

Research Article



Prevalence and Morphological Identification of Tick Species Infestation in Goat in Chittagong, Bangladesh

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Abstract | Ticks are blood sucker, ecto-parasites of a wide range of mammals that enforce major economic threats to the livestock industry throughout the world. The present cross sectional study was conducted to assess the prevalence of tick in goat's population of three different areas (Kaptai, Kattoli and Chittagong Veterinary and Animal Sciences University) of Chittagong, Bangladesh. A total of 60 goats were examined for tick infestation in three places using random positive sampling technique. Among the breed, Black Bengal goats were highly affected (53.33%) followed by Jamuna pari (33.33%) and cross breed (13.33%) ($P=0.00$). Black coat coloured (53.33%) were mostly infested than another coat coloured animals ($P=0.00$). Age less than 6 months goats were mostly affected (55.0%) than adult goats (26.67%) ($P=0.00$). In this study, males were more prone (58.33%) than female goats (41.67%) ($P=0.036$). The ticks were more in goat reared under semi intensive system (63.33%) than free range (20.0%) and the intensive system (16.67%) ($P=0.00$). Ticks were found mostly around the ear (66.67%) than the other body parts. The most abundant ticks were identified as *Boophilus* sp. (61.67%), followed by *Haemaphysalis* sp. (30.0%) and *Hyalomma* sp. (8.33%) ($P=0.00$).

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Introduction

The Tick is one of the most economically important parasites of goat in tropical and subtropical countries like Bangladesh (Jongejan and Uilenberg, 1994). Ticks are hematophagous arthropods belonging to the Class Arachnids. Ticks are important to livestock and wildlife animals because of transmitting different vector borne diseases, directly damage the host body by piercing the skin. They are acting not only as potential vectors, but also as reservoirs of certain infectious agents such as *Pasteurella multocida*, *Brucella abortus* and *Salmonella* Typhimurium in

man and animals (Jongejan and Uilenberg, 2004). Specialization of mouthparts of parasite to take food from host body for advantage of specific attachment sites and utilizing different food sources (Simkova et al., 2002). They attach to a host for a blood meal and they can cause skin irritation and anemia. Usually a tick or its instars suck 0.8 to 2.0 ml blood in a day and one female tick can suck more blood than thirty times of her weight during engorgement (Sangwan et al., 1995). Opara and Ezech (2011) estimated that more than 80% of goat population is infested by ticks, leading tick borne diseases such as hemorrhagic fever, anaplasmosis, theileriosis, louping ill and viral en-

cephalomylites. Ticks also transmit different zoonotic diseases like Lyme Borreliosis, tick borne encephalitis, relapsing fever or Rocky Mountain spotted fever (Gray, 1998). Different animals and environmental factors are associated with the co-infection pattern of tick having spatial and temporal pattern (Gilbert, 2010). Ticks are found in different parts of the body, such as ear, mouth, muzzle, thoracic and abdominal region, around the scrotum, tail and lower part of the leg sometimes found in the vulva and anal region (Biswas, 2003). Ticks also irritate the animal body, resulting damages the hide and skin leading to significant financial losses to livestock's farmer (Biswas, 2003). There are very minimum literatures and information about the ticks and their infestation in goat in Bangladesh. Therefore, the present study was undertaken to estimate the prevalence of ticks in relation to age, sex, breed, coat color, rearing system and available tick species found on the area.



Figure 1: *Boophilus* sp.

Materials and Methods

Study Area

The study area was conducted in the kaptai upazilla under Chittagong district near the river of kornofully. This area was mostly hilly, so most of the animal grazing in the hill and affected different type of tick. Another study area was conducted in SAQTVH which was located in the Chittagong metropolitan area, large number of goat came in hospital which was affected tick infestation. Kattoli was also located in the Chittagong metropolitan area, so these three areas where help to collected tick sample easily.

Study Design

The study design was cross sectional.



Figure 2: *Haemaphysalis* sp.

Study Population

The study was carried out for a period of six months from January to June, 2015. During this time, a total number of 60 tick infested goats were considered from three different areas [(Kaptai, kattali and Shahidul Alam Quadery Teaching Veterinary Hospital (SAQTVH)], CVASU of Chittagong, Bangladesh.

