



**PREVALENCE OF TICKS INFESTING CATTLE AT GOVERNMENT LIVESTOCK
EXPERIMENTAL FARM FAZILPUR, DISTRICT RAJANPUR, PAKISTAN**

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Received 29th May 2019; Revised 28th June 2019; Accepted 28th July 2019; Available online 1st Dec. 2019

<https://doi.org/10.31032/IJBPA/2019/8.12.4892>

ABSTRACT

The present investigation was carried out during May-November 2016 to examine the prevalence of ticks in cattle at Government Livestock Experimental Farm Fazilpur, District Rajanpur. During the present study 600 cattle were examined and the following genera of ticks were recovered; *Hyalomma* (47.33%), *Dermacentor* (6.16%), *Amblyomma* (1.83%), *Rhipicephallus* (2%), *Boophilus* (2.5%) and *Ixodes* (3.16%). Results regarding the relationship between sex and ticks infesting cattle showed that *Dermacentor* (16.20%), *Amblyomma* (7.62%), *Rhipicephallus* (7.62%), *Boophilus* (4.23%) and *Ixodes* (5.08%) were more prevalent in male animals, whereas prevalence of *Hyalomma* was highest (52.69%) in female animals. Age wise prevalence showed that the *Hyalomma* was highest (61.70%) in age group of 37-72 months while the prevalence was lowest (20%) in age group of 109-144 months. The highest prevalence of *Dermacentor* (12.76%), *Amblyomma* (4.25%), *Rhipicephallus* (4.25%) was in age group of 73-108 months while prevalence of *Dermacentor* (2.97%), *Amblyomma* (0.85%), *Rhipicephallus* (0.85%) was lowest in age group of 37-72 months. The highest prevalence of *Boophilus* (7.5%) and *Ixodes* (12.5%) was in age group of 109-144 months while lowest prevalence was recorded for *Boophilus* (1.70%) and *Ixodes* (1.27%) in age group of 37-72 months. The relationship between body weight and ticks infesting cattle showed that the prevalence of *Hyalomma* was highest (57.29%) in body

weight group of 101-200kg while the prevalence was lowest (26.08%) in body weight group of 50-100kg. *Dermacentor* (13.04%), *Amblyomma* (4.34%), *Rhipicephallus* (4.34%), *Boophilus* (6.52%) and *Ixodes* (10.86%) were more prevalent in body weight group of 50-100kg. The difference was statistically significant ($P < 0.05$).

Key words: cattle, ticks, prevalence age, sex

INTRODUCTION

Ticks cause substantial losses in cattle production, in terms of diseases, reduced productivity and fertility and often death, and are economically the most important ecto-parasites of cattle [1]. Ticks suck blood, damage hides and skins introduce toxins and predispose cattle to myiasis and dermatophilosis [2]. Tick infestations not only lower the production of animals but also transmit a number of important protozoa, viruses, helminths [3]. The tick borne diseases are mostly confined to tropical and subtropical countries especially Pakistan, India and Bangladesh, where climatic conditions are conducive for the growth and development of many tick species [4]. Ticks and tick-borne diseases are of global importance because of their economic and health implications in livestock, human and companion animals [5]. Cattle ticks are responsible for severe economic losses in both dairy and beef cattle enterprises in the tropics [6].

Various studies have been conducted on ticks in different hosts in various part of world [7-11]. But no work has been done on the prevalence of ticks in cattle at Government Livestock Experimental Farm

Fazilpur, District Rajanpur. So, keeping in view the importance of the ticks the project was designed to study the overall prevalence, relationship between sex, age, body weight and ticks infesting cattle.

MATERIALS AND METHODS

The present investigation was carried out to determine the prevalence of ticks in cattle at Government Experimental Livestock Farm FazilPur, District Rajanpur. Ticks were collected from 600 animals. Ticks were placed in labeled vials containing 70% alcohol and brought to Parasitology laboratory, Bahauddin Zakariya University, Multan. The hosts' sex, age and body weight was also recorded. The following technique was used to make the permanent mounts of ticks [12].

Preparation of permanent mounts of ticks

Ticks were washed with distilled water to remove the fixative. The washed specimens were kept in 10% KOH until their bodies become transparent, then the specimens were washed to remove the alkali. The washed specimens were dehydrated with the graded series of alcohol 30, 50, 70, 90 and 100% for 10 to

15 minutes. Following dehydration, the specimens were cleared in xylene and mounted in canada balsam. The mounted specimens were identified under the compound microscope.

