African Journal of Agricultural Research Vol. 6(29), pp. 6208-6211, 5 December, 2011
Available online at http://www.academicjournals.org/AJAR
DOI: 10.5897/AJAR10.236
ISSN 1991-637X ©2011 Academic Journals

Full Length Research Paper

A study on tick borne infections of cattle in Yola locality of Adamawa State

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Accepted 22 September, 2010

Blood samples were collected and examined for haemoparasites from 1530 cattle composed of four breeds: Adamawa gudali (434), Sokoto gudali (386), Red bororo (414) and Bunaji (298). Six hundred and forty (41.8%) of those examined were infected with haemoparasites. Three species of tick-borne parasites were encountered namely *Babesia bigemina, Theileria parva and Anaplasma marginale* and a non-tick borne parasite *Trypanasoma vivax.* Adamawa gudali was the most infected (44.5%), followed by Sokoto Gudali (43.0%). The least infected was Bunaji (37.9%). Chi square analysis showed significant association between infection and breed of cattle (P<0.05). Seven species of ixodid ticks were collected from the cattle namely, *Amblyomma variegatum, Amblyomma lepidum, Hyalomma truncatum, Hyalomma rufipes, Boophilus decolaratus, Boophilus annulatus and Rhipicephalus evertsi.* Monthly tick distribution shows that the month of April had the least tick burden. Whereas, the month of August recorded the highest tick burden.

Key words: Haemoparasites, Chi square analysis.

INTRODUCTION

Ticks are ectoparasites of most terrestrial vertebrates particularly vulnerable are mammals whose warmth and odour are highly attractive to them (Harwood and James, 1969). They are distributed worldwide but occur principally in tropical and sub-tropical countries (Bowman et al., 1996). Ticks are of great medical and veterinary importance. They surpass all other arthropods in number and variety of pathogens that they transmit to domestic animals, being haematophagous they are well adapted and have rather a unique association with the host, which facilitate the transmission of disease agents such as viruses, bacteria and protozoan. They cause by far the greatest economic losses in livestock production worldwide. Losses could be due to tick worry (toxicosis), damaged hides and anemia. However, the main problem is the transmission of tick borne infection (Bowman et al., 1996).

According to Unlenberg (1971), there is a direct relationship between tick abundance and tick borne infection. Adamawa State has high concentration of livestock particularly cattle, it is estimated that there are between 2.8-3.5 million cattle in the State (Ardo and Tukur, 1999), considering the relationships that exist between tick abundance and tick borne infection. This study was carried out to assess the prevalence of tick borne infection of cattle in Yola locality of Adamawa State.

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MATERIALS AND METHODS

Study area

Yola, the state capital of Adamawa lies between latitude 9° 14'N and longitude 12° 28 E. The vegetation in Yola and environs is secondary type due to human activities through construction, farming, wood gathering for fuel and grazing have altered the natural vegetation (Adamawa diary , 1994; Akosim et al., 1999). Majority of people in the environs are farmers and nomads.

Cattles were examined physically for the presence of ticks after which blood smears were made monthly between January and September, from venous blood collected from 1532 cattle chosen randomly from four breeds of cattle, Adamawa gudali (434), Sokoto gudali (386), Bunaji (298) and Red bororo (414). Cattles from which blood was collected were categorized into adult (4 years and above), young (2-3 years) and Calf (1-12 months). Blood smears

Table 1. Prevalence rate of haemoparasites in relation to cattle breeds.

Breeds	No. examined	No. infected	*B. bigemina*	*T. parva*	*Anaplasma*	*T. vivax*
Adamawa gudali	434	193(44.5)	85	62	38	8
Sokoto gudali	386	166(43.0)	70	76	16	4
Bunaji	298	113(37.9)	50	53	07	03
Red bororo	414	168(40.6)	71	56	35	06
Total	1532	640(41.8)	276(43.1)	247(38.6)	96(15.0)	21(3.3)

prepared were fixed in methanol and stained with Giemsa stain as described by Ministry of agriculture (1984). Parasites on the fixed slides were identified microscopically with aids of keys as presented in Welcome (1982).

