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PREVALENCE OF IXODID TICKS IN POST ACARICIDE TREATED CATTLE AND BUFFALOES AT SINNER DISTRICT NASHIK (M.S) INDIA.

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ABSTRACT
A survey was carried out to investigate the prevalence of hard tick species (Acari: Ixodidae) on cattle in Sinner Diary farms at Nashik district, India. A total of 1364 (958 caw and 305 buffaloes) post acaricide treated animals were selected and examined for the prevalence of tick infestation. The effect of host, breed, health status, sex, age, coat colour on tick infestation was recorded. Prominently *Boophilus*, *Amblyomma* and *Hyalomma* spp were found on caw and buffalo. Where age and sex of host play non-significant role in prevalence of tick infestation, while breed of the host and health status are important parameters found to be significantly affecting tick prevalence. The routine acaricide treatment at local level is found ineffective in controlling tick infestation. This may be due to use of unspecific acaricide, wrong method of application and increased resistance in tick. This research focuses on necessity of integrated tick management Programme and awareness at national level.

KEY WORDS: *Boophilus*, buffaloes, cattle, *Hyalomma*, Ixodid tick, Nashik, *Rhipicephalus*, prevalence, Sinner,

INTRODUCTION

Livestock production represents one of the most promising fields of diversification of the national economy as well as socio-economic status of millions of rural households. It 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 and 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 and 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). The tick prevalence study after the treatment of acaricide on caw and buffaloes are very rare. In Present study tick prevalence study was done in dairy farms at sinner in Nashik district. It was carried out in accordance with mostly occurring tick species, host preference along with different host parameters like age, sex, coat colour and health status of cattle and buffalo. This kind of periodical monitoring of tick infestation in local dairy farms is an essential component for formulating effective control recommendations.

MATERIAL AND METHODS

Study Area

The study was conducted in villages Kundewadi, sulewadi, duber, khopadi located at 19.85°N 74.0°E in Sinner tahasil, Nashik district, (M.S.) India. Cattle, buffaloes, rising are major agricultural enterprise of the farmers of the study area.

Animal Sampled

The animals sampled were all post acaricide treated penned ruminents including buffaloes and caw. Parameters such as age, sex, breed health status body colour of host and post acaricide infestation tick samples were careful noted and collected.

Collection of Ticks

Ticks were collected by forceful detachment (Iwuala and Okpala, 1978A, B., James- Rugu and Iwuala, 1998). The Specimens were preserved in labeled glass bottles containing 70% alcohol. All ticks collected were transported to the laboratory within the shortest time possible but never more than 12 hours.

Processing, identification of ticks and statistical analysis:

Ticks were processed by the method of Iwuala and Okpala (1978a b). The grouping to their genus was made according to the methods developed by Hoogstraal (1956) and Horak *et al.* (2002). Prevalence for each tick species was calculated as:

p = {d/n } X 100

Where P represents the prevalence; d represents the number of animals that tested positive for a particular tick species; n represents the total number of animals sampled (Thrusfield, 1995).

The tick counts were transformed according to the following formula y = log 10 (x+1) to confirm normality. The data was analyzed using SAS (2003). Specifically the chi-square test was used to determine associations between tick prevalence and age, sex, breed, Health status, Coat colour and their interactions. Frequencies were determined using PROC FREQ of SAS (2003). The effect of age, sex, breed, Health status, Coat colour and their interactions on tick counts was determined using the generalized linear model procedures for repeated measures (SAS, 2003). Pair wise comparisons of means were performed using the PDIFF option.

RESULTS

Overall 1368 ruminants were examined after the treatment of acaricides. Among them 958 were caws and 305 were buffaloes, Caw shows 62% and buffaloes showed 28.20 percent prevalence. Three species of tick viz. *Boophilus*, *Amblyomma* and *Hyalomma* were prominently found infesting these animals. Tick species wise prevalence was given in table 1. Age wise prevalence of tick infestation was given in table No.2. Total 673 Adult Caw and 285 Calve were examined. For buffaloes, 248 were adult and 57 were below two year age. No significant higher prevalence was found in calves than adult in caw and buffaloes. Sex wise prevalence of tick infestation was given in table No. 3. Total 727 female caws and 231 male caw while in case of buffaloes 259 female and 46 male were examined. Whereas non-significant higher prevalence of ticks were found in females than male host. Breed wise prevalence of tick infestation was given in table no.4. In cattle, breed was found to be a significant determinant affecting the prevalence of tick infestation as estimated through χ^2 analysis (χ^2 = 65.20; df = 5).

The highest prevalence was found in cross breed cow Jersey. In buffaloes there was an insignificant difference in prevalence of tick with respect to breed. Health status wise prevalence of tick infestation was given in table No. 5. In caw and buffaloes, health status was found to be a significant determinant affecting the prevalence of tick infestation as estimated through χ^2 analysis (χ^2 =57.21; df = 5). The prevalence of tick in weak animal is higher than normal. Coat colour wise prevalence of tick infestation is given in table no.6. In caw four different coat colours as black, brown, white, and mixed type was found. In buffaloes only one coat colour was present so data was analyzed statistically together. In caw and buffaloes, Coat colour was found to be a significant determinant affecting the prevalence of tick infestations estimated through χ^2 analysis (χ^2= 69.324; df= 5).

Table 1. Tick-species wise prevalence (%) on domestic animals.

Tick species	Caw	Buffaloes
Boophilus spp.	51.87	15.41
Amblyomma spp.	5.53	6.56
Hyalomma spp.	4.59	6.23

Table 2. Age-wise prevalence (%) of different tick species infestation on domestic animals.

