

Trypanosome Prevalence in Cattle in Lere Area in Kaduna State, North Central Nigeria

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Key words

Cattle – *Trypanosoma* – Morbidity – Nigeria.

Summary

Trypanosome prevalence in cattle was estimated in August 2001 in selected farms in the three districts of Lere local government area of Kaduna State, North Central Nigeria. The study was subsequent to reports of trypanosomiasis outbreaks, which had resulted in deaths of cattle that led to yearly migration of seminomadic Fulanis out of the area, especially during the rains. Blood samples collected randomly from 526 cattle were examined for presence of trypanosomes using the buffy coat technique and Giemsa thin blood smears. Overall, 48 animals were found infected: 39 (81%) with *Trypanosoma vivax*, 7 (15%) with *T. congolense* and 2 (4%) with *T. brucei*. The infection rates in young and adult cattle were 6 and 10%, respectively, which was not significant ($P > 0.05$). From this study, it is clear that trypanosomiasis is still a major obstacle to livestock production in Nigeria and that the incidence rate is similar in young and adult animals.

INTRODUCTION

Animal trypanosomiasis is one of the main pathological constraints on the development of animal production in sub-Saharan Africa (8, 12) and causes annual losses estimated at US\$ 1 billion (3). Tsetse flies are the main vectors in this part of Africa. In Nigeria, tsetse flies still infest 80% of the nation's land mass including the high lands of Jos, Mambilla and Obudu plateaux previously known to be tsetse free (16). The risk of transmission is primarily linked to the intensity of the encounters between vectors and hosts (12).

In the last three years, the Nigerian Institute for Trypanosomiasis Research (NITR) has received reports of outbreaks of animal trypanosomiasis, which resulted in deaths of cattle with consequent yearly migration of seminomadic Fulanis out of Lere local government area (LGA) during the rainy seasons. Lere LGA used to be a known human African trypanosomiasis (sleeping sickness) endemic focus between 1930 and 1960 (4), after which the disease

was effectively controlled to below epidemic proportions (10). Up till 1998, sleeping sickness cases were still identified in this area and other parts of Nigeria (5).

Furthermore, in a Fulani herd located one kilometer away from Saminaka, 124 out of 150 (83%) animals were reported to have died in a space of three years. The remaining 26 animals were examined during a spot survey and were all found to be infected with *Trypanosoma vivax* (Abenga et al., pers. commun., 2000). For these reasons, a more extended study was undertaken to assess the prevalence of trypanosome infection in cattle in the area for appropriate control measures that will permit the exploitation of the abundant fodder and water for large scale cattle production.

MATERIALS AND METHODS

Study area

Lere LGA of Kaduna State (Figure 1) is situated at latitude 10° 50' N and longitude 7° 54' N. The LGA is made up of three districts: Garu, Kadaru and Lere with Saminaka in Lere district as its headquarter. The study was conducted in these three districts in August 2001. The study area with an estimated human population of about 180,000 and a cattle population of 1500 was an old

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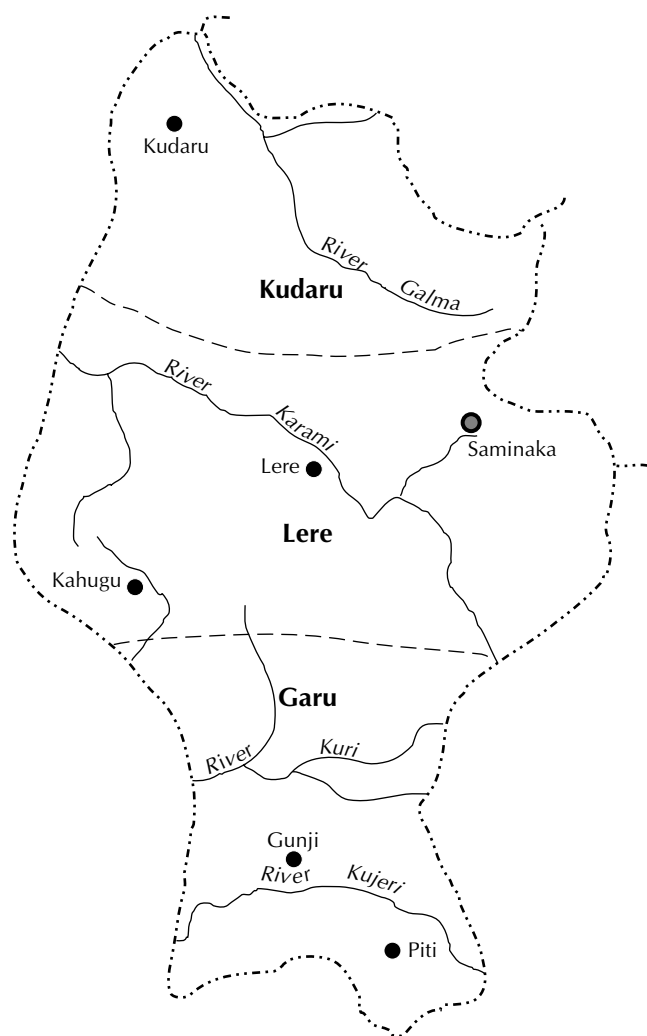


