide damage, milk production and loss of body weight (Ghosh *et al*., 2007). Direct injuries to animals can be very serious, especially in tropical and sub-tropical climates and are generally observed in infestations with ixodid ticks. Their hardiness and longevity enable them to survive long periods in adverse environmental conditions and transmit a large variety of human and animal pathogens (Soulsby, 1982; Ghosh *et al*., 2007). Some authors also suggest that the adult and larval ticks can suck 0.5-2.0 ml blood per day and cause mortalities in heavy infestations (Ram *et al*., 2004).

The prevalence of ticks in a particular area can be affected by agro-climatic conditions, animal husbandry practices, and socioeconomic and technological advances in control measures. The current information on regional prevalence is essential for development and modulation of control and curative measures for tick infestations which in turn will result in increase in production and economic stability. There is only one published report on the prevalence of ixodid ticks from Jammu region (Khajuria *et al*., 2014). Hence, the present study was designed to determine the prevalence of ixodid ticks infesting organised and unorganised cattle population of Jammu region.

Materials and Methods

The ticks were collected from organised and unorganised cattle farms located in eight districts of Jammu region, Jammu and Kashmir (India), during July 2016 to June 2017. A total of 1660 cattle were examined for the presence/absence of ixodid ticks. The animals of both sexes and all age groups were examined and each animal was considered as one sample. Ticks were searched by passing hands through the animal's coat and the different stages of ticks (larva, nymph and adult) were collected with the help of a forceps and brush without damaging their mouthparts. The collected ticks were then transferred to plastic tubes marked with age (i.e. <6 months, >6 month to 1 year and >1 year of age), sex (male/ female) and area of collection. The vials were closed with muslin cloth to allow air and moisture exchange and were brought to the laboratory. Some of specimens were identified directly under stereomicroscope and some of the specimens were digested in 10% KOH passed through different grades of ethanol for dehydration. Dehydrated specimens were fixed in DPX and canada balsam. Identification up to species level was made following identification keys and check lists authored by Soulsby (1982) and Walker (1994).

The differences in the prevalence of ticks between seasons, age groups and sex were examined for significance using one way ANNOVA and were considered significant at $p<0.05$.

Results and Discussion

In the current study, a total of 1660 animals were examined for the presence of adult, nymphs and larval stages of ixodid ticks from organised and unorganised cattle farms from various agro-climatic regions consisting eight districts of Jammu province. Among these, 40.18% (667/1660) animals were found to be infested with ticks. Only one species of ixodid ticks i.e. *Rhipicephalus* (*Boophilus*) *microplus* was recorded.

The findings of the current study are in accordance with Khajuria *et al*. (2014) who reported 42.18% prevalence of ixodid ticks in bovines of Jammu district and Vatsya *et al*. (2007) who examined large ruminants at Pantnagar, Uttaranchal and reported an overall infestation rate of 40.67% of *B. microplus*. On contrary to the present findings, Singh and Rath (2013) recorded a higher prevalence of 58.06% of ixodid ticks of cattle from 18 districts of Punjab state. The management practices, including the use of acaricides and animal holdings influence the tick infestations on the body of the host. The animals maintained under extensive system of management and in smaller holdings (2-10 animals) often harbour low grade infestations on their body, as they are regularly removed by hand picking and burning or grooming of animals on return from grazing lands (Latha *et al*., 2004; Ghai *et al*., 2008).

A significant difference ($p<0.05$) was recorded in the prevalence of ixodid ticks among three agro-climatic zones of Jammu province. The highest prevalence was recorded in low altitude sub-tropical zone (47.64%), followed by middle agro-climatic zone (33.1%) and high altitude zone (29.53%). High prevalence of *R*. (*B*.) *microplus* was recorded in areas receiving high annual rainfall. This finding can be associated with high

soil content of the region as reported elsewhere (Singh and Rath, 2013).

The current study revealed only one species of ixodid ticks i.e. *R.* (*B*.) *microplus*. Earlier, Singh and Rath (2013) reported *R. microplus* as the major tick species infesting cattle from sub-mountain undulating, undulating plain and central plain regions of Punjab state which have high annual rainfall with high soil moisture content. However, the concurrent infestations are quiet common in animals reared under extensive and semi intensive managemental practices, and Miranpuri (1988) recorded a total of 13 ixodid tick species from 424 buffaloes in the North-western states of India. The macro as well as microclimate of an area determined the prevalence of ixodid tick species thus, the epidemiological pattern of ticks may be different in nearby agro-climatic regions.