RESULTS

In this study the prevalence of the following genera of ticks were found; *Hyalomma*, *Dermacentor*, *Amblyomma*, *Rhipicephallus*, *Boophilus* and *Ixodes* in 600cattle's. The overall prevalence of parasite recorded was presented in **Table 1**. Results regarding the relationship between sex and ticks infesting cattle showed that the females had 62.21% prevalence and the male animals had 66.07% prevalence (**Table 2**). The relationship between age

and ticks infesting cattle (**Table 3**) showed that the prevalence of *Hyalomma* was highest (61.70%) in age group of 37-72 months while the prevalence was lowest (20%) in age group of 109-144 months. The relationship between body weight and ticks infesting cattle showed that the prevalence of *Hyalomma* was highest (57.29%) in body weight group of 101-200kg while the prevalence was lowest (26.08%) in body weight group of 50-100kg. *Dermacentor* (13.04%), *Amblyomma* (4.34%), *Rhipicephallus* (4.34%), *Boophilus* (6.52%) and *Ixodes* (10.86%) were more prevalent in body weight group of 50-100kg (**Table 4**).

Table 1: The overall prevalence of ticks infesting cattle (n=600)

Name of parasite	No. of animals infested	Prevalence %
<i>Hyalomma</i> spp.	284	47.33
<i>Dermacentorspp.</i>	37	6.16
<i>Amblyomma</i> spp.	11	1.83
<i>Rhipicephalus</i> spp.	12	2
<i>Boophilusspp.</i>	15	2.5
<i>Ixodes</i> spp.	19	3.16
Total	378	63

Table 2: The relationship between sex and ticks infesting cattle (n=600)

Name of Parasite	Male animals n=118	Female animals n=482
<i>Hyalomma</i> spp.	30(25.42%)	254(52.69%)
<i>Dermacentorspp.</i>	19(16.20%)	18(3.73%)
<i>Amblyomma</i> spp.	9(7.62%)	2(0.41%)
<i>Rhipicephalus</i> spp.	9(7.62%)	3(0.62%)
<i>Boophilusspp.</i>	5(4.23%)	10(2.07%)
<i>Ixodes</i> spp.	6(5.08%)	13(2.69%)

Table 3: The relationship between age and ticks infesting cattle (n=600)

Name of Parasite	Age (Month)			
	1-36 (n=278)	37-72 (n=235)	73-108 (n=108)	109-144 (n=40)
<i>Hyalomma</i> spp.	119(42.80%)	145(61.70%)	12(25.53%)	8(20%)
<i>Dermacentorspp.</i>	20(7.19%)	7(2.97%)	6(12.76%)	4(10%)
<i>Amblyomma</i> spp.	6(2.15%)	2(0.85%)	2(4.25%)	1(2.5%)
<i>Rhipicephalus</i> spp.	6(2.15%)	2(0.85%)	2(4.25%)	2(5%)
<i>Boophilusspp.</i>	5(1.79%)	4(1.70%)	3(6.38%)	3(7.5%)
<i>Ixodes</i> spp.	6(2.15%)	3(1.27%)	5(10.63%)	5(12.5%)

Table 4: The relationship between body weight and ticks infesting cattle (n=600)

Name of Parasite	Body weight (kg)			
	50-100 (n=46)	101-200 (n=185)	201-300 (n=92)	301-350 (n=277)
<i>Hyalomma</i> spp.	12(26.08%)	106(57.29%)	45(48.91%)	121(43.68%)
<i>Dermacentor</i> spp.	6(13.04%)	6(3.24%)	5(5.43%)	20(7.22%)
<i>Amblyomma</i> spp.	2(4.34%)	2(1.08%)	1(1.08%)	6(2.16%)
<i>Rhipicephalus</i> spp.	2(4.34%)	2(1.08%)	2(2.17%)	6(2.16%)
<i>Boophilus</i> spp.	3(6.52%)	4(2.16%)	3(3.26%)	5(1.80%)
<i>Ixodes</i> spp.	5(10.86%)	4(2.16%)	4(4.34%)	6(2.16%)

