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APPRAISAL OF THE STATUS OF BOVINE TRYPANOSOMIASIS AROUND THE SUMMIT AREAS OF THE JOS PLATEAU, NIGERIA.

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ABSTRACT

A parasitological survey of blood samples of 200 calves, yearlings and adults of zebu cattle for infecting Trypanosoma species, the causative agents of bovine trypanosomiasis in Jos, Babale and Federe areas revealed an overall percentage infection of 7.5%. Thin film technique and haematocrit centrifugation diagnostic methods were used. Three Trypanosoma species namely T. Brucei, T. Vivax,, and T. Congolense were identified. Differences in infection were not indicated between yearlings and calves (X^2 = 0.389, P>0.05), but between adults and claves, the pattern of infection was significant (X^2 = 6.394, P>0.05) for the sam-ples taken from Babale. Males from Naraguta and Federe were significantly (P<0.05) more parasititized than the males, while at Jos, females were the sole carriers of the infections. Our findings show a recrudescence of bovine trypanosomiasis and a gradual build up of the infection over a ten-year period since the last outbreak and control of the disease on the Plateau. More studies to cover a wider of the Plateau are now required to determine the spread and pattern of the disease, as well as the apparent variation in the prevalence rates observed between the sexes. A study of the species composition of the vectors and population dynamics in relation to the transmission of bovine trypanosomiasis on the Plateau is also advocated.

Key words Bovine Trypanosomiasis, Jos Area.

INTRODUCTION

Bovine trypanosomiasis due to T. Vivax, T. Congolense and T. Brucei are among other factor limiting beef and dairy production in Nigeria (WHO/FAO, 1979; Ikede & Taiwo, 1986). Bovine trypanosomiasis is rather widespread over much of Nigeria. In the mid Norther states, reports published by Shabu (1976) in parts of Lafia now in Nasarawa State and Onyiah (1977) in Kaduna state as well as Tsar (1977) in Benue State all confirmed the wide spread distribution of the disease. Adekolu (1980) found the prevalence in the Nigeria River valley to be seasonally pronounced.

The dry season had the least prevalence of 3.11% while the wet season had 5.3%. Furthermore, herds of cattle kept by the nomadic Fulani have had 37.5% incidence of the disease and 24.68 for the non nomadic herds. Ikede et.al. (1988) later confirmed this seasonal pattern in studies conducted over the wet and dry seasons. The vectors of these protozoan parasites are members of the dipteran flies glossinidae of which G. Morsitans and G. Pallidipes are the main vecxtors of T. Brucei in Nigeria (WHO/FAO, 1979). The present study was undertaken to determine the prevalence of bovine trypanosomiasis more than ten years since the last report (Joshua and Shanthikutmar, 1989) and five years since the last reported epidemic of the disease in this important and fast growing beef and dairy farming area of Nigeria.

MATERIALS AND METHODS

Study Area

The study sites were Jos, Babale, Federe and Naraguta Villages all within the summit area of the Jos Plateau in Nigeria. Jos is 10^{o} 00^{1} N and 09^{o} 001 E, Federe 09^{o} 541E is to the North East of Jos. Naraguta and Babale are located in between these two. The summit ara is 1300m above sea level and is source to the rivers Delimi and Jarawan Kogi which drain the area. Two seasonal weather patterns, the wet season (April-October) and the dry season (November-March) prevail over the area. This study was conducted in the dry season months of January to March. Cattle breeds studied were of the local Zebu Cattle which were age graded into calves (<1 year), yearlings (1-2 years) and Adults (>2 years); and according to their sexes.

Methods.

