

## Occurrence of *Rhipicephalus sanguineus* and *Ixodes acutitarsus* (Acari: Ixodidae) among semi-wild cattle *Bos frontalis* in Northeast India

Bhabesh Ronghang and Bishnupada Roy\*

Department of zoology, North-Eastern Hill University, Shillong

Correspondence: [bishnuroy9@gmail.com](mailto:bishnuroy9@gmail.com)

(Received: 20-6-14)

(Accepted: 11-7-14)

### ABSTRACT

*Rhipicephalus sanguineus* and *Ixodes acutitarsus* reported for the first time from semi wild cattle *Bos frontalis* (Mithun) of Arunachal Pradesh, Northeast India. During December 2011 to March 2012, a thorough survey was undertaken to evaluate the incidence and intensity of ectoparasite infections among mithun in Northeast India. During the course of investigation, a relatively uncommon ectoparasite were encountered in five mithun examined. Based on the morphological characters, the ectoparasites were identified as *Rhipicephalus sanguineus* and *Ixodes acutitarsus*. Significance of the infection in terms of veterinary and public health is discussed.

**Keywords:** ectoparasite. *Ixodes acutitarsus*. *Rhipicephalus sanguineus*. *Bos frontalis*. Arunachal Pradesh.

### INTRODUCTION

Ticks are ectoparasites which survive by haematophagy on the blood of their host (mammals, bird or reptiles) and act as vectors of human and animal pathogens worldwide [1]. They are mainly classified into three families such as the Ixodidae, the Argasidae, and the Nuttalliellidae [2, 3] of which ixodidae represents approximately 80% of the world tick fauna [4]. *Ixodes acutitarsus* and *Rhipicephalus sanguineus* are hard bodied tick belongs to the family ixodidae and distributed throughout the globe [5]. In Asia this tick is mainly distributed in India, Nepal, Bhutan, China, Burma, Taiwan, Japan, Pakistan and Bangladesh [6, 7]. These parasites were endemic in rural areas where farmers rear different kinds of livestock for their livelihood and transmit different varieties of diseases such as babesiosis, lyme diseases, spirochetes and rickettsia [7-9] to animals as well as to human being, particularly during rainy seasons. Tick and tick borne diseases are major constrain to the improvement of livestock. They reduced growth and milk production, and cause high calf and adult cattle mortalities in many situations. Eighty percent of the cattle population is reported to be infected with this tick and tick borne diseases all around the world, especially in tropical and sub tropical countries, including India [10, 11]. In India *I. acutitarsus* is reported from domestic cattle (*Bos indicus*), yak (*Bos grunineus*), goat (*Capra hircus*), dog (*Canis lupus familiaris*) and sheep (*Ovis aries*), whereas, *R. sanguineus* is reported from dog (*C.l. familiaris*), horse (*Equus ferus caballus*) and barking deer (*Muntiacus muntjak*) of Arunachal Pradesh, Assam and Sikkim [7]. However, the parasites are not reported to be present among semi-wild cattle *Bos frontalis* (mithun). The present communication is the first record of the parasites from mithun in Arunachal Pradesh, a Northeastern state of India.

### MATERIALS AND METHODS

Different ectoparasites were collected from the skin of mithun (*Bos frontalis*) slaughtered at Ganga market (27°10'N-93°62'E) in Itanagar (Arunachal Pradesh, Northeast India). The external parasites were carefully removed with thumb forceps so that the mouth parts were not left behind during traction from the host animals. Soon after

collection, the specimens were immersed in glass vials having 70% ethanol and brought to the laboratory for identification. Alcohol fixed parasites were poured into a big Petridis and with light microscopic observation, five male *Ixodes acutitarsus* and two male *Rhipicephalus sanguineus* ticks were identified and keep them in a 70% ethanol. Alcohol fixed tick specimens were washed with distilled water, viewed and photographed under light microscope.