A significant (p<0.05) seasonal variations was observed in the occurrence of ticks on cattle. It was found to be highest in monsoon season (53.15%), followed by summer (42.37%), post monsoon (37.5%) and winter (19.28%) seasons. The majority of workers have reported rainy and summer seasons to be most conducive for development and propagation of ticks. During rainy season the epizootiological determinants such as ambient temperature and atmospheric humidity, and microclimate of grazing lands are optimally most favourable for feeding, breeding, growth and development of tick population in the surroundings, while lower ambient temperature (below 12^{o}C) with lower humidity during winter months do not favour propagation of ixodid ticks. Further, the ticks have ability to protect themselves against adverse climatic conditions and enter diapause, leading to delayed morphogenesis and reduced behavioural activities and they pass winters as engorged females, nymphs, larvae and unfed adults by hiding into the cracks and crevices in the walls (Gray, 1991). It has also been suggested that female *B. microplus* has capabilities of converting its body weight to egg mass until the temperatures reaches a critical upper limit (Oubelli *et al*., 1982). The maximum egg production in *B. microplus* occurs at 25-30°C and its egg production seized below 10°C. However, humidity does not alter the oviposition much, but the shrinkage of eggs and failure of hatching occur between 20- 40% of humidity (Khan *et al*., 1986). Moreover, the optimum temperature beside an average rainfall of more than 60 cm is essential to provide optimum humidity for faster propagation of ixodid cattle ticks, except for *Hyalomma* spp. ticks. In the current study region, the average temperature and relative humidity during this period were observed to be 28.56^{0}C and 72.16%.

Higher prevalence was found in the animals aged below 6 months (49.52%), followed by 6 months -1 year (39.48%) and above 1 year of (37.39%) age groups. Singh and Rath (2013) also reported a significantly (p<0.01) higher infestation rate in cattle below 6 months of age (72.6%) than growing (6 months- 1 year) (61.7%) and above 1 year age group The lower rate of tick infestations in adults could be attributed to acquired resistance incidental to repeatedly exposer of host to low grade field infestations during the prolonged growth and development period (Das, 1994). Moreover, the adults or the productive animals are provided utmost care with better animal husbandry practices, whereas the younger animals are least attended with limited use of acaricides, thus resulting in higher tick infestations. The males had higher prevalence rate (41.94%) than the females (39.64%). It might be attributed to the fact that male animals are generally neglected and the owners provided the least care to them with occasional use of acaricides. Further, with the popularization of artificial insemination, the males are now considered useless by the farmers.

It can be concluded that *R.* (*B*.) *microplus* tick is the main ixodid tick which infests cattle of Jammu province. The study also suggest that the agro-climatic conditions are suitable for the development of *R.* (*B*.) *microplus*, besides poor animal husbandry practices followed by the farmers may be responsible for aggravating the condition.

References

Das SS (1994) Prevalence of ixodid tick infestation on farm animals in Pantnagar tarai of Uttar Pradesh. *J. Parasitol. Appl. Anim. Biol*. **3**: 71-73.

Ghai JK, Singh M and Singh A (2008) Population dynamics of ixodid ticks infesting cattle in Bathinda and Hoshiarpur districts in the Punjab state. *Ann. Biol*. **24**: 95-100.

Ghosh S, Azahaianambi P and Yadav MP (2007) Upcoming and future strategies for tick control: A review. *J. Vect. Born. Dis*. **6**: 305-314.

Gray JS (1991) The development and seasonal activity of the tick *Ixodes ricinus*: A vector of Lyme borreliosis. *Med. Vet. Entomol*. **79**: 323-333.

Khajuria V, Godara R, Yadav Anish and Katoch R (2014) Prevalence of ixodid ticks in dairy animals of Jammu region. *J. Parasit. Dis*. **39**: 418-421.

Khan MH (1986) Biology of *Boophilus microplus* (Can.) in Andamans. *Indian J. Anim. Hlth.* **25**: 7-10.

Latha BR, Aiyasami AA, Pattabiraman G, Sivaraman T and Rajavelu G (2004) Seasonal activity of ticks on small ruminants in Tamil Nadu State, India. *Trop. Anim. Hlth. Prod*. **36**: 121-133.

Miranpuri GS (1988) Ticks parasitising the Indian buffalo (*Bubalus bubalis*) and their possible role in disease transmission. *Vet. Parasitol*. **27**: 57-62.

Ouhelli H, Pandey VS and Choukri M (1982) The effects of temperature, humidity, photoperiod and weight of the engorged female on oviposition of *Boophilus annulatus* (Say 1821). *Vet. Parasitol*. **11**: 231-239.

Ram H, Yadav CL, Banerjee PS and Kumar V (2004) Tick associated mortality in crossbred cattle calves. *Indian Vet. J*. **81**: 1203-1205.

Singh NK and Rath SS (2013) Epidemiology of ixodid ticks in cattle population of various agro-climatic zones of Punjab, India. *Asian Pacific J. Trop. Med*. **6**: 947-951.

Soulsby EJL (1982) Helminths, Arthropods and Protozoa of Domesticated Animals, 7th ed., Bailliere Tindal, London, UK. pp. 461-462.

Vatsya S, Yadav CL, Kumar RR and Garg R (2007) Seasonal activity of *Boophilus microplus* on large ruminants at an organised livestock farm. *J. Vet. Parasitol*. **21**: 125-128.

Walker A (1994) The arthropods of humans and domestic animals, 1st ed., Chapman and Hall, London, UK. pp. 34-36.