Figure 1: Map of Lere local government showing the three districts and cattle settlement areas surveyed.

endemic sleeping sickness area (4, 14); it lies within the subhumid zone, which is characterized by a dry season period from November to April and a rainy season from May to October. There are a few rivers in the area but there are seasonal streams and ponds which usually dry up during the dry season, although few ponds survive the dry season and serve as source of water for domestic use as well as drinking water for the livestock.

Vegetation is typical of the Northern Guinea savannah woodland (Figure 2). However, because of the effects of annual bush fires, there are now many species of both the Northern and the derived savanna zones found in the area. Lere districts fall within the *Glossina tachinoides* and *G. palpalis* infestation belt (15).

Settlement patterns are mainly hamlets and farm compounds. There are more than ten different tribes, including Kurama, Hausawa, Amarwa, Warsa and Fulani, and Hausa is the general spoken language. The main occupations of the people are farming, fishing and trading. Mixed farming of crop cultivation and animal production is the usual practice, and the LGA is known for its maize production and supply to several parts of Nigeria. During the rainy season, many of the cattle rearsers go on transhumance to Bauchi State with their animals and return at the end of the rainy season. Infrastructure development is poor with some areas being inaccessible during the rains.

Animal sampling and diagnosis

A systematic random sampling was used to obtain a sample of 526 cattle of different ages, sexes and breeds. Animals one year and under were considered as young calves, whereas those over one year were regarded as adults. The animals were made up mostly of white Fulani breeds of cattle (Bunaji) and few Sokoto Gudali.

From each animal, five milliliters of blood were taken from the jugular vein into specimen bottles containing ethylene diamine tetra acetic acid (EDTA) dispensed as one milligram powder per milliliter of blood and conveyed in cold boxes with ice packs to the field laboratory for analysis. The samples were analyzed using the buffy coat dark ground/phase contrast technique (13) and Giemsa-stained thin smears. Trypanosome species were identified based on their morphological structure from Giemsa-stained thin films. The rates of infection in animals under and over one year of age were analyzed using ANOVA, while the prevalences between districts were analyzed using the sample T test.

RESULTS

In the 319 cattle sampled in Garu district, 67 were under one year old. Of these 67 young cattle, parasitological examinations showed three *T. vivax* and one *T. congolense* infections. In the 252 adult animals, four showed *T. vivax*, six *T. congolense* and one *T. brucei* infections, bringing to eleven the number of trypanosome-infected cases. Finally, 4.7% of the animals were found infected in Garu district, 46.6% with *T. vivax*, 46.6% with *T. congolense* and 6.6% with *T. brucei* (Table I).

Table I

Prevalence of trypanosome infections

Cattle Age	Garu					Kudara					Lere				
	Num. sampled	Num.+ (%)	Tv (%)	Tc (%)	Tb (%)	Num. sampled	Num.+ (%)	Tv (%)	Tc (%)	Tb (%)	Num. sampled	Num.+ (%)	Tv (%)	Tc (%)	Tb (%)
≤ 1 year	67	4 (5.9)	3 (75)	1 (25)	0	35	0	0	0	0	15	3 (20)	3 (100)	0	0
> 1 year	252	11 (4.4)	4 (36.4)	6 (54.5)	1 (9)	105	8 (7.6)	8 (100)	0	0	52	22 (42.3)	21 (95.5)	0	1 (4.5)
Total	319	15 (4.7)	7 (46.6)	7 (46.6)	1 (6.6)	140	8 (5.7)	8 (100)	0	0	67	25 (37.3)	24 (96)	0	1 (4)

Num.+ = Number of *Trypanosoma*-positive cattle

Tv = *Trypanosoma vivax*; Tc = *T. congolense*; Tb = *T. brucei*

In the 140 cattle sampled in Kudu district, 35 were young, and of these 35 young animals, none was positive for trypanosomes. In the 105 adult animals, eight were positive for *T. vivax* only. Finally, 5.7% of the animals were found infected with *T. vivax* (Table I).

Sixty-seven cattle (15 young and 52 adult) were examined in Lere district. Of the young cattle, three were positive for *T. vivax* only. Of the 52 adult cattle, 21 were positive for *T. vivax* and one for *T. brucei*. In other words, 37.3% of the animals were infected, 96% with *T. vivax* and 4% with *T. brucei*.

Further analysis between districts revealed that there was no significant difference ($P > 0.05$) within the sample sizes and prevalences in the three districts in either young or adult animals. Even though Lere district recorded the highest prevalence overall, there was no statistical significant difference between the districts ($P > 0.05$).