Two hundred cattle from all the sampling areas were extensively managed and diagnosed for trypanosomiasis infections using the Thin Film technique (WOO, 1970) and the Haematocrit Centrifugation Technique (Paris et al., 1980). Of this number, 108 were males and 92 females. Fifty-one were claves, 58 yearlings and 91 adults. From each of the four sampling sites, fifty blood samples of the cattle were taken and numbered serially according to the age and sex of the animal. Sterilized syringes and needles were used to obtain blood from the jugular vein which was stored in EDTA as the anticoagulant. Thus blood cell morphology was preserved until analysed in the laboratory bioassay / In the thin film technique, a drop of blood sample was placed on a clean glass slide, approximately 20mm from one end. A spreader slide placed at an angle of 30o was drawn back to make contact with the blood. The blood was allowed to run to each end of the spreader and a quick smear made over most of the slide. The slide was subsequently waved in the air to dry and labelled appropriately. The slide was fixed for a minute in methyl alcohol and stained in giemsa for 30 minutes. This stage was followed by differentiating in M/15 phosphate buffer, and drained in an upright position to dryness. A thin layer of oil immersion was placed on it and the slide viewed at 40X magnification of a light microscope for the detection of trypanosomes. Identifications at the 100X magnification, enabled the observation of trypanosome sizes, and the presence of absence of a free flagellum, undulating membrane and the position of the kinetoplast.

For the Haematocrit Centrifugation Techniuque (HCT), unclotted blood was drain in a capillary tube to about three quarters of its length and sealed at with cristaseal at one end of the tube., The tubes were then placed in a microhaematocrit centrifuge, with the sealed end outermost and loaded symmetrically to ensure good balance. The set up was centrifuged at 12,000/rpm for 5 minutes. Packed Cell Volume (PCV) was read from the haematocrit reader for each tube.

RESULTS AND DISCUSSION

Results

The overall prevalence of bovine trypanosomiasis was 7.5% over the study areas as determined by the (HCT) technique. By the TFT technique, only 2% of the

sample was infected. The rest of the results presented here are by the HCT method. The prevalence within the villages is as shown in Table 1. Federe had the highest prevalence of 12% and Babale the least (4%). Chi square statistics was applied on the data to determine the relationships between age and sex, and the prevalence rates in the areas sampled. The combined results for all sites (Table 2) showed no significant difference between the sexes ($X^2 = 0.569$, $P>0.05$). However, site analyses revealed significant differences due to sex for samples taken from Federe and Naraguta, but not for those from Babale. In Table 3, comparisons of the infections in calves and yearlings and between adults and yearlings, revealed no significant differences for the age groupings $|(X^2 = 0.389, P> 0.05)$ for all sites combined. However, between the adults and the calves, a significant difference in the pattern of infection was indicated ($X^2 = 6.394$, $P <0.05$).

Discussion

The result of the survey revealed a prevalence of 7.5% bovine trypanosomiasis on the summit parts of the Jos Plateau. This finding is within range of the earlier accounts by Ikede and Taiwo (1986), Joshua and Shanthikutmar (1989) and Kalu (1991). These earlier accounts indicated the prevalence of trypanosomoiasis was between 9.6% and 11.5% from various locations of Jos Plateau. Nearly ten years on, it is not clear whether the 7.5% prevalence in this study represents a recrudescence of the disease from the campaign mounted following the outbreak reported by Kalu (1991) or is the actual level of prevalence in the absence of a sustained control programme. Previous studies of the disease by Ikede et al. (1988) had established the seasonal nature of bovine onchocerciasis and since this study was in the dry season, this may account for the lower prevalence recorded here rather than the effect of any previous control programme. The difference observed in prevalence between the four sites maybe attributed to any of several epidemiological factors. All four site4s are on the summit area of the Plateau which is reputed to be free of the vector breeding sites and so are subject to nearly the same climatic conditions. The practicie of Fulani herdsmen, who usually take their cattle to grazing fields far from their normal settlements and by extension to poten6ial vector breeding sites is one possible explanation of the differences in prevalence between the villages. With respect to the differences observed between the sexes (males & females) which were significant ($P< 0.05$). It is not clear, the reasons for this observed differences also previously reported by other workers. Ikede (1986) found a similar pattern and noted that adult males carried a heavier infection than adult females. Since the sexes have equal exposure to the vectors, it may only point to the possible variation in the immune responses of the sexes to the infection, a factor that needs to be clarified.

The age related pattern of the disease in which the adult males and females were more infected (14.29% followed by the yearlings (3.5%) and the calves, was previously reported by Ikede (1986) and Kalu (1991). The presence of vector Glossina species on the summit ar34as of the Jos Plateau (Kalu, 1991) Joshua and Shanthikutmar, (1989) coupled with the cattle management practices are believed to be responsible for the recrudescence of the disease. Another factor for the disease

prevalence on the Plateau, can be attributed to the practice of transhumance husbandry of cattle by the Fulani herdsmen. During the dry season, the berdsmen take their cattle to graze in the tsetse infested areas to the south of the Plateau and even deep into areas in the derived Guinea Savanna.

