

A COMPARATIVE STUDY ON THE INCIDENCE OF TICKS AND TICKS BORN DISEASES ON LOCAL AND CROSSBRED CATTLE IN MALAKAND AGENCY

N. Ahmad and H.A Hashmi

University of Veterinary and Animals Sciences. Lahore.

ABSTRACT

Ticks infestation and piroplasmosis are serious problems of domestic cattle. The present study was conducted to find out the prevalent species of ticks and the piroplasms transmitted by these ticks. The effect of ticks and blood parasites on various blood parameters was also studied. The parameters included: TEC count, TLC count, haemoglobin (Hb) estimation, erythrocytic sedimentation rate (ESR) and differential leukocytic count (DLC). The study was conducted from June to August 2001. A total of 80 cattle (40 local nondescript cattle and 40 crossbred) were selected. Each type was divided into four groups A, B, C and D. The cattle of group—A were free from any infestation/infection. The animals of group B were only tick infested. Animals of group—C were only piroplasm infected and the animals of group—D were infested with ticks and the piroplasms infected. Each group from both the genetic groups consisted of 10 animals. Haematological examination revealed a significant decrease ($P < 0.05$) in TEC, Hb and TLC in groups B, C and D as compared to group—A relating to each genetic group. The lymphocytes were decreased from normal in all test groups in both the genetic groups, significantly. However, neutrophil and eosinophils were increased significantly in test groups as compared to control group (A). The values of erythrocytic sedimentation rate (ESR) showed a significant increase in groups B, C and D of both types of cattle as compared to the control group (A). The overall results showed that the effect of mixed infection on haematology was greater than the single infection of ticks or piroplasm.

Key words: Ticks, Erythrocytic sedimentation rate (ESR), differential leukocytic count (DLC), lymphocytes.

INTRODUCTION

The prevalence of ticks and haemoparasitic diseases of local cattle in Malakand Agency has been reported (Ahmad *et al.*, 2006). The paper deals with a comparison of the occurrence of ticks and tick transmitted diseases in cross bred and local cattle in the Malakand area of NWFP.

MATERIALS AND METHODS

The materials and methods have already been described elsewhere (Ahmad *et al.*, 2006). However, a comparative study on the incidence of ticks and the haemoparasitic diseases of local as well as cross bred cattle were conducted. The samples were collected from veterinary hospital Batkhela, Dheri, Aladand, Thana, Dargai and Sakhakot and other places in Malakand Agency from June to August 2001.

RESULTS AND DISCUSSION

The findings with respect to ticks and the incidence of haemoparasitic diseases of local and cross bred cattle are being discussed as under.

MIXED INFECTION

Ticks: A total of 1100 cases were examined. Out of those 322 cases were found positive for *Rhipicephalus*

appendiculatus and *Boophilus imicroplus*. Monthwise prevalence of ticks in June, July and August was 19.4%, 26% and 39.5% respectively. Month wise prevalence for local cattle was 18.8% in June, 26.6% in July and 38.8% in August. For cross bred cattle in June 22.5%, in July 24.5% and in August it was observed as 41.1% (Table-1). In both breeds the infestation rate was increased with the progress of rainy season. These findings are supported by the finding of Soulsby (1982). The infestation on local cattle was relatively low which may be due to the genetic resistance in local cattle.

Babesia: A total of 1100 animals were examined, only 73 (6.6%) were found positive for piroplasm (*Babesia bigemina*). In June the local cattle were infected as 1.2%, in July 4.16% and in August 9.5%. In crossbred cattle the infection was 2.5% in June, 8.8% in July and 16.1% in August (Table-1). From this study it has been observed that the crossbred cattle were having greater infection percentage as compared to local cattle. The findings of the present study are fully in agreement with the finding of Mahmood (1994) who observed that. The crossbred cattle were more favourite to ticks which were responsible for transmitting haemoparasitic diseases.

EFFECT OF TICKS AND BABESIA ON HAEMATOLOGY

The effect of ticks and babesia on haematology of local and cross bred cattle has been presented in Table-2.

Total erythrocytes count: The total erythrocytes count for cross bred cattle were $8.9 \times 10^6 \pm 0.4$, $6.8 \times 10^6 \pm 0.33$, 6.1 ± 0.22 and $5.6 \times 10^6 \pm 0.23$ and $5 \times 10^6 \pm 0.16$ recorded for group A, B, C and D, respectively. For local cattle, it was $8.2 \times 10^6 \pm 0.34$, $6.4 \times 10^6 \pm 0.36$, $5.7 \times 10^6 \pm 0.16$ and $5 \times 10^6 \pm 0.16$ for group A, B, C and D, respectively. The results in both the genetic groups revealed a significant decrease in the number of TEC in group B, C and D as compared to group-A. There was also a significant difference between group BFC, CFD and BFD ($P < 0.05$). Similar observations were reported by Breitschwerdt *et al.* (1983), Harvey *et al.* (1988), Mahmood *et al.* (1994) and Haseeb (2001) who diagnosed thrombocytopenia due to piroplasmosis and tick infestation. The reduction in the RBC counts occurred due to blood sucking by the ticks as well as due to destruction of RBC's by the Babesia.