DISCUSSION

In this study the prevalence of ectoparasite was calculated and the results are presented in **Table 1**. According to these results the prevalence was 63 %.The overall prevalence of Ixodid ticks examined during the present study and *Hyalomma* spp. was found to be most abundant (47.33%). Another species prevalence was; *Dermacentor* (6.16%), *Amblyomma* (1.83%), *Rhipicephalus* (2%), *Boophilus* (2.5%), and *Ixodes* (3.16%). [13] carried out a survey to investigate the prevalence of cattle ticks in Rawalpindi and Islamabad. A total of 730 Ixodidae ticks were collected from 75 animals including 30 cattle, 21 buffaloes, 18 goats and 6 sheep. Five species of ticks, *Haemaphysalis sulcata* 74%, *Hyalomma anatolicum* 14%, *Hyalomma anatolicum anatolicum* 12%, *Hyalomma marginatum* 0.1 % and *Haemaphysalis serinacei* 0.1% have been found.[14] carried out a survey to investigate the prevalence of cattle ticks in Bangladesh. Five species of ixodid ticks were recorded, namely, *Boophilus microplus* (56.3%), *Haemaphysalis bispinosa* (11.3%), *Rhipicephalus*

sanguineus (14.7%), *Hyalomma anatolicum anatolicum* (15.0%) and *Amblyomma tudinarium* (2.8%). [15] conducted a survey to study the prevalence of ticks in Bavaria. Ticks were detected in all 31 farms with a mean prevalence of 69%. [16] carried out a survey to study the prevalence of hard ticks in animals in Peshawar. Out of 1279 farm animals studied, 255 cattle, 97 buffalo, 273 sheep, 544 goats and 110 donkeys were studied for tick infestation. About 13.37 % of the total observed farm animals were found tick infested with highest infestation in cattle (20.4%) followed by sheep (12.8%), goat (12.1%), buffalo (11.3%) and donkey (6.4%). The most commonly prevalent ticks were belonging to genus *Boophilus* (46.1%) followed by *Hyalomma* (31.25%), *Rhipicephalus* (17.93%) and *Amblyomma* (4.61%). [17] carried out a survey to examine the prevalence of cattle ticks in Uzbekistan. The dominating species were *Hyalomma anatolicum* (34.9%), *Hyalomma detritum detritum* (31.8%), *Boophilus kohlsi* (30.7%). [18] carried out a survey to investigate the prevalence of ticks infesting cattle in Mazandaran province, Iran. A total of 953

ticks were collected from 86 infested cattle. Nine species were identified: *Boophilus annulatus* (51.3%), *Rhipicephalus bursa* (16.8%), *Haemaphysalis punctata* (6.3%), *Ixodes ricinus* (6.8%), *Hyalomma marginatum* (12.5%), *Hyalomma anatolicum excavatum* (5.2%), *Hyalomma asiaticum* (0.6%), *Hyalomma adetrutum* (0.2%), and *Dermacentor* spp. (0.1%). [19] conducted a survey to study the prevalence of cattle ticks in Rawalpindi, Multan and Lahore Districts by collecting 300 specimens of ectoparasites randomly from cattle in each district. The highest prevalence (12%) of *Hyalomma* ticks and lowest prevalence (3.1%) of *Rhipicephalus* was recorded in cattle. [20] carried out a survey to study the overall prevalence of ticks in Nguni and non-descript cattle on the sweet and sour communal rangelands of the Eastern Cape Province. The tick species observed on both rangeland types were *Rhipicephalus appendiculatus* (71.0%), *Rhipicephalus (Boophilus)* species (29.2%) and *Rhipicephalus evertsievertsi* (40.2%). *Hyalomma* species (19.0%) occurred only on the sour rangeland. [7] conducted a survey to investigate the overall prevalence of ticks in cattle around Dera Ghazi Khan (Pakistan). A total of 300 cattle were examined for the prevalence of ectoparasites. The prevalence of ticks, mites and lice was found to be 108 (36%), 15 (5%) and 24 (8%), respectively. [21]