DISCUSSION

This study has shown that animal trypanosomosis is prevalent in the three districts of Lere LGA with an overall trypanosome infection rate of 9.1% confirming earlier reports of trypanosomosis menace in the area, upon which the study was predicated. The overall rate of 9.1% positive cases was higher than the 4.3% overall prevalence rate for Nigeria obtained from the country wide

survey within the EEC-trypanosomosis control project between 1989 and 1996 (16). This suggests that animal trypanosomosis is a problem in this area and the present findings agree with the work by Agu et al. (1), who reported a rate of 9.4% in parts of Kaduna State. Similarly, a much higher rate of 53.4% was reported by Maikaje (11) during an outbreak of bovine trypanosomosis in Kaura LGA of Kaduna State. The high prevalences of animal trypanosomosis in Kaduna State appear to indicate a general increase in the menace of the disease in the State.

Further analysis of the results between districts showed that Lere had the highest trypanosome prevalence (37.3%), followed by Kudu and Garu with 5.7% and 4.7%, respectively, but the results were not statistically significant ($P > 0.05$). The majority (81%) of the trypanosome infections detected and identified parasitologically in cattle were *T. vivax*, whereas *T. congolense* and *T. brucei* accounted for the minority (15 and 4%, respectively). Calves less than one year old had an infection rate of 6% compared to 10% obtained in animals more than one year old, but this was not statistically significant; the infections were mainly due to *T. vivax*. This merely indicated that the incidence rate was similar in young and adult animals. The dominance of *T. vivax* infections observed in this study agrees with several workers' findings in Nigeria and West Africa, (6, 7, 9). This could be ascribed to the mechanical transmission or the shorter development cycle in the anterior station of the tsetse fly (2).

