

STUDY ON THE PREVALENCE AND IDENTIFICATION OF DIFFERENT TICK SPECIES IN CATTLE, SHEEP AND GOAT OF SINDH

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Abstract

In our study the prevalence % species composition and attachment sites of hard ticks for domestic ruminants were studied in Sindh, province of Pakistan. There were 780 animals including 420 cattle, 210 sheep and 150 goats examined for ticks. The overall prevalence % of ticks were 43.8% on cattle, 24.8% on sheep and 50.7% on goats. Goats had highest prevalence % of ticks of all animals. The five species of hard ticks belonging to three genera were identified, such as *Hyalomma asiaticum*, *Hyalomma inermis anatolicum*, *Rhipicephalus sanguineus* and *Rhipicephalus bursa*. The *Hyalomma anatolicum* was the most prevalent species 69.8% for cattle, while *Rhipicephalus bursa* 43.8% were most prevalent for sheep and goats, respectively. Tick distribution on the host was different for different animal species. For cattle preferred place of attachment was udder 35% and head and neck 29%. The ears were the most heavily infested parts of the body, in sheep and goats, respectively, accounting for 40% and 61% of tick attached to them. The results indicate that there is high level of variation in tick prevalence, species distribution and tick attachment preference among domestic ruminants. Economically significant tick species predominantly in the study have pointed towards possible risk of tick borne disease and should urge for integrated surveillance of ticks, strategic application of acaricides and better management practices to minimize losses in production and reduce disease transmission in Sindh, province of Pakistan.

INTRODUCTION

The ixodid ticks of the family Ixodidae are some of the most medically and economically important ectoparasites affecting domestic ruminants globally. Ixodid ticks cause considerable damage as

results of their bold feeding habits blood loss, lesions to skin, irritation, sensitization and allergic reactions, toxicity and toxicoses resulting in decrease of weight, milk and other reproductive and productive performance of host animals (Sajid

et al., 2020). Additionally ixodid ticks transmit number of important infectious agents such as viruses, rickettsia, spirochaetes, protozoa and bacteria, which affect not only animals but also humans, hence pose threat to animal and public health (Gharbi et al., 2006). It is important to strengthen tick control measures through implantation of the integrated tick control program and surveillance programs to prevent spread and damage by tick infestation. Early identification of the dominant tick species and the animals susceptible to infestation is vital to initiate the tick control measure (Rajput et al., 2006 and Kumbhar et al., 2018). The Ixodidae family is largest group of parasitic ticks in the world, having about 13 genera and more than 650 recognized species (Rizwan et al., 2019 and Kaleri et al., 2015a). Pakistan is largest country with one of the largest populations of livestock including cattle, sheep and goats in the region; livestock is fundamental importance for the rural livelihood and economic development of country. The province of Sindh, Pakistan with arid to semi-arid conditions and vast grazing practices, supports considerable livestock populations and favorable environment for existence, proliferation, and transmission of ixodid ticks (Rafiq et al., 2025 and Kabir et al., 2021). Ticks' infestation and associated tick-borne disease continue to hamper productivity of livestock in this province, this it is required to update our knowledge on the prevalence of and distribution of hard tick species of domestic ruminants in this province. Thus, the objectives of the current study were to assess the prevalence, species composition and distribution patterns of ixodid ticks infecting cattle, sheep and goats in the Sindh Province.

Material and Methods

Present study was carried out to find the prevalence, species composition and sites of attachment of hard ticks of domestic ruminants from Sindh, province, Pakistan. The survey was conducted over selected livestock rearing areas that cover main agro-ecological zones of province. Sindh has an arid to semi-arid climate with hot summers, mild winter, low to moderate annual

rainfall, extensive grazing systems and hot summer environment, which favors survival and propagation of hard ticks throughout the year.

A cross-sectional survey was conducted in selected villages and livestock farms. Randomly, 780 domestic ruminants, 420 cattle, 210 sheep, and 150 goats were selected and examined without paying attention to any age, sex, or breed for the presence of ticks by different teams of Veterinary Research and Diagnosis CVDL, Sindh, Tandojam. Animals were carefully checked for the presence of ticks and common predilection sites such as shoulder, ears, head, and neck, tail and anal region, groin and udders were inspected in detail.