## RESULTS

*Ixodes acutitarsus* is a non segmented oval tick measures 3.75 mm in length and 2 mm in width. Mouth appendages consist of chelicerae and pedipalps. Dorsal surface possesses one pair of elongated palp, a hypostome, a basis capitulum without porose area and the conscutum which is cover almost whole dorsal surface of the tick. Anterior most part of the ventral side have one pair of elongated palps and a hypostome with sharp teeth having 2/2 dentition. The internal and external spurs were visible on coxae 1 to coxae 4 of the tick, and one pair of sharp elongated spurs with the internal spur pointed towards the genital aperture on coxae 1 in the ventral side. Genital aperture in male *I. acutitarsus* is observed between the coxae 3. One pair of spiracle plate, one pair of adanal plate and two single sclerotized plates is also observed under light microscope. Anterior to the anus the oval-shaped anal groove was visible.

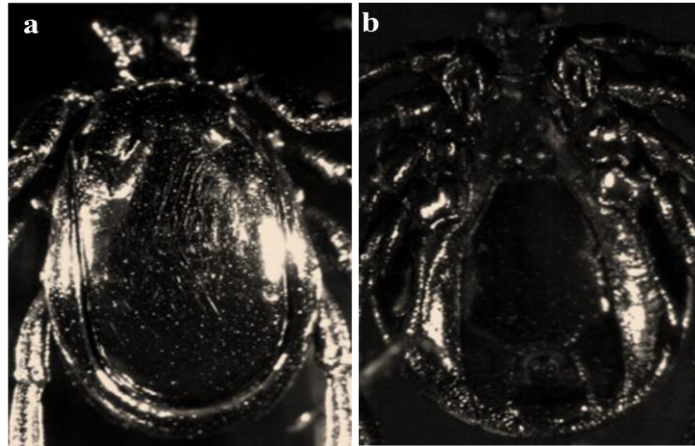


Fig.1: Light microscopy image of male *Ixodes acutitarsus* showing dorsal (a) and ventral (b) surface of the body.



Fig.2: Light microscopic image of male *Rhipicephalus sanguineus* showing dorsal (a) and ventral (b) surface of the body.

*Rhipicephalus sanguineus* is a small hard bodied tick, mid brown in color and measures 3.12 mm in length and 1.72 mm in width. Dorsal side of the tick possesses one pairs of short palps and a basis capitulli without porose area.

Lateral groove, median groove and festoons also observed in the dorsal side of the body. The ventral part of *R. sanguineus* revealed a pair of short palp, a hypostome having with 2+2 arrangement of dentition. Coxae 1, have one pair of distinct external and internal spurs. The genital aperture of the male have a broad V shaped structure. At the posterior part of ventral side it possesses one pair of adanal shield and one pair of accessory adanal shields. The anal groove position is found to be posterior to the anus in the tick.

### DISCUSSION

The present report is the first record of *Ixodes acutitarsus* and *Rhipicephalus sanguineus* from mithun (*Bos frontalis*), a semi-wild cattle of Northeast India. Though several species of *Ixodes* ticks like *I. kashmiricus*, *I. acutitarsus*, *I. ovatus* were reported from domestic cattle (*Bos indicus*), *I. acutitarsus*, *I. ovatus* from yak (*Bos grunniens*), *I. kashmiricus*, *I. ovatus*, *I. acutitarsus* from goat (*Capra hircus*), *I. kashmiricus*, *I. acutitarsus*, *I. ovatus* from sheep (*Ovis aries*), *I. acutitarsus*, *I. ovatus* from dog (*Canis lupus familiaris*) and *I. petauristae* from barking deer (*Muntiacus muntjak*), and several species of *Rhipicephalus* ticks like *Rhipicephalus haemaphysaloides* from domestic cattle (*B. indicus*), *R. turanicus* from goat (*C. hircus*), *R. haemaphysaloides*, *R. turanicus* from sheep (*O. aries*), *R. turanicus*, *R. sanguineus* from dog (*C. l. familiaris*), *R. sanguineus* from horse (*E. f. caballus*), *R. haemaphysaloides* from barking deer (*M. muntjak*), only two species of Acari ticks i.e. *Bophylus microplus* and *Haemaphysalis davisii* were recorded from mithun (*Bos frontalis*) [7]. Ticks are widely distributed all around the world which transmits different types of infectious pathogens like *Borrelia burgdorferi*, *B. afzelli*, *Anaplasma phagocytophilum*, *Coxiella burnetii*, *Francisella tularensis*, *Bartonella henselae*, *Babesia microti* and *Babesia venatorum* to livestock as well as human being [1]. It is estimated that almost 80% of the world cattle populations were infected by tick and tick borne diseases and in India and its neighboring countries like Pakistan and Bangladesh a considerable percentage of *Babesia bigemina* (6.2%), *Theileria annulata* (0.4%), *Theileria mutants* (10.8%), and *Anaplasma sp.* (0.8%) infections in cattle, *Theileria ovis* (14.6%) in goat and *Babesia canis* (10.2%) in dog were recorded [7]. India is predominantly an agricultural country where almost 70% of total population lives in rural areas in which their daily livelihood mainly depends on agriculture and livestock. It has been reported that in India damage caused by ticks and tick borne diseases to the livestock animals is revealed to be at the extent of an US\$ 498.7 million per annum [12]. The lack of accurate data on the epidemiology of ticks and tick borne diseases in the region makes it difficult to determine their impact, therefore investigation are inevitable to estimate the extent of economic losses incurred due to ticks and tick borne diseases to formulate proper management strategy of different semi-wild and wild animals in northeast India.