Table-1 Overall prevalence of ticks and babssia bigemina.

Month	Breed	Total animals examined	Ticks		Babesia	
			No.	%age	No.	%age
June	Cross	80	18	22.5	2	2.5
	Local	250	46	18.4	3	1.2
July	Cross	102	25	24.5	9	8.8
	Local	240	64	26.6	10	4.16
August	Cross	124	51	41.1	20	16.1
	Local	304	118	38.8	29	9.5
Total		1100	322	29.27	73	6.63

Table-2: Effect of piroplasm and ticks on mean values of different blood parameters and differential leusytic count in local & cross breed cattle.

Groups	Breed	TEC	TLC	Hb(gm %)	ESR	Lymphocytes	Neutrophils	Eosinophils	Monocytes	Basophiles
		($10^6/\mu\text{l}$) Mean \pm SE.	($10^3/\text{Cm}^2$) Mean \pm SE.	Mean \pm SE.	(mm/hour) Mean \pm SE.					
A	Local	82 \pm 0.34	73 \pm 0.17	9.8 \pm 0.36	23 \pm 0.30	62.9 \pm 1.3	28.6 \pm 1.7	4.9 \pm 0.6	2.7 \pm 0.7	1.0 \pm 0.0
	Cross	89 \pm 0.40	72 \pm 0.32	9.4 \pm 0.29	1.6 \pm 0.2	62.0 \pm 2.1	27.1 \pm 0.6	5.6 \pm 1.1	2.4 \pm 0.6	1.0 \pm 0.0
B	Local	64 \pm 0.36	62 \pm 0.26	8.2 \pm 0.29	5.1 \pm 1.0	59.5 \pm 2.6	30.7 \pm 3.0	7.1 \pm 0.8	1.9 \pm 0.3	1.0 \pm 0.0
	Cross	68 \pm 0.33	64 \pm 0.40	7.6 \pm 0.30	5.5 \pm 1.0	44.8 \pm 3.2	47.9 \pm 3.4	4.7 \pm 0.4	1.6 \pm 0.3	0.0 \pm 0.0
C	Local	57 \pm 0.24	55 \pm 0.20	7.2 \pm 0.13	8.5 \pm 1.20	51.8 \pm 2.0	41.6 \pm 2.0	5.6 \pm 0.5	1.0 \pm 0.0	0.0 \pm 0.0
	Cross	6.1 \pm 0.22	5.7 \pm 0.21	6.5 \pm 0.43	10.2 \pm 1.5	45.2 \pm 1.3	46.7 \pm 1.1	6.5 \pm 0.5	1.3 \pm 0.2	0.0 \pm 0.0
D	Local	5.0 \pm 0.16	5.1 \pm 0.17	5.8 \pm 0.29	13 \pm 1.5	54.1 \pm 1.5	36.0 \pm 1.9	6.9 \pm 0.7	1.9 \pm 0.3	1.0 \pm 0.0
	Cross	5.6 \pm 0.23	5.0 \pm 0.16	5.0 \pm 0.15	12.7 \pm 1.2	44.1 \pm 2.3	46.8 \pm 2.1	7.3 \pm 0.7	1.3 \pm 0.2	0.0 \pm 0.0

Group-A = Non infected, non infested cattle.

Group-C = Piroplasm positive ticks negative cattle

Group-B = Tick positive piroplasm -ve cattle.

Group-D = Ticks positive piroplasm +ve cattle

Total leukocytic count: The total leukocytic count for cross bred cattle were $7.2 \times 10^3 \pm 0.32/\text{cmm}$, $6.4 \times 10^3 \pm 0.4 / \text{cmm}$, $5.7 \times 10^3 \pm 0.21 / \text{cmm}$ and $5 \times 10^3 \pm 0.16 / \text{cmm}$ for group A, B, C and .D, respectively. For crossbred cattle it was recorded as $7.3 \times 10^3 \pm 0.17/\text{cmm}$, $6.2 \times 10^3 \pm 0.26/\text{cmm}$, $5.5 \times 10^3 \pm 0.20$ and $5.1 \times 10^3 \pm 0.17/\text{cmm}$ for group A, B, C and D, respectively (Table-2). It was observed that the TLC had a significant difference among the four group of both the genetic groups ($P < 0.05$). However, between the two breeds it was not significant ($P > 0.05$). Similar observations were made by Sharma (1979) and Mahmood (1994). They noted a significant decrease in TLC.