RESULTS

Out of the 1532 cattle from which blood smears were made and examined; 640 (41.8%) were infected with haemoparasites. Three species of tick-borne parasites were encountered, *Babesia bigemina, Theileria parva and Anaplasma marginale* and a non-tick borne parasite *Trypanasoma vivax*. Adamawa gudali was the most infected with prevalence rate of (44.5%), followed by Sokoto Gudali (43.0%). The least infected was Bunaji (37.9%). Chi square analysis showed significant association between infection and breed of cattle ($P<0.05$). The most prevalent parasite was *B. bigemina (*(43.1%), followed by *T. parva* (38.6%) and *A. marginale*s (15.0%). The least observed was *T. vivax* (3.3%) (Table 1).

The age of cattle was observed to have significant effect on tick-borne infection. In all the breeds except for Red bororo, adults were the most infected followed by the young whereas the calf were the least infected ($P<0.05$) (Table 2). Monthly prevalence of tick-borne parasite shows that February recorded the least parasite prevalence. This however increased in the preceding months with the highest recorded in September (Figure 1).

Seven species of ixodid ticks were collected from the cattle: *Amblyomma variegatum, Amblyomma lepidum, Hyalomma truncatum, Hyalomma rufipes, Boophilus decolaratus, Boophilus annulatus and Rhipicephalus evertsi* Monthly tick distribution shows that the month of April had the least tick burden while the month of August recorded the highest tick burden. *Amblyomma and Hyalomma spp* were the most encountered tick species, while the least encountered was *R. evertsi*.

DISCUSSION

Haemoparasitic infection transmitted by ectoparasites constitutes a major handicap to livestock production. Animals infected suffer from low productivity and anaemia, which may lead to death if not treated. Ticks are known to transmit several important protozoan, rickettsial, bacterial and viral diseases to animals, thereby causing great economic losses. In addition, the effect of tick borne infection of livestock have been documented by Saror (1980), Tanwia (1989) and Iwuala and James-Rugu (1995). The Tick-borne parasites encountered*, B. bigemina, T. parva*, and *A. marginale*, cause a disease complex known as tick fever, which are transmitted by the genus of ticks collected during the study, *Boophilus, Hyalomma, Amblyomma, and Rhipicephalus*. Similarly Mohammed (1974), James-Rugu and Iwuala (1999), Losos (1995) and Welcome (1982) all confirmed these ticks as vectors of the aforementioned tick borne parasites.

According to Lancaster and Meisch (1996), the increasing incidence of tick borne infection might be attributed to concentration of cattle and the continuous extensive management system of cattle by stockowners, thereby predisposing them to infection.

The high infection rate among Adamawa gudali and Sokoto gudali could be attributed to their mode of life, which is usually free ranging, they cover long distance grazing criss-crossing vector infested areas; thus bring them in contact with the tick vector. In addition these breeds of cattle are the most preferred by pastoralist. Whereas the low infection rate among Bunaji could be attributed to the fact these breed of cattle are usually kept at low concentration for fattening and are usually restricted. Hence they are less exposed to tick infestation.

The high infection rate observed among adult and the young could be attributed to the fact that they are more exposed to vector prone areas through grazing and migration compared to the calves that are usually restricted and kept at low concentration. Lima et al. (2000) reported that calves are usually maintained apart from adult at low densities and were thus exposed to lower parasites burden. Tick borne infection of cattle has specific distribution and impact, which is essentially determined by the distribution of the vectors (Brown, 1997). This may account for the increase in tick-borne infection, which corresponds with increase in tick abundance.

The presence of tick borne parasites in blood samples may not necessarily translate to pathological conditions.

Table 2. Tick-borne parasites in relation to ages and breeds of cattle.