Sample Collection, Preservation and Examination

The sample (tick) was collected from goat in randomly different parts of the body, namely ear, mouth part, tail, legs and mostly (80%) tick from ear by using forceps. The samples were kept in 10% formalin containing vials. A record keeping sheet was used to record demographic information about goats. Later, the samples were transferred to the Parasitology laboratory at Chittagong Veterinary and Animal Sciences University (CVASU). Finally, with the help of microscopic examination three species of ticks (*Boophilus* sp., *Haemaphysalis* sp. and *Hyalomma* sp.) were morphologically identified according to Kettle (1994) and (Figure 1, 2 and 3).

Statistical Analysis

Statistical analysis was performed by using STATA-13 software. Significance of difference was determined by using chi square test. The value of $p \leq 0.05$ considered as statistically significant.

Results

The breed wise proportionate of tick infestation in Black Bengal, Jamuna Pari and cross breed were 53.33%, 33.33% and 13.33% respectively with a significant variation ($p=0.000$). The highest prevalence was found in Black coat color goats (53.33%) in comparison to others ($p=0.00$). According to age-

wise prevalence, young goats (<6 months) were more prone (55.00%) than other age (6 months to > 1 year) ($p=0.00$). Prevalence of tick infestation in male goats (58.33%) was found higher than female goats (41.67%) ($p=0.036$). Semi intensive system showed the highest prevalence (63.33%) to infestation than goat reared under free range and intensive management system. Among the different body parts, ear was mostly affected (66.67%) with significant difference ($p=0.00$). *Boophilus* sp. (61.67%) were mostly common than *Haemophysalis* sp. (30%) and *Hyalomma* sp. (8.33%).



Figure 3: *Hyalomma* sp.

Discussion

The present study was identified three tick species (*Boophilus* sp, *Hyalomma* sp and *Hemophysalis* sp) that previously been observed on the goat by Rony et al. (2010). All three species infest a broad range of host species and serve as vectors for several important disease agents of livestock and wildlife such as anaplasmosis, babesiosis etc. (Walker et al., 2003). In the current study, did not enumerate total tick populations on each host. In particular, expected to miss the most larval and many nymphal ticks because live sampling of ticks bias towards adults (Horak et al., 2006). Black Bengal goats were highly susceptible (53.33%) than Jamuna Pari (33.33%) and cross breed (13.33%) with significant variation ($p=0.00$) that agreed with Rony et al. (2010). The black coat color showed higher prevalence (53.33%) than others ($p=0.00$). There were no data available on coat color. The study counted far more infectious in males (58.33%) on the host than females (41.67%) ($p=0.036$). This is typical for the most of *Boophilus* sp. followed by *Haemaphysalis* sp.,

where the male tick spends more time than females on the host (Horak et al., 2007). The mechanisms underlying this sex bias could be due to horizontal transmission between species and mates (Horak et al., 2006). A study conducted by Kabir et al. (2011) reported that females are more supposed to get infected than the males, which may be due to difference in immune status. Moreover, stresses of production such as pregnancy and lactation make the female animals more prone to any infection. Tick infestation in younger goat (less than 6 months of age) was found more affected (55.00%) than the adult group (greater than 1 year of age) which is in agreement with Jugessur et al. (1998). Ticks were widely distributed in different body parts of the host, such as ear, neck, tail, mammary gland, udder, groin and perianal region, of which ear (66.67%) was the most affected parts of the animal body and tail (1.67%) was the least. However, Kabir et al. (2011) reported that groin (48.75%) was most affected parts of the animal body and face and neck (30%) were the least. The ticks were recovered on the goats under semi-intensive system (63.33%) whereas intensive system were about to free from tick infestation (16.67%). This finding was agreed with Rabbi (2006) who reported, the highest ectoparasitic infestation in semi-intensive system (59.7%) followed by an extensive system (33.5%) and intensive system (8.27%). Whereas, Rony et al. (2010) observed that, higher prevalence of ticks in goats under free-range (83.57%) than semi-intensive (60.0%) and intensive condition. It may be due to the restricted feeding and housing management.

Conclusion

Ecto-parasitic disease is a worldwide problem and considered as a major obstacle in the health and productivity performances of animals. Ticks are directly or indirectly involved in different diseases and also hamper in production. In the current study, three genuses of ticks were identified as *Boophilus*, *Haemophysalis* and *Hyalomma* in goats from three areas. So it has been concluded that ticks are prevalent in the goat population in this study area. Heavily localization of ticks was seen on the ear in goats. Semi intensive rearing system had more prevalent to tick infestation than other management system. The acaricide should be sprayed inside the animal shed to prevent the infestation of animals. Regular deworming and proper husbandry practices also suggested to the animal owners.

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Conflict of Interest

The authors declare that they have no conflict of interest.

Authors' Contribution

All authors contributed equally.

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