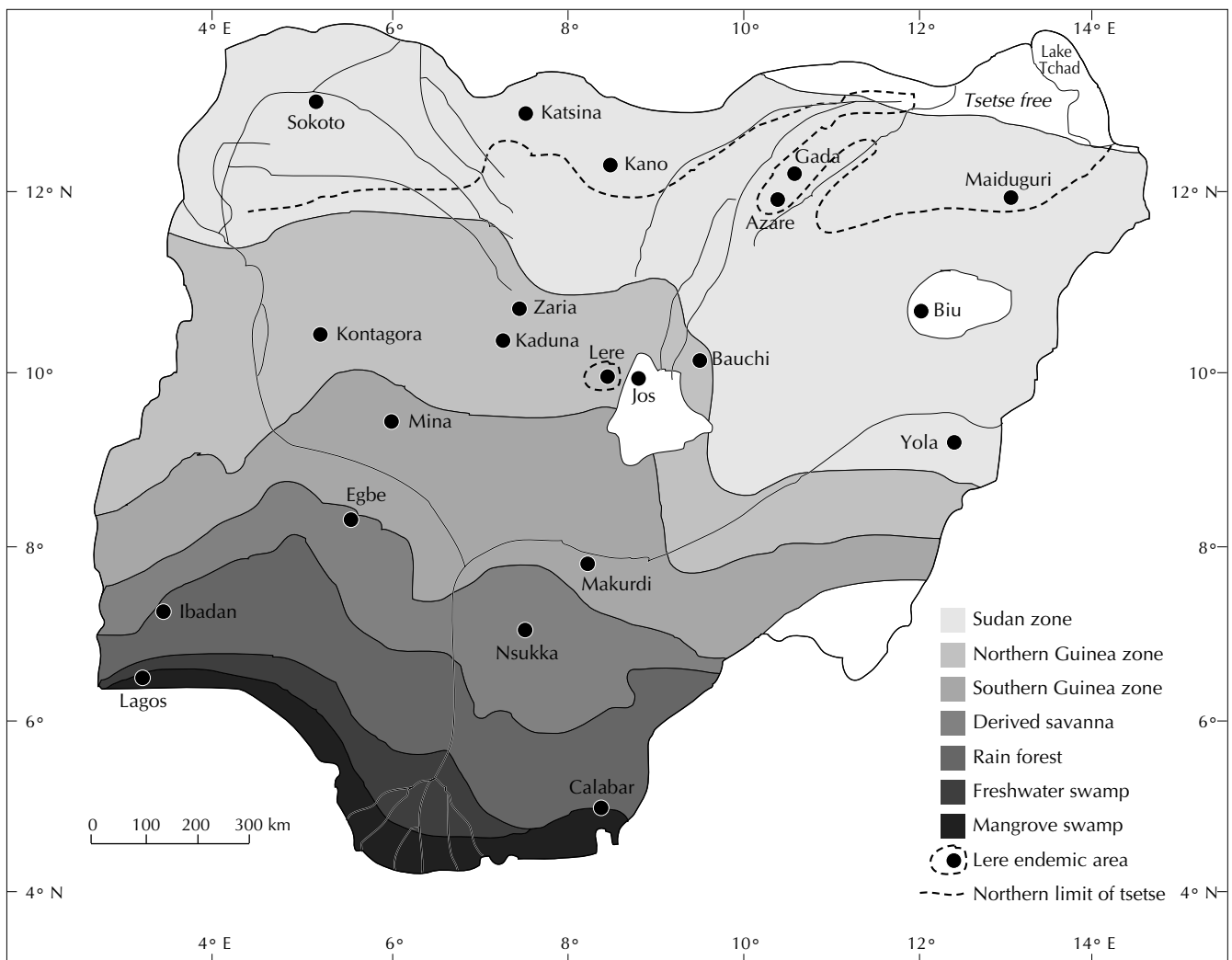


Figure 2: Vegetation map of Nigeria showing Lere endemic area within the Northern Guinea zone.

■ CONCLUSION

Animal trypanosomosis is a major obstacle to livestock production in Lere districts. Since Lere LGA lies within the tsetse belts, it therefore appears appropriate that chemotherapeutic and chemoprophylactic as well as tsetse control programs should be extended to the area in order to curtail the menacing effects of the disease and arrest the flight from the area of the seminomadic Fulanis during the rains. Similar trypanosomosis situations are likely to exist in other parts of Southern Kaduna State as evidenced by Agu et al. (1), and in the Southern Guinea savannah of Nigeria. These findings call for concerted and sustained efforts in the control of the disease.

Acknowledgments

We are grateful to Late Mr Marcus Maikaje for technical assistance and to the Director General, NITR, Kaduna, Dr Ibrahim Halid, for funding the study.

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Reçu le 18.12.2003, accepté le 02.09.2004

Résumé

Abenga J.N., Enwezor F.N.C., Lawani F.A.G., Osue H.O., Ikemereh E.C.D. Prévalence de trypanosomes chez des bovins dans la région de Lere dans l'Etat de Kaduna au centre nord du Nigeria

La prévalence de trypanosomes chez des bovins a été estimée en août 2001 dans des fermes sélectionnées dans les trois communes de la zone administrative de Lere, située dans l'Etat de Kaduna au centre nord du Nigeria. Cette étude a été consécutive à des rapports sur la présence de foyers de trypanosomose ayant causé des mortalités chez les bovins et ayant ainsi provoqué des migrations annuelles des Fulanis seminomades hors de cette zone, pendant les pluies en particulier. Des échantillons sanguins de 526 bovins ont été prélevés au hasard et examinés pour la recherche de trypanosomes en utilisant la technique du *buffy coat* et les frottis sanguins par coloration de Giemsa. En tout, 48 animaux se sont révélés infectés : 39 (81 p. 100) par *Trypanosoma vivax*, 7 (15 p. 100) par *T. congolense* et 2 (4 p. 100) par *T. brucei*. Les taux d'infection chez les bovins jeunes et adultes ont été non significatifs ($P > 0,05$) : respectivement 6 et 10 p. 100. Cette étude a montré que la trypanosomose continuait d'être un obstacle important à la production de bétail et son taux d'incidence était semblable chez les jeunes comme chez les animaux adultes.

Mots-clés : Bovin – *Trypanosoma* – Morbidité – Nigeria.

Resumen

Abenga J.N., Enwezor F.N.C., Lawani F.A.G., Osue H.O., Ikemereh E.C.D. Prevalencia de la tripanosomosis en ganado en los distritos de Lere, estado de Kaduna, centro norte de Nigeria

En agosto de 2001, se estimó la prevalencia de la tripanosomosis en ganado, en fincas seleccionadas en tres distritos de Lere, del área de gobierno local del estado de Kaduna, centro norte de Nigeria. El estudio fue subsecuente a reportes de brotes de tripanosomosis, los que resultaron en muertes de ganado que llevaron a una migración anual de Fulanis seminómadas fuera del área, especialmente durante las lluvias. Las muestras de sangre fueron recolectadas al azar en 526 animales fueron examinadas para la presencia de tripanosomas mediante el método de *buffy coat* y frotis finos de sangre con Giemsa. Se encontraron en total 48 animales infectados: 39 (81%) con *Trypanosoma vivax*, 7 (15%) con *T. congolense* y 2 (4%) con *T. brucei*. Las tasas de infección en ganado joven y adulto fueron de 6 y 10% respectivamente, lo cual no fue significativo ($P > 0,05$). A partir de este estudio, es claro que la tripanosomosis es aún un obstáculo mayor para la producción de ganado y la tasa de incidencia es similar en animales jóvenes y adultos.

Palabras clave: Ganado bovino – *Trypanosoma* – Morbilidad – Nigeria.