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Research Article

ANALYSIS OF SITE OF PREDILICTION FOR THE TICKS OF FAMILY IXODIDAE

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ABSTRACT
Ixodidae family ticks infest cattle and buffalo and cause economic losses. They affect various parts of the body of the animal. Here we used 1473 Cattle and 927 buffaloes from four different villages that are in and around the Jabalpur of Madhya Pradesh state, where bovines are raised under unorganized farming and free range extension grazing system. There is higher incidence of *R. microplus* in both cattle and buffalo with more than 50% of the ticks belonging to this specis. About 3% Buffalo in and 16% in catle showed dual infestation. Abodomen followed by neck seems to be most favourable site for both cattle and buffalo for *R. microplus*. For *H. a. anatolicum* groin region followed by genita region is most favourable site of prediliction while dewlap and abdomen are least favourable sites. The results are useful in predicting type of tick affecting bovines based on their site of prediliction.

INTRODUCTION
Ticks rank first as arthropod vectors of protozoa, rickettsiae, bacteria and viruses, causing diseases in nonhuman vertebrates, and rank second only to mosquitoes as vectors of pathogens to humans (Zhou *et al.*, 2009). India accounts for a significant share of the world's livestock resources with nearly 56.63% of world's buffaloes and 12.48% cattle (FAO, 2009). Minjauw and McLeod (2003) showed that the cost of management of ticks and tick borne diseases (TTBDs) in livestock of India is as high as US$ 498.7 million per annum. The most common combined effect of tick and tick borne diseases (TTBDs) in Indian dairy system is reduction in milk yield i.e. (loss of 14% of the lactation) (McLeod and Kristjanson, 1999) and quality of hides for leather industry (Biswas, 2003). Here the study was targeted to identify the association of the Ixodid ticks with cattle and buffalo population along with their specific attachment site.

MATERIALS AND METHODS
Geographical information: The state of Madhya Pradesh is situated between 72^0 to 85^0 E longitudes. Jabalpur tehsil of Madhya pradesh, where the present study was undertaken, is at 23.17 latitude and 79.57 E longitudes at 410.87 MSl in the IV agroclimatic zones viz., Satpura plateau and Kymore hills. The present study on the prevalence of *R. microplus* and *H. a. anatolicum* ticks of bovines which are raised under unorganized farming and free range extension grazing system, were selected for the present study.

Collection of Ticks
Ticks of cattle and buffaloes were collected during rainy season of September and December months, winter (January, February) and spring season (March, April). For epidemiological study a questionnaire comprising details about the animal (age, sex, species, type of ticks, predilection site, housing, grade of infestation) was formulated. Ticks were collected without damaging their mouthparts. The collected tick samples were then transferred to plastic tubes marked in accordance with the serial number of the questionnaire containing the detail information about the source of the samples collected. The samples were brought to the laboratory and were transferred to dessicator in which 85-90% relative humidity was maintained using sulphuric acid (Solomon, 1951). Collected ticks were mounted for species identification according to the keys given by McCarthy (1967), Kaiser and Hoogstraal (1964) and Sen and Fletcher (1962).

RESULTS AND DISCUSSION

Ticks collected from cattle and buffaloes were identified as *Rhipicephalus microplus* and *Hyalomma anatolicum anatolicum*. *R. microplus* (53.20%) was by far the most common and predominant species encountered in animals while *H. a. anatolicum* (35.20%) were less commonly encountered and dual infestation (11.56%) was also recorded from the study area. Out of 1473 cattle, 54.12% animals were infested with *R. microplus*, 30.02% with *H. a. anatolicum* and 15.84% with dual infestation. Similarly, out of 927 buffaloes, *R. microplus, H. a. anatolicum* and dual infestation was 51.35%, 45.72% and 2.92% respectively.

In cattle infestation with *R. microplus* and Dual infestation was 2.77, 12.92 per cent higher than buffaloes. Whereas, In Buffaloes *H. a. anatolicum* found 15.7 per cent higher than cattle (Table 1, Figure 1).