conducted a survey to investigate the prevalence of cattle ticks in 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%). [22] conducted a survey to investigate the prevalence of cattle ticks in and around Mekelle, northern Ethiopia. A total of 849 cattle were examined: 40.2% (341), 53.2% (452) and 5.9% (50) were infested with ticks, lice and Demodex, respectively. Durrani and Shakoori (2009) carried out a survey for the overall prevalence of cattle ticks in three districts (Rawalpindi, Multan and Lahore) of Punjab province in Pakistan. The results showed highest prevalence (67%) of ticks in district Lahore. The highest prevalence (12%) of *Hyalomma* ticks and lowest prevalence (3.1%) of *Rhipicephalus* in cattle was recorded. [23] conducted a survey to investigate the prevalence of cattle ticks in Zimbabwe. Overall, 81.5% of the cattle were infested; prevalence of tick infested cattle was significantly higher on communal land (93.8%) and recently claimed land (85.1%) than on commercial farms. [24] carried out a survey to examine

the prevalence of ticks on local and crossbred cattle in and around Asella town, southeast Ethiopia. A total of 6298 adult ticks were collected. Of all the total ticks collected, *Amblyomma*, *Rhipicephalus*, *Boophilus* and *Hyalomma* constituted 60.1%, 22%, 15.4% and 2.5%, respectively. The tick species encountered were *A. variegatum* (48.2%), *Rhipicephalus evertsi* (22%), *Boophilus decoloratus* (15.4%), *A. cohaerence* (11.9%) and *Hyalomma marginatum rufipes* (2.5%). [9] carried out a survey to investigate overall prevalence of cattle ticks in three districts of Punjab (Faisalabad, Jhang and Khanewal). Six thousand two hundred sixty-three ticks were collected from 71 cattle and 32 buffaloes. Over all prevalence of *Hyalomma* species is significantly higher than other species of hard ticks ($P > 0.05$). [10] carried out a survey to investigate the overall prevalence of ticks on cattle and sheep southeast of Iran. A total of 972 ticks were collected from 280 infested cattle and 1,207 ticks were collected from 632 infested sheep. The species collected from cattle were *Hyalomma marginatum marginatum* (50.92%), *Hyalomma anatolicum excavatum* (25.61%), *Hyalomma anatolicum anatolicum* (8.12%), *Hyalomma asiaticum asiaticum* (1.85%), and *Rhipicephalus sanguineus* (13.47%) while the species collected from sheep were *R. sanguineus* (36.37%), *H.*

marginatum marginatum (30.65%), *H. anatolicum excavatum* (19.05%), *H. asiaticum asiaticum* (10.52%), *Hyalomma detritum* (3.14%), and *Dermacentor marginatus* (0.24%). [25] conducted a survey to study the prevalence of ticks in Taiwan. Cattle in 6 (40%) of the 15 enrolled farms were infested by ticks, and ticks were collected from 133 (4.5%) cattle among the total of 2,950 cattle.

The variation in the prevalence of ticks may be due to climatic conditions or seasonal variations (After rainy seasons, with higher temperatures and lower relative humidity, number increases rapidly) [26, 13, 27] locality [27], body condition of the host, acaricides treatment, housing and grazing systems including vegetation [28, 29] and [16].

Results regarding the relationship between sex and ticks infesting cattle showed that the females had 62.21% prevalence and the male animals had 66.07% prevalence (Table 2).

Results regarding the relationship between sex and ticks infesting cattle showed significant difference that *Dermacentor* (16.20%), *Amblyomma* (7.62%), *Rhipicephallus* (7.62%), *Boophilus* (4.23%) and *Ixodes* (5.08%) were more prevalent in male animals, whereas prevalence of *Hyalomma* was highest (52.69%) in female animals. Various other scientists work is; [30] studied the prevalence of ixodid ticks

population in 400 cattle, 185 buffaloes and 350 sheep from villages in the Oshnavich suburb, West Azerbaijan. According to sex, heavy infestation was observed in adult cows (60.77%), female buffalo calves and ewes, whereas light infestation was observed in bulls and bull calves (20%), male buffalo calves (16.66%) and rams (26.31%). [27] studied 849 ticks in northwest region of Iran on sheep and goats. Of 77 sheep and 119 goats studied, 56.1% were infested. Of infested animals 78.1% were females and 21.9% males. [24] carried out a survey to examine the prevalence of ticks on local and crossbred cattle in and around Asella town; southeast Ethiopia. The incidence of infestation of ticks was higher on males than the females. These results match the results of present study in which ticks prevalence was greater in males as compared to females.

