



Short Communication

Point Prevalence of Hard Ticks (Ixodids) Infesting Domestic Ruminants of Lower Punjab, Pakistan

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ABSTRACT

The objective of this study was to determine the diversity and intensity of tick population infesting domestic ruminants in Districts Layyah and Muzaffargarh of lower Punjab (Pakistan). A total of 1050 cattle, 700 buffaloes, 1400 each of sheep and goats and 250 camels were randomly selected and examined for the prevalence of tick infestation. The highest (P=0.00) prevalence of tick infestation was found in cattle (n=789/1050; 75.1%) followed in order by goat (n=723/1400; 51.6%) and buffaloes (n=281/700; 40.08%). None of the examined camels and sheep was found infested with ticks. *Hyalomma anatolicum* was the most abundant followed by *Rhipicephalus sanguineus*. Appropriate control measures for ticks need to be employed in the study area for economical animal production.

Key Words: Tick infestation; Taxonomy; Ixodids; Hard ticks; Ruminants; Punjab, Pakistan

INTRODUCTION

Livestock, the backbone of Pakistan's agricultural economy, is at risk of decline in production due to number of ecto- and endo-parasites. Among ecto-parasites, ticks have been recognized as the notorious threat due to severe irritation, allergy and toxicosis (Niyonzema & Kiltz, 1986). They are known to transmit diseases like babesiosis, theileriosis, anaplasmosis, etc. (Norval *et al.*, 1984). Ticks act not only as potential vectors but also as reservoirs of certain infectious agents e.g. *Pasteurella multocida*, *Brucella abortus* and *Salmonella typhimurium* in man and animals (Jongejan & Uilenberg, 2004). Various studies have shown that acaricide-treated/tick free animals produce better than tick infested animals (Scholtz *et al.*, 1991; Jonsson *et al.*, 1998; Sajid *et al.*, 2007). The impact of ticks and tick borne diseases on the individual and national economics, warrants application of appropriate tick control strategies on priority basis (Bansal, 2005). Most of the investigations on prevalence of tick species in Pakistan are more than a decade old (Chaudhry *et al.*, 1969; Iqbal, 1971; Siddiqi & Jan, 1986; Khan, 1993), whereas periodical monitoring of tick infestation is an essential component for formulating effective control recommendations. This paper describes point prevalence of hard ticks (Ixodids) on some species of domesticated animals in lower Punjab, Pakistan.

MATERIALS AND METHODS

The study area included District Layyah and

Muzaffargarh of the lower Punjab (Pakistan) situated north and south between the Indus and Chenab rivers (Fig. 1). Cattle, buffaloes, goat, sheep and camel raising are major agricultural enterprise of the farmers of the study area in descending order of importance. Based on proportional allocation (Thrusfield, 1995) a total of 1050 cattle, 700 buffaloes, 1400 each of sheep and goats and 250 camels were randomly selected and examined for the tick infestation. Point prevalence of ticks was determined using the following formula (Thrusfield, 1995).

$$\text{Point Prevalence (\%)} = \frac{\text{Number of existing cases during specified time period} \times 100}{\text{Population at risk during specified time period}}$$

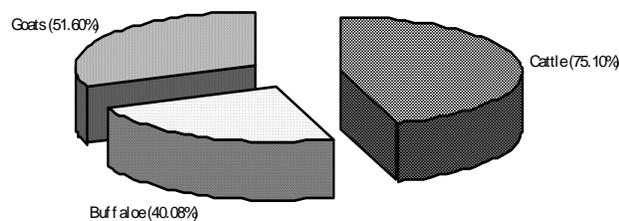
Tick specimens were collected using forceps without damaging their mouthparts (Soulsby, 1982) and preserved in 70% ethyl alcohol. Complete record was maintained for each tick specimen for their origin regarding species of the host. Permanent mounts of the tick specimens were prepared following Soulsby (1982). Morphological characterization of ticks was carried out using a stereoscopic microscope according to the keys given by Mc Carthy (1967), Kaiser and Hoogstraal (1964) and Estrada-Pena *et al.* (2004).