Table 1: Species wise prevalence of tick infestation in bovines

Type of Tick	Buffalo	Cattle
Rhipicephalus microplus	51.35	54.12
Hyalomma anatolicum anatolicum	45.72	30.02
Dual infestation	2.92	15.84

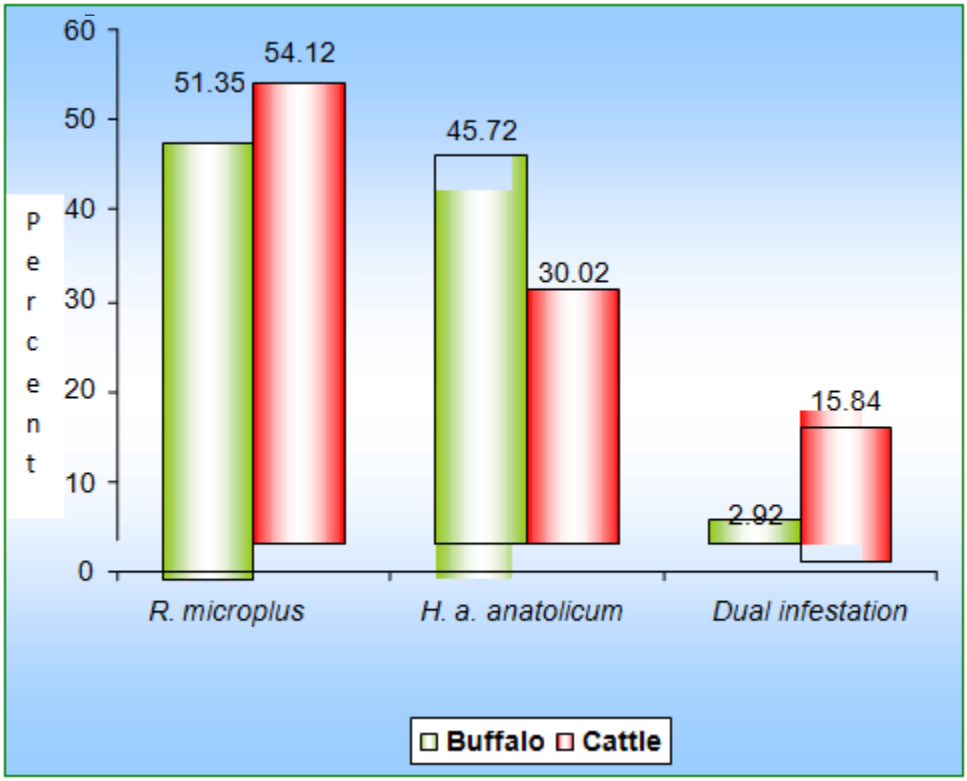

Figure 1: Prevalence of tick infestation in bovines based on type of tick species

Predilection site of the tick infestation may vary with the tick species. Adult Gulf Coast ticks prefer feeding on the ears of cattle (Bishopp & Trembley, 1945). In this study, the favorable predilection sites for *R. microplus* in cattle was found highest at abdomen (67.77%) followed by neck (65.61%), dewlap (59.22%), external genital (40.94%), ear (35.25%), groin (34.65%) and lower infestation at tail (34.46%). *H. a.*

anatolicum was found highest at groin (40.25%) followed by tail (36.36%), external genitalia (36.05%), ear (25.22%), dewlap (14.76%), neck (10.96%) and lower rates were at abdomen (9.68%).

In buffaloes *R. microplus* was found highest at abdomen (73.62%) followed by neck (63.94%), ear (51.76%), external genitalia (47.50%), tail (41.25%) and groin (38.07%). *H. a. anatolicum* were found highest at groin region (57.29%) followed by tail (53.75%), external genitalia (48.68%), ear (41.76%; 71), neck (31.22%) and lower rates were at abdomen (21.61%). The overall prevalence of tick infestation in bovines based on predilection site irrespective of the type of host and found highest at external genital (71.19%) followed by abdomen (67.38%), neck (65%), groin (62.31%), tail (53.20%) and lower rates were recorded at ear (37.23%). Favorable predilection sites of *R. microplus* were abdomen, neck and dewlap, For *H. a. anatolicum* was observed at groin, tail and external genitalia. Similar findings were obtained by Reik (1962), Tatchell (1987) and Mattioli *et al.*, (1997), in the abdomen and dewlap for the *R. microplus*. Groin and external genitalia were the favorite sites for *H. a. anatolicum* attachment in bovines (Table 2, Figure 2).