The forceps were used to remove all visible ticks from animals, in order not to damage the mouth parts. The collected specimen was put in suitable labeled screw capped tubes with 70% ethanol for preservation and transportation to the laboratory. The subsequent examination of ticks' specimens was carried out under a stereomicroscope and species identification was done using the standard morphological identification keys described by (Monfared et al., 2015), based on their morphological features.

The prevalence of infestation was expressed as the percentage of animals infested to the total number of animals examined of each host species. The distribution of the ticks was presented as percentage of each species collected; the tick attachment sites preference was expressed as a percentage of ticks recovered from each anatomical site examined.

Results

In this study there were total 780 domestic ruminants (cattle, sheep and goats) examined for tick infestation. A total of 184 (43.8%) of the total 420 cattle were infested with total 336 isolated ticks. A total of 52 (24.8%) of 210 sheep sampled were infested with total of 586 ticks. The goats had highest number of infested animals (150) of which 76 (50.7%) were collected (423) ticks. Goat had the highest highest prevalence rate of ticks, while sheep had lowest proportion of tick infested individual, but the highest number of isolated

ticks, suggesting a relatively high tick burden on infested sheep. Details are presented in Figure 1.

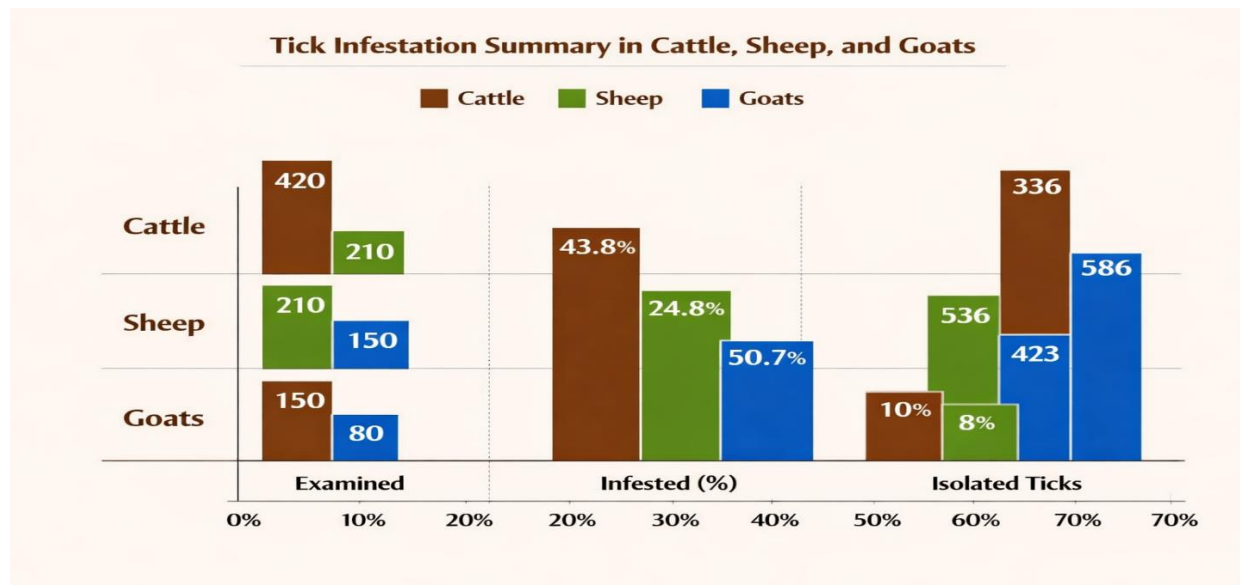


Figure 1. The prevalence % of ticks in domestics ruminants of Sindh.

The preferred site for attachment of ticks on the body of domestic ruminants

The results for tick distribution ranged between body regions among cattle, sheep and goat. The most infected body parts of cattle were udder 35% (35%), then the head/neck (29%) and tail and anal area (20%). The comparative infestation rate of the remaining areas was comparatively low as in groin (105), ears (3%) and shoulder (3%). In sheep the ears were the most common attachment site

(40%) tick attachment, followed by tail and anal region (29%), udder (20%), groin (8%) and head and neck (3%) with no ticks found on the shoulder. Likewise, the goats' ears had the highest percentage of attachments (61%), with tail and anal region coming in at (18%), the groin at (13%), and udder at (18%). There were no ticks found on the head and neck or shoulder of the goats.