### CONCLUSION

The present study is the first record of *Rhipicephalus sanguineus* and *Ixodes acutitarsus* tick from mithun (*Bos frontalis*) of Arunachal Pradesh, Northeast India. Several species of ticks were reported from domestic cattle, buffalo, goat, sheep, mithun, birds, wild mammals, dog, tortoise, wild boar, yak, monkey, camel, tiger, snake, deer, pig and bats in India. Livestock animals in India, including Northeastern India are infected with different species of ticks and tick borne diseases but because of limited awareness regarding the impact of ticks and lack of suitable veterinary facilities, the control strategy has not achieved impetus. Therefore, educating people on proper animal husbandry and creating awareness on tick epidemiology would be necessary to reduce the effect of ticks and tick borne diseases in these areas and improve the living standard of the rural society.

### Acknowledgement

This study was supported by the UGC Non-NET fellowship to Bhabesh Ronghang. Infrastructural support from DSA (UGC-SAP) programme to the Department of Zoology and UPE Biosciences programme to the school of life science, NEHU is gratefully acknowledged. Thanks are due to the Head, SAIF, NEHU for providing SEM facilities.

### REFERENCES

- [1] A. L. Reye, V. Stegney, N. P. Mishaeva, S. Velhii, J. M. Hubschen, G. Lgnatyev, C. P. Muller, *PLoS ONE*, **2013**, 8, e54476.
- [2] J. H. Oliver, *Annul. Rev. Eco. Syst.*, **1989**, 20, 397- 430.
- [3] D. E. Sonenshine, Oxford University Press, New York, **1991**.
- [4] F. Jongejan, G. Uilenberg, *Parasitology*, **2004**, 129, S3-S14.
- [5] L. L. Chao, C. M. Shi, *Exp. Appl. Acarol.*, **2012**, 56,159-164.

- 
- [6] K. F. Teng, Z. J. Jiang, Science Press, Beijing (in Chinese)., **1991**, 1:6, 359 pp.
- [7] S. Ghosh, G. C. Bansal, S. C. Gupta, D. Ray, M. Q. Khan, H. Irshad, M. D. Shahiduzzaman, U. Seitzer, J. S. Ahmed, *Parasitol. Res.*, **2007**, 101, s207-s216.
- [8] C. M. Shih, L. P. Liu, W. C. Chung, S. J. Ong, C. C. Wang, *J. Clin. Microbiol.*, **1997**, 35, 450-454.
- [9] L. L. Chao, Y. J. Chen, C. M. Shih, *Int. J. Infect. Dis.*, **2011**, 15, e182-e187.
- [10] J. J. de Castro, A. D. James, B. Minjauw, *Exp. Appl. Acarol.*, **1997**, 21, 3-19.
- [11] FAO, Food and Agriculture Organization of the United Nations, Rome, **2004**, pp 25-77.
- [12] B. Minjauw, A. McLeod, Centre for Tropical Veterinary Medicine, University of Edinburgh, UK, **2003**.