The above comparison shows that the prevalence of the ticks on different host sex is not fully dependent upon sex of the host many other factors also affect the prevalence of ticks like gathering of the cattle, [31] reported that there was no significant effect of the sex of the host on the intensity or prevalence of tick infestations. The high prevalence in males may be due to following reasons; Males range more widely than females and are thus more exposed to questing ticks [32, 33] reported that sex and age specific rates

of ectoparasite infection in the goats were statistically not related ($P>0.05$).

The relationship between age and ticks infesting cattle

The relationship between age and ticks infesting cattle (Table 3) showed that the prevalence of *Hyalomma* was highest (61.70%) in age group of 37-72 months while the prevalence was lowest (20%) in age group of 109-144 months. The highest prevalence of *Dermacentor* (12.76%), *Amblyomma* (4.25%), *Rhipicephallus* (4.25%) was in age group of 73-108 months while prevalence of *Dermacentor* (2.97%), *Amblyomma* (0.85%), *Rhipicephallus* (0.85%) was lowest in age group of 37-72 months. The highest prevalence of *Boophilus* (7.5%) and *Ixodes* (12.5%) was in age group of 109-144 months while lowest prevalence was recorded for *Boophilus* (1.70%) and *Ixodes* (1.27%) in age group of 37-72 months. The difference was statistically significant ($P<0.05$). [34] examined the prevalence in ticks *Ixodes ricinus* within the Bukowa Forest. The study covered 215 ticks, 193 nymphs and 22 adults. Positive readings of the immunological reaction were stated in 17.7% of the collected nymphs and adult forms of *Ixodes ricinus*. [15] conducted a survey to study the prevalence of ticks in cattle in Bavaria. Ticks were detected in all 31 farms with a mean prevalence of 69%. 3218 out of 3453 collected ticks were

Ixodes ricinus; 139 nymphs, 19 larvae and 77 damaged adults. [16] studied the prevalence of ticks in Frontier Region Peshawar on buffaloes, donkeys and the small ruminants. The prevalence was higher in young stock (20.8%) followed by yearling (20.0%) and adults (6.3%). In donkey prevalence was maximum in young stock (20.0%) followed by yearling (8.3%) and adults (4.9%). In cattle, (young stock) aged below 1 year was suffering 24.5 %, against the yearlings (1-2-year age) (20.5%) and adult animals (above 2 years age) (19.2%). [35] conducted a survey to study the prevalence of ticks in cattle and goats in Maputo Province. The prevalence of tick infestation was higher in adults and nymphs. [11] conducted a survey to examine the prevalence of ticks in cattle at different upazila of Chittagong District. Prevalence was significantly ($P<0.01$) higher in cattle of 1.5 years of age (46.28%) than in cattle of >1.5 years of age (27.80%).

It is clear from above comparison that the prevalence of ticks is greater in younger hosts as compared to the older hosts. The results of the present study are comparable with studies conducted by [15-16], [35] and [11, 16] reported that the high prevalence of ticks in younger hosts may be due to low resistance.

The relationship between body weight and ticks infesting cattle

The relationship between body weight and ticks infesting cattle showed that the prevalence of *Hyalomma* was highest (57.29%) in body weight group of 101-200kg while the prevalence was lowest (26.08%) in body weight group of 50-100kg. *Dermacentor* (13.04%), *Amblyomma* (4.34%), *Rhipicephallus* (4.34%), *Boophilus* (6.52%) and *Ixodes* (10.86%) were more prevalent in body weight group of 50-100kg (Table 4). The difference was statistically significant ($P<0.05$). [36] carried out a survey to examine the seroprevalence of toxoplasmosis in sheep in Southern Punjab, Pakistan. The relationship between body weight and sheep toxoplasmosis revealed that the prevalence of *T. gondii* was highest (20.85%) in weight group of 26-36Kg and lowest (10.71%) in weight group of >47 Kg, the difference was non-significant. [37] conducted a survey to examine the prevalence of some gastrointestinal parasites in sheep in Southern Punjab, Pakistan. The prevalence of different species of endoparasites also varied in sheep of different body weight groups ($P<0.05$).

Relationship between body weight and ticks infesting cattle was recorded.

CONCLUSION

The results of present study showed that as the weight of animal increases, the prevalence decreases. This might be due to

development of acquired immunity with gradual increase in body weight along with age.

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