Breeds	Age	No. examined	No. infected	*B. bigemina*	*T. parva*	*Anaplasma*	*T. vivax*
Adamawa gudali	Adult	168	77(45.8)	38(49.4)	32(41.6)	05(6.5)	02(2.6)
	Young	198	89(44.9)	40(44.9)	35(39.3)	09(10.1)	05(5.6)
	Calf	68	28(39.7)	18(66.7)	06(22.2)	03(11.1)	-
	Total	434	193(44.5)	96(49.7)	73(37.8)	17(8.8)	07(3.6)
Sokoto gudali	Adult	158	75(47.5)	32(42.7)	29(38.7)	09(12.0)	05(6.7)
	Young	170	64(37.6)	28(43.8)	26(34.7)	06(9.4)	04(6.3)
	Calf	58	27(46.6)	11(44.4)	13(48.1)	02(7.4)	-
	Total	386	163(43.0)	7(43.4)	68(41.0)	17(10.2)	09(5.4)
Bunaji	Adult	68	38(55.9)	17(47.4)	14(36.8)	04(10.5)	02(5.3)
	Young	204	65(31.9)	28(43.1)	25(38.5)	09(13.8)	03(4.6)
	Calf	26	10(38.5)	03(30.0)	04(40.0)	03(30.0)	-
	Total	298	113(37.9)	49(43.4)	43(38.1)	16(14.2)	05(4.4)
Red bororo	Adult	158	62(39.2)	31(50.0)	21(33.9)	07(11.3)	03(4.8)
	Young	234	95(40.6)	42(44.2)	33(34.7)	15(15.8)	05(5.3)
	Calf	22	11(50.0)	05(45.5)	06(54.5)	-	-
	Total	414	1168(46.4)	77(46.4)	60(35.7)	22(13.1)	8(4.8)

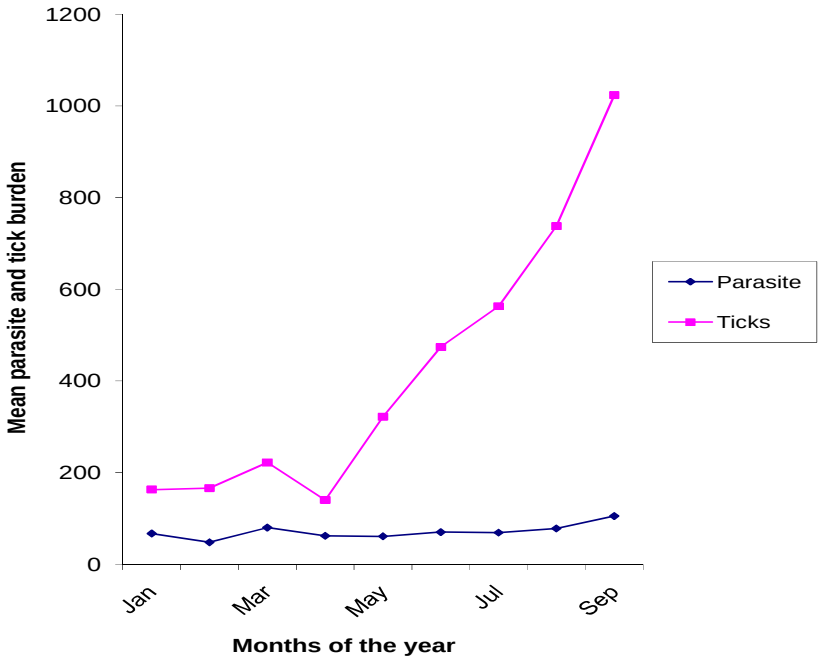

Figure 1. Tick distribution and parasite burden in relation to months of the year.

This is because most indigenous cattle are immune to tick-borne parasites. However environmental stress and malnutrition may upset this enzootic stability, which may leads to manifestation of clinical symptoms of infection (Losos, 1995). Most livestock owners rear them on free range with little or no supplementary feeding; poor feeding increases susceptibility of animals to diseases. Cattle that recover from tick borne infection are conferred

with immunity against subsequent infection but may remain as reservour from which ticks become infected and further spread the infection among healthy cattle.

Although ticks were present on cattle throughout the sampling period, the tick burden however varied between the sampling months. It was observed that there was an increase in tick burden from the month of May, which corresponds, with the onset of rainy season, which consequently increased the infestation level and remained relatively high during the study and reached a peak in the months of July, August and September. This observation is in conformity with observation of Lima et al. (2000), reported that rainfall is the single most important factor that determines the distribution and species abundance, with more ticks collected during the rainy season than in the dry season.

Since tick-borne diseases constitute a major handicap to livestock rearing it is therefore important that farmers and livestock owners should employ the services of veterinary doctors to periodically assess the health status of their herds and those found to be infected should be promptly treated to prevent its spread among the herds. In addition, the control and prevention of ticks is of paramount importance since they are responsible for the transmission. The use of acaricides is the main stay for the control of ticks, there are however other alternative which include the use of anti-tick vaccine and pasture spelling.

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