Tick species	Caw		Buffaloes	
	Adult	Calves	Adult	Calves
Boophilus spp.	50.52	55.09	14.11	21.05
Amblyomma spp.	4.75	7.37	6.85	5.26
Hyalomma spp.	5.35	2.81	5.65	8.77

Table 3. Sex-wise prevalence (%) of different tick species infestation on domestic animals.

Tick species	Caw		Buffaloes	
	In females	In males	In females	In males
Boophilus spp.	54.20	44.59	15.83	13.04
Amblyomma spp.	5.78	4.76	6.95	4.34
Hyalomma spp.	4.81	3.90	5.79	8.70

Table 4. Breed-wise prevalence of tick infestation on domestic animals.

Domestic animal	Breeds	No. of animals examined	Prevalence (%)
Caw	Gir	53	26.77
	Holstein Friesian	140	83.83
	Jersey	148	86.55
	Cross breed	128	88.28
	Non descriptive	29	32.22
	Khilari	96	51.34
Buffaloes	Murrah	47	34.06
	Jafarabadi	24	25.00
	Non descriptive	15	21.13

Table 5. Health status wise prevalence (%) of tick infestation on domestic animals.

Domestic animal	Health status	No. of animals examined	Prevalence (%)
Caw	Good	181	46.53
	Normal	218	68.98
	Weak	195	77.07
Buffaloes	Good	9	10.34
	Normal	26	25.24
	Weak	51	44.35

Table 6. Coat colour wise prevalence (%) of tick infestation on domestic animals.

Domestic animal	Coat colour	No. of animals examined	Prevalence (%)
Caw	black	85	88.54
	Brown	67	21.54
	White	187	75.10
	Mixed	255	84.44
Buffaloes	blackish Gray	86	28.20

DISCUSSION

The present research was conducted in order to study basic parameters like age, sex, breed health status, coat colour on the prevalence of tick infestation at post acaricide treatment. The predominant tick species were *Boophilus* sp, *Amblyomma* sp., *Hyalomma* sp. found in study area in descending order. In this study the host susceptibility for tick infestation was found highest in cattle than buffaloes. Reason may be in buffaloes fewer hairs on skin, thickness of skin. The ticks' easily pierce the comparatively thin skin of cattle (Davoudi 2008, Kakarsulemankhel 2011). Present research did not conclude any statistically significant effect of age on the prevalence of tick infestation. However, higher numerical figures of tick infestation were found in calves in both cattle and buffaloes. The only possible reason behind this trend may be the lack of immunity against infesting organisms. Contributing factors may include the softer tissue and thinner skin facilitating the penetration of mouth parts into the host for successful feeding. (L'Hostis *et al.*, 1996; Swai *et al.*, 2005; Stuti Vatsya, 2007). Similarly, there was no significant effect of sex of the host on the prevalence of thick infestation however, higher numerical figure of tick infestation were found in female animal. Although, the exact cause of higher prevalence of tick infestation in female cattle cannot be explained but it can be hypothesized that some hormonal influences may be associated with this phenomenon. Lloyd (1983) reported that higher level of prolactin and progesterone hormones make the individual more susceptible to any infection. Moreover, stresses of production such as pregnancy and lactation make the female animals more susceptible to any infection (Kabir *et al.*, 2011).

In the current study significant relationship between breed and prevalence of tick infestation was found in cattle. The highest prevalence was found in Cross breed followed in order by Jersy (*Bos tauru*), Holestian-Friesen, Khilari (*Bos indicus)*, Non Descriptive then Gir (*Bos indicus)*. Frisch *et al.*, (2000) mentioned that no breed is completely resistant to ticks and all breeds are at times adversely affected by the parasites. The breed wise prevalence is highest in the exotic

breeds (*Bos taurus*) as compared to indigenous local breed (*Bos indicus*) (Sutherst *et al.,* 1983). Jongejan and Uilenberg (2004) described that the resistance to tick infestation is genetically determined trait. Wagland (1978) described that the degree of tick resistance is highly heritable trait in *Bos indicus* cattle and their crosses. *Bos taurus* are highly susceptible to tick infestation as compared to *Bos indicus* breeds described by de Castro and Newson (1993). In buffaloes non-significant relationship between breed and prevalence of tick infestation was found. Highest prevalence was found in Murrha followed by Jafarabadi and non-descriptive. Reason may be all breeds are indigenous (Sajid 2009). In this study significant relationship between health status and prevalence of tick infestation was found in cattle and buffaloes. Good and healthy animal are less susceptible to tick infestation than normal and weak animal as they may have strong immunity than other. Weak animals are found highly infested with ticks because of reduced immunity. (Abdul *et al.,* 2007). Significant relationship of coat colour and prevalence of tick infestation was found in cattle and buffaloes. In cattle higher infestation found in black followed by mixed, white and brown.

The reason may be coat colour help tick to camouflage well (Machado *et al.,* 2010). In buffaloes no variations in colour was found. Prevalence of tick infestation was generally higher in the untreated animals, but in present study the treated animal also showed the considerable occurrence of tick infestation. The use of unspecific acaricide, wrong method of application, development of resistance to acaricides, and seasonal behavioral change of tick and host may be the reason of significant prevalence of tick in post acaricide treatment. Dolan (1999) and Okello-Onen et al 1994 suggested the extensive and wrong use of acaricide favoring development of resistant among ticks. Acaricidal resistance was one of the main reasons for the failure to eradication of *Boophilus* spp. explained by Jongejan and Uilenberg (2004). Thus in conclusion, the tick infestation is more in calve and female domestic ruminants. Exotic breed are more susceptible to thick infestation than indigenous breeds. Emerging acaricide resistant strain of tick is more important problems in tick control programme. In the study area lack of knowledge, poor management and hygiene and incorporation of exotic breed have made it necessary to develop an integrated tick control programme at national level.

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