References

Adekolu A. (1980). Some aspects of recent advances in trypanosomiasis research. Paper Presented at the 2nd National Conference on Haemoparasitic Diseases and their Vectors. Zaria, Nigeria.

Ikede B.O. (1986). "Trypanosomiasis and Livestock Production in Africa: Is current emphasis misplaced?". *Tropical Veterinarian* 4(1-2): 1-4.

Ikede B.O. and Taiwo V.O. (1986). Prevalence of Bovine Trypanosomiasis in Sedentary zebu and trypanotolerant breeds in South Western and North Western Nigeria. In: *OAU/STRC* 10 (4612): 141-146.

Ikede B.O., Reynolds L., Ogunsami A.O., Fawomi M.K., Ekwuruke J.O. and Taiwo V.O. (1988). The epizootiology of bovines in the derived Savanna zone of Nigeria – a preliminary report. *OAU/STRC* 13(6053): 289-294.

Joshua R.A. and Shanthikutmar S. (1989). Naturally occurring trypanosomiasis in some cattle herds around the Jos Plateau of Nigeria. *Bulletin of Animal Health and Production in Africa.* 37(1): 95-96

Kalu A.U. (1991). An outbreak of trypanosomiasis on the Jos Plateau, Nigeria. *Tropical Animal Health and Production,* 23(4): 215-216

Onyiah (1977). Trypanosomiasis in cattle in Kaduna State, Nigeria. *Nigeria Veterinary Journal.* 2:30-35

Paris J., Muray M., and Aggure R. (1980). An evaluation of the Sensitivity of Current Trypanosome Parasitological Techniques. WHO, *Tryp/Inf* /80. 65: 1-9.

Shabu K. (1976). Survey of Trypanosome Infection in the Trace Cattle in Plateau State of Nigeria. *Bulletin of Animal Health and Production in Africa.* 23:165-172.

Tsar A. (1977). Cattle trypanosomiasis in Northersn Nigeria. Problem in the *Field. Bulletin of Epizootiology in Africa, II*: 381-390.

WOO P.T.K. (1970); The Haematocrit centrifugation technique for the diagonisis of Africa Trypanosomiasis. *Acta Tropica.* 27:384-386.

WHO/FAO(1979).*Animal Health Year Book.* 65-68: Geneva.

Table 1: Prevalence of Bovine Trypanosomiasis from four Villages on the Jos Plateau Summit Area

SITES	NO. SAMPLED	NO. POSITIEVE	PREVALENCE
Babale	50	2	4
Federe	50	6	12
Jos	50	3	6
Naraguta	50	4	8
Total	200	15	7.8

Table 2: Sex Related Distribution of Bovine Trypanosomiasis in four Villages on the Jos Plateau Summit Area.

Sites	Male		Female	
	Sample Size/ No. Positive	Prevalence	Sample size/No. Positive	Prevalence
Babale	24/3	13	26/3	12
Federe	29/4	14	21/0	0
Jos	24/0	0	22/2	9
Naraguta	27/3	11	22/0	-
Total	108/10	9	92/5	5

P>0.05 % Prev. = Percentage prevalence

Table 3: Age Related Distribution of Bovine Trypanosomiasis in Four Villages on the Jos Plateau Summit Area.

SITES	CALF	YEARLING	ADULT
	SAMPLE SIZE/NO. POSITIVE	SAMPLE SIZE/NO. POSITIVE	SAMPLE SIZE/NO. POSITIVE/%
Babale	12/0 (0)	14/0 (0)	24/6 (25)
Federe	10/0 (0)	16/2 (0)	24(2) (8)
Jos	13/0 (0)	14/0 (0)	23/2 (9)
Naraguta	16/0 (0)	14/0 (0)	20/3 (15)
Total	51/0 (0)	58/2 (3)	91/13 (14)

P> 0.05 in the case of Calf/yearling and Adult/yearling
P> 0.05 for Adult/Calf
Figures in parenthesis – (percentages)