Table 2: Species wise prevalence of tick infestation in relation to their favorable predilection sites

Species	Type of ticks	Abdomen	Neck	Dewlap	Ear	Tail	Groin	External genitals
Buffalo	*Rhipicephalus sp.*	73.62	63.94	-	51.76	41.25	38.07	47.5
	Hyalomma sp.	21.61	31.22	-	41.76	53.75	57.29	48.68
	Dual infestation	4.76	4.83	-	6.47	5	4.62	3.81
Cattle	*Rhipicephalus sp.*	67.77	65.61	59.22	35.25	34.46	34.65	40.94
	Hyalomma	9.68	10.96	14.76	25.22	36.36	40.25	36.05
	Dual infestation	22.53	23.42	30.18	39.51	29.17	25.09	23

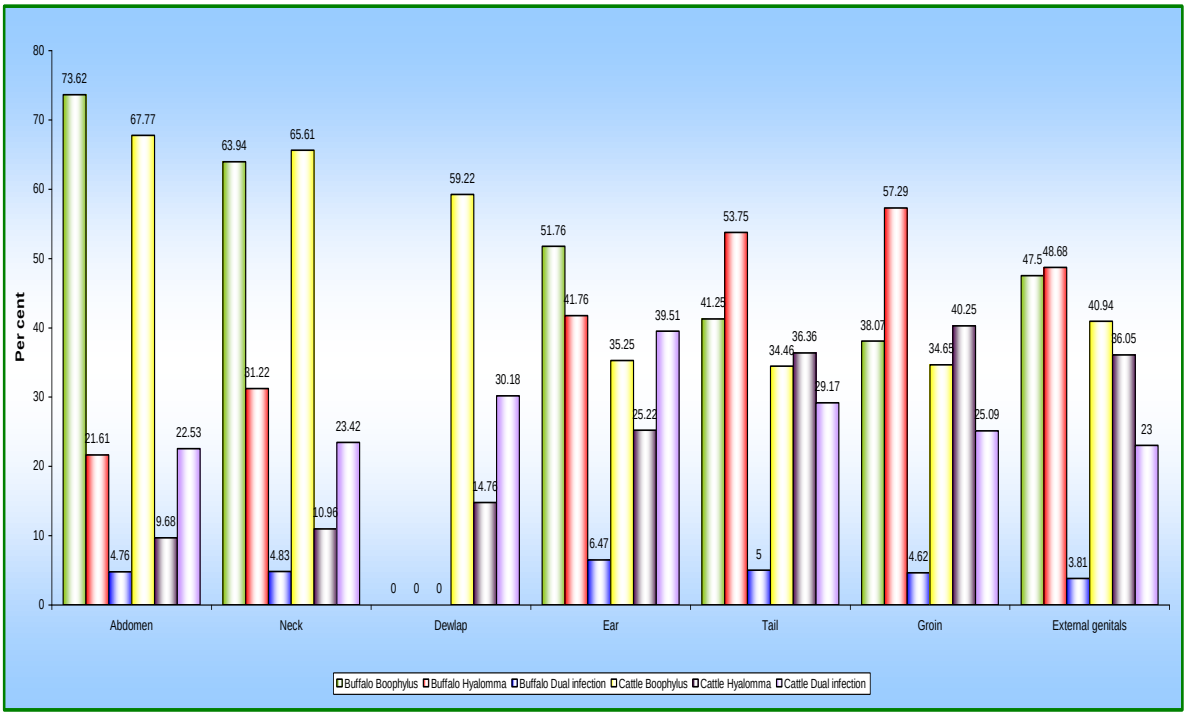

Figure 2: Species wise prevalence of tick infestation in relation to their favorable predilection sites

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