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ROLE OF IXODID TICKS IN TRANSMISSION OF BACTERIAL DISEASES IN CATTLE AND BUFFALOES IN PAKISTAN

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Three species of bacteria viz. *Staphylococcus pyogenes, Pasteurella multocida* and *Brucella abortus* were isolated from different species of ticks parasitizing cattle and buffaloes. *Staphylococcuspyogenes* was isolated from *Rhipicephalus (H.) sanguineus* and *Boophilus (B.) annulatus* infesting cattle and *R. sanguineus, B. microplus* and *Hyalomma (H.) anatolicum anatolicum* infesting *buffaloes.Pasteurella multocida* was isolated from *R. sanguineus* and *B. annuletus* infesting cattle and *R. sanguineus, B. annulatus* and *H aegyptium* infesting buffaloes. *Brucella abortus* was isolated from *B. microplus* infesting cattle and *B. microplus* and *H anatolicum anatolicum* infesting *buffaloes.*

Key words: Ixodid ticks, transmission of bacterial diseases

INTRODUCTION

Ticks *have* been recognized as important ectoparasites of livestock. They are voracious blood suckers resulting in lowered productivity. Besides this, *ticks* transmit protozoal(Celep,1982), bacterial (Webster and Mitchell, 1986) and rickettsial (Krauss *et al.,* 1987) diseases to their hosts. This paper describes the *vector* role of Ixodid ticks in transmission of bacterial diseases to cattle and buffaloes.

MATERIALS AND METHODS

Ticks infesting cattle and buffaloes were collected and identified as described previously by Khan *et al.* (1993). Twenty batches each of 25 ticks of each species viz. *Rhipicephalus (R.) sanguineus, Boophilus (B.) microplus, B. annulatus, Hyalomma (H) anatolicum (e.I anato/icum* and *H aegyptium* were collected. Each batch of ticks was collected from a different animal. The ticks were triturated in sterilized pestle and mortar and 20 ml of sterilized normal saline solution was added to each batch. The procedure described by Cruickshank (1975) was followed for isolation, purification and characterization of bacterial species. Briefly, the triturated material was examined directly and *cultivated* on basic media. The colonial charcteristics of grown bacteria (if any) were observed and differentially cultivated on selective media. Different species of bacteria were characterized on the basis of biochemical and pathogenicity tests. All the procedures were completed in strict sterilized conditions to avoid contamination.

RESULTS

In cattle, 60 % batches of *R. sanguineus,55* % batches of *B. annulatus and* 70 % batches of *B microplus* were found infected with *Staphylococcw (S.) pyogenes and Pasteurella (P.) multocide* (Tabf 1). In buffaloes, 40 % batches of *R. sanguineus,* 7e % batches of *B. microplus,* 65 % batches of *B annulatus,* 45 % batches of *H te.) anatolicum* and 5C % batches of *H aegyptium* were found infected with S. *pyogenes, P. multocida and B. abortus* (Table 1). Chisquare analysis showed that there was nc difference among different species of animals in carrying the ticks infected with bacteria and among different species of ticks in carrying the bacterial infection. There was no difference among *R. sanguineus* and *B. microplus* species of ticks infesting cattle and buffaloes in carrying different bacterial isolates. However, *B. annulatus* infesting cattle was more prone ($P < 0.05$) to carry S. *pyogenes* compared with *P. multocida.* Similarly, *H (a.) anatolicum* infesting buffaloes was more prone ($P < 0.05$) to carry S. *pyogenes* compared with *B. abortus.*

DISCUSSION

Ticks appear as an important vector of bacterial diseases in this area. Three species of bacteria *viz.* S. *pyogenes, P. multocida* and *B. abortus* were isolated from different species of ticks parasitizing cattle and buffaloes. These three important pathogens result in huge economic losses due to morbidity, mortality and lowered productivity of the animals. The role of ticks in transmission of bacterial diseases of livestock has

Table 1: Bacterial isolates from different spe_;pf ticks collected from cattle and buffaloes