Haemoglobin: Haemoglobin estimation in local cattle for group A, B, C and D were recorded as $9.8 \pm 0.36 \text{ g\%}$, $8.2 \pm 0.29 \text{ g\%}$, $7.2 \pm 0.13 \text{ g\%}$ and $5.8 \pm 0.29 \text{ g\%}$, respectively. For crossbred cattle it was recorded as for A, $9.4 \pm 0.29 \text{ g\%}$, for B, $7.6 \pm 0.3 \text{ g\%}$, for C, $6.5 \pm 0.43 \text{ g\%}$ and for group D, $5.0 \pm 0.15 \text{ g\%}$ (Table-2). It was observed that a significant difference ($P < 0.05$) was found among the groups and also there was a significant difference between local and crossbred cattle. Similar results were

observed in tick infested and piroplasm positive animals by Harvey *et al.* (1988) and Haseeb (2001). The findings of these workers are in agreement with the present findings.

Erythrocytic sedimentation rate: Erythrocytic sedimentation rate for local cattle recorded in group A, B, C and D were $2.3 \pm 0.3 \text{ mm/hr}$, $5.1 \pm 1.6 \text{ mm/hr}$, $8.5 \pm 1.2 \text{ mm/hr}$ and $13.0 \pm 1.5 \text{ mm/hr}$, respectively. For crossbred cattle it was $1.6 \pm 0.2 \text{ mm/hr}$ in group A, $5.5 \pm 1.0 \text{ mm/hr}$ in group B, $10.2 \pm 1.5 \text{ mm/hr}$ in group C and $12.7 \pm 1.2 \text{ mm/hr}$ in group D (Table-2). There was non significant difference ($P > 0.05$) between the genetic groups, but a significant difference among the groups of each breed was noted. Similar observations have been recorded by Benjamin (1978) and Haseeb (2001).

Differential leukocytic count: The details of DLC are given in Table-2. The lymphocytes %age was decreased significantly in both the breeds among the groups (A, B, C and D). The neutrophils in both the breeds showed increase in %age amongst the groups. The eosinophil in local and crossbred cattle increased significantly among

the groups. There was significant difference ($P < 0.05$) from A to all groups and also in between B+C, B+D and C+D.

There was non-significant difference in groups of both the genetic groups in monocytes number, similarly basophil were having non-significant difference between the breed and amongst the groups.

Comparison between local and cross bred cattle for incidence of ticks and ticks born diseases: It was found that the crossbred cattle overall suffered more from the attack of ticks as compared with local cattle. However, in the upper Malakand area (Tehsil Batkhela), the incidence of haemoparasitic disease was not found. which may be attributed to the cold climatic conditions in the area.

On the contrary, in the lower Malakand area (Tehsil Dargai) which is adjacent to Mardan & Charsadda Districts (having mild climate as compared with the upper Malakand area), more prevalence of ticks and haemoparasitic diseases in crossbred cattle as compared to local indigenous cattle. Again this difference may be attributed towards the ecological conditions (mild temperature etc) prevailing in the area. Furthermore, this also tends to indicate the superiority of local cattle to withstand the attack of ticks as well as occurrence of tick born diseases. However, this aspect needs more investigations for ascertaining the factors in a more precise manner.

REFERENCES

- Ahmad, N. H. A. Hashmi and S. A. Khan. (2006) Study on Ticks and Haemoparasitic Diseases of Local Cattle in Malakand Agency. J. Anim pl. Sci. 16(3-4): 82-84.
- Benjamin, M.M. (1978). "Out Line of Veterinary Clinical Pathology". 3rd Ed. Iowa State University Press Ames, lowas. pp 48-54, 305.
- Harvey, J.W., J. Taboada and J.C. Lewis (1988). Babesiosis in a litter of pups. J. Am. Vet. Med. Assoc., 192(12): 1751-1752.
- Haseeb, A.K. (2001). Studies on *Babesia canis* and ticks of dogs. M.Sc (Hons.) Thesis, Univ. of Agric. Faisalabad.
- Mahmood, A. (1994). Effect of thelariasis on various blood parameters and total serum protein in exotic and crossbred cattle in and around Lahore. M.Sc (Hons.) Thesis, Univ. of Agric. Faisalabad.
- Sharma, M.M. (1979). Haematological observations in bovine theileriasis, anaplasmosis and in mixed infections. md. J. Parasitol., 3(2): 153-165.
- Soulsby, E.J.L. (1982). Helminths, arthropodes and protozoa of domestic animals. Baillere Tindall, London, pp 162-163.