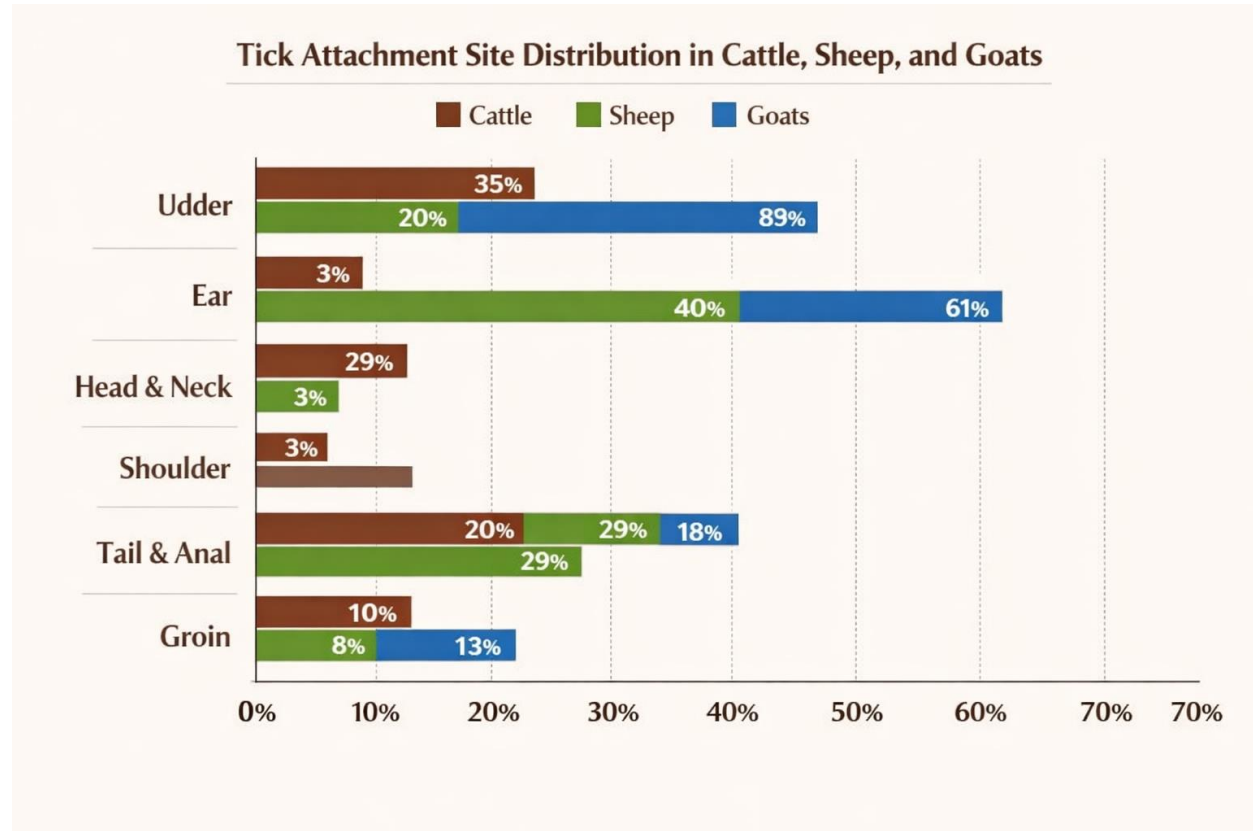


Figure 2. The prevalence % of ticks found on the different body parts of domestic ruminants

The prevalence % of different tick species found on the domestic ruminants

The results for domestic ruminants under investigation had different tick species distribution. With (69%) of the tick sampled, *Hyalomma anatolicum* was the most common species in cattle, followed by *Hyalomma asiaticum* (18.7%) and *Rhipicephalus bursa* (11.5%). The most common species in sheep was *Rhipicephalus bursa*

(43.8%), which was followed by *Hyalomma inermis anatolicum* (30.5%), *Rhipicephalus sanguineus* (16.9%), and *Haemaphysalis inermis* (8.8%). With (44.2%) of all ticks collected, *Rhipicephalus sanguineus* were the most common tick species among goats, followed by *Rhipicephalus bursa* (40.2%) and *Haemaphysalis inermis* (15.7%). In the current investigation, no *Hyalomma* species were found in goats.