Animal species/ticks	Batches infe~t_ No.		Species of bacteria isolated
Cattle			
Rhipicephalus sanguineus	07	35	*Staphylococcus pyogenes*
	03	15	*Pasteurella multocida*
	02	10	*Staphylococcus pyogenes & Pasteurella multocida*
Boophilus annulatus	08	40	*Staphy~ccus pyogenes*
	02	10	*PasteurellJ!'~/tocida*
	01	05	*Staphy/~c(j(i~~.pyogenes & Pasteurella muliiTCida*
Boophilus microplus	14	70	*Brucella abortus*
Buffalo			
Rhipicephalus sanguineus	06	30	*Staphylococcus pyogenes*
	02	10	*Staphylococcus pyogenes & Pasteurella multocida*
Boophilus microplus	14	70	*Staphylococcus pyogenes & Brucella abortus*
Boophilus annulatus	13	65	*Pasteurella multocida*
Hyalomma anatolicum	07	35	*Staphylococcus pyogenes*
	02	10	*Brucella abortus*
Hyalomma eeqyptium	10	50	*Pasteurella multocida*

*Twenty batches of each species of ticks each having 25 ticks were examined.

usually been controversial in literature. Some workers report one species of ticks to be the vector of a bacterium, whereas others do not. Likewise in the current study, *S. pyogenes* was isolated from *R. sanguineus* and *B. ennutetus* infesting cattle; *R. sanguineus, B. microplus* and *H. (a.) anatolicum* infesting buffaloes.? *. multocida* was isolated from *R. sanguineus* and *B. annulatus* infesting cattle and *R. sanguineus, B. annulatus* and *H. aegyptium* infesting buffaloes. *B. abortus* was isolated from *B. microplus* infesting cattle and *B. microplus* and *H. anatolicum anatolicum* infesting buffaloes. Results of bacterial isolation indicated that all the batches of ticks and all species of ticks did not have natural infection with species of bacteria recorded. Bacterial isolation from ticks infesting livestock has been carried out for the first time in Pakistan, therefore, no comparison could be made locally. The reports of bacterial isolation are, however, available from other countries which are being referred to in this paper. *S. pyogenes* was isolated from *Ixodes ricinus* from England (Webster and Mitchell, 1986). *P. multocida* was isolated from *Amblyomma variegatum* ticks from Northern Nigeria (Macadam, 1962). The role of ticks as vector of pasteurellosis was proved by Macadam (1962). *B. abortus* infection was detected in *H. marginatum* and *Dermacentor nuttali* ticks infesting cattle in Moscow (Pritulin, 1954). Similarly, *Brucella* organism was

isolated from D. *marginatus* and D. *pictus* in Mosq~'i~ (Gudoshnik, 1958) .)ff0't .

It appears from the results of the present stu(1ysnd those of other studies given above that tiQks' have been found indiscriminately infected wi.t~different species of bacteria. A species of bacteri.,tL1'lmsmitted through one type of ticks in a 10Qafity, may be transmitted through another type ~fitjCk in an other area. The differences in the isolatiQflof bacteria from different places could beattril>Vted to the prevalence of various species of Q~~teria, availability of susceptible animal popu1atf,Qtttopography of the area and distribution of tick species. Since surface geology is known to affect th~vegetation and ultimately the tick distribution, thU$the differences in various areas in this regard also affect vector status of different species of licks. Moreover, coincidence of the prevailing geoclimatic conditions of an area is conducive for the *development* of both the ticks and some bacterial species, influencing the vector status of ticks .. For example, if in an area geoclimatic conditions are suitable for the survival and development of a species of bacteria but the same are not favourable for the maintenance of a particular population of ticks, this will affect the vector status. It is concluded that the tick species prevailing In Pakistanact as important vectors for bacteria having economic significance. However, statistical analysis revealed no association between any species of tiC~s, and bacteria. It is suggested that special attentlbnbEi given to the control of ticks in order to protect the livestock from deadly diseases caused by the bacteria isolated from ticks.

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