RESULTS AND DISCUSSION

Out of the five domestic ruminants examined for the prevalence of tick infestation, only three viz; cattle, buffalo and goat were found infested with ticks. No ticks were found on sheep and camels of the study area. The attributed reasons for absence of ticks in sheep and camel may include

Table I. Prevalence of *Hyalomma anatolicum* and *Rhipicephalus sanguineus* in bovines and caprines of the Layyah and Muzaffargarh Districts, Punjab (Pakistan)

Sr. No.	Name of species	Percentage infestation in cattle (P = 0.00)	Percentage infestation in buffaloes (P = 0.00)	Percentage infestation in goats (P = 0.00)
1	<i>Hyalomma anatolicum</i>	41% (324/789)	36.3% (102/281)	42.7% (309/723)
2	<i>Rhipicephalus sanguineus</i>	25.5% (201/789)	29.6% (83/281)	37.6% (272/723)
3	Dual infestation	33.5% (264/789)	34.1% (96/281)	19.6% (142/723)

Fig. 1. Physical Map of Punjab province showing various districts and surrounding provinces/ countries. Shaded area shows the study districts**Fig. 2. Prevalence (%) of tick infestation in various species of domestic ruminants (P = 0.00) in Districts Layyah and Muzaffargarh of lower Punjab (Pakistan)**

the free grazing practice for sheep and solitary populations of camels as both of these factors can decrease the possibilities of ticks to attack on their hosts. Furry wool in sheep might be an additional natural protective tool against tick infestation. But the exact and appropriate reasons for lower or zero prevalence of ticks in these subjects should be sort out in future studies.

Among the infested species of domestic ruminants of the study area (cattle, buffalo & goat), the highest (P=0.00)

prevalence of tick infestation found in cattle (n=789/1050; 75.1%) followed in order by goat (n=723/1400; 51.6%) and buffalo (n=281/700; 40.08%) as shown in Fig. 2.

Hyalomma anatolicum was predominant tick species both in cattle, buffaloes and goats followed by *Rhipicephalus sanguineus*. In cattle population, the prevalence of *Hy. anatolicum* and *R. sanguineus* was 41% (324/789) and 25.5% (201/789), respectively. Mixed infestation of both the tick species was found in 33.5% (264/789) of infested animals. In buffaloes, the prevalence of *Hy. anatolicum* and *R. sanguineus* was 36.3% (102/281) and 29.6% (83/281), respectively while 34.1% (96/281) animals were infested with both of the species. In caprines, the prevalence of *Hy. anatolicum* and *R. sanguineus* was 42.7% (309/723) and 37.6% (272/723), respectively while 19.6% (142/723) of animals were infested with both the species.

As far as could be ascertained, only a limited amount of literature is available on the prevalence and associated risk factors of tick infestation in Pakistan (Chaudhry *et al.*, 1969; Iqbal, 1971; Siddiqi & Jan, 1986). For example, Khan *et al.* (1993) identified seven species of ticks including *R. sanguineus*, *Boophilus microplus*, *Boophilus annulatus*, *Hy. anatolicum*, *Hy. aegyptium* and *Dermacentor marginatus* from district Faisalabad (Pakistan). Tick infestation was recorded as 28.2%, 14.7%, 18.8% and 12.3% in cattle, buffalo, sheep and goat, respectively. In another study of the same district, 32% of buffaloes, 25% of cattle and 17% of sheep were found infested with ticks (Iqbal, 1971). The species identified included *Hy. aegyptium*, *Hy. anatolicum* and *Boophilus microplus*. In district Lahore, *Haemaphysalis brunati* was reported infesting domestic ruminants (Durrani, 1992). In a study conducted in north-western frontier province (NWFP) of Pakistan, twelve species of ticks, representing five genera were identified from buffaloes, sheep, goats, dogs and camels of six districts including Bannu, Dir, Peshawar, Swat and Mardan (Siddiqi & Jan, 1986). The identified species included *Boophilus microplus* (7.86%), *B. sharifi* (0.47%), *Dermacentor raskimensis* (0.23%), *Ha. cormupunctata* (0.12%), *H. montgonervi* (0.12%), *Hy. anatolicum* (7.86%), *Hy. excavatum* (0.27%), *Hy. detritum* (1.41%), *Hy. dromedarii* (0.58%), *Hy. marginatum toranicum* (0.12%), *R. haemaphysaloides* (0.23%) and *R. sanguineus* (5.16%). Another study of Ixodids of sheep and goats of five areas of different agro-ecological zones of Sind province was conducted by Hussain and Kumar (1985). Sixteen species of ticks were recorded infesting 63008 sheep and goats of the province.

Keeping in view the previous reports of tick infestation in domestic ruminants, it can be concluded that the most prevalent species of ticks are *Hy. anatolicum* followed by other reported species.

The climatic determinants of the study areas are very important in the prevalence of ticks in domestic ruminants. The poor husbandry practices of small holder dairy farmers may be a determinant making the animals more prone to tick infestation. Keeping in view the results of this study, the farmers of the study area should be educated about the significance of the disease through local extension programs. Moreover, a stress should be given to practice a routine preventive therapy against ticks rather than treating the animals at the cost of lowered milk production (Sajid *et al.*, 2007).

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