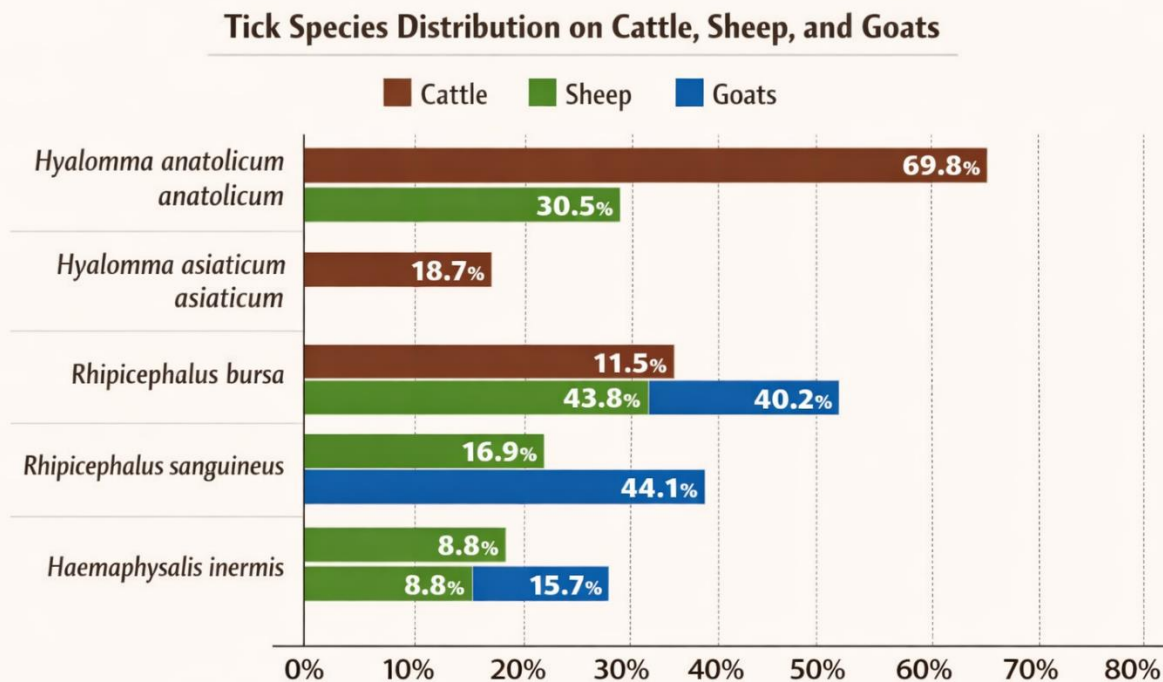


Figure 3. The presence % of tick infestation rate on the outer surface of the domestic ruminants.

Discussion

The different pathogens including virus, bacteria, protozoa and filarial nematodes are associated with ticks as vector in both animals and human (Mustafa et al., 2014 and Kaleri et al., 2016). Hence knowledge of the regional distribution, abundance, and species composition of ticks is a crucial component to the understanding the epidemiology of tick-borne disease and to creating effective control measures. The results of present research revealed that 43.8%, 24.8% and 50.7% of the examined domestic ruminants were infested with ticks in cattle, sheep and goats, respectively, which showed that goats had the highest tick infestation rate (Irshad et al., 2010 and Rind et al., 2023). The results show that tick infestation is still a significant factor affecting livestock production in study areas. Five species of hard ticks in three genera were on the examined animals. The species identified were; *Hyalomma anatolicum*, *Hyalomma asiaticum*, *Hyalomma inermis* *anatolicum*,

Rhipicephalus sanguineus and *Rhipicephalus bursa*. This increased occurrence in goats could be due to differences in the management system, grazing habits and contact with tick infested areas compared to the cattle and sheep. In parallel with our findings *Hyalomma anatolicum* has been reported to be widely distributed throughout the Sindh. This species is recognized as an important vector for theileriosis and is capable of transmitting several pathogenic organisms including *Theileria*, *Ixodes*, *Theileria equi*, *Babesia caballi*, *Trypanosoma theileri*, and hemorrhagic fever virus Crimean Congo (Sultana et al., 2015; Kaleri et al., 2025b and Sajid et al., 2020). The predominance of *Hyalomma anatolicum* in cattle observed in the present study further emphasized its epidemiological importance in livestock Sindh. Nasiri 2010 conducted a study in Adbanan county in southwestern part of Iran and identified two genera and five tick's species *Hyalomma asiaticum*, *Hyalomma dromedarii* and

Haemaphysalis sucata, *Hyalomma anatolicum*, *Hyalomma* and *Hyalomma marginatum* 43.17, 6.37, 44.67, 0.24 and 5.55%, respectively. These observations are like the present ones on the presence of *Hyalomma* species; but in contrast, no *Hyalomma* species were observed in their survey. These could be due to geographic location, climate, vegetation, livestock management and host availability. The present study was carried out in Sindh, province of Pakistan, which has an arid to semi-arid climate with hot and very long summer season, mild and sort winters, and variable rainfall and large grazing area (Rehman et al., 2017 and Soomro et al., 2025). Several hard tick species have habitats that are conducive to their development and survival in these ecological and climate conditions. The distribution, seasonal abundance and species diversity of ticks has been reported to be affected by environmental factors like temperature, humidity, vegetation cover, and host density. The variation in prevalence and species composition of ticks may therefore be attributed to differences in geography and climate between Sindh and other parts of the country. Ticks are involved in transmission of various pathogen including viruses, bacteria, protozoa and filarial nematodes and both animals and humans (Suthar et al., 2026; Parveen et al., 2011 and Khan et al., 2026). Hence, data on distribution and abundance and species composition at the regional level is critical to understanding the epidemiology of tick-borne disease and to effective tick control. The *Rhipicephalus bursa* and *Rhipicephalus sanguineus* are both species commonly found in study conducted by (Riaz et al., 2017). Likewise, both species occurred commonly in the current study, on both sheep and goat, indicating that the ticks are quite adaptable to a broad spectrum of both ecological and host conditions. *Rhipicephalus sanguineus* is one of the most widely distributed tick species in the world and *R. sanguineus* can transmit various important pathogens such as *Rickettsia rickettsi*, *Coxiella burnetii*, *Ehrlichia* spp. and *Anaplasma* spp. Some of most common species are *Luecyzoon canis* (Shah et al., 2015) and *Leishmania infatum*. The high prevalence among

goats in the current study suggested that it's importance in veterinary and public health and calls for ongoing monitoring and control of ticks in study area. The distribution of ticks on different parts of body also differed among species of animals examined. The most heavily infested area in cattle was udder 35%, then the head and neck 29% and lastly the tail and anal area 20 with attached ticks. The ears 40% were the most preferred attachment site, followed by tail and anal region 29% and udder 20% in sheep. Likewise, in goats, the ears 61% were the most affected part of the body followed by the tail and anal region 18% and groin 13%. The ears and shoulders 3% had the lowest infestation among cattle, whereas the head and neck 3% had the lowest infestation among sheep, and the udder 8% had the lowest infestation in goats. Most ticks removed from the host during the current study were found in areas with less hair, less skin and plenty of blood supply. This preference for these anatomical sites may be related to the microclimatic conditions that make them favorable in attachment, feeding and survival. This finding has been documented by (Khan et al., 2000 and Shah et al., 2015), who proposed that tick prefer warm, moist, enclosed areas of the body having thin skin and high vascularization. The results of the present study thus confirm the previous studies on the site preference of hard ticks and will be helpful for formulation of specific tick control program in domestic ruminants in Sindh province in Pakistan.

Conclusion

In present study, *Hyalomma anatolicum anatolicum*, *Rhipicephalus bursa* and *Rhipicephalus sanguineus* were found to be the most common hard ticks found on domestic ruminants in Sindh, province. To minimize tick-borne disease and optimize the health and productivity of livestock, effective tick control and regular surveillance is key. Present study thus conforms to the previous studies on site preferences of hard ticks and will be helpful for formulation of specific tick control program in domestic ruminant of Sindh, province.

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