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Survey for trypanosoma species in cattle from three farms in Iddo Local Government Area, Oyo State

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Abstract

This study investigated the prevalence of bovine Trypanosomosis in three farms in Iddo Local Government Area of Oyo State, Nigeria. Blood samples were obtained from 320 cattle of 3 different breeds (55 Muturu, 65 Sokoto Gudali and 200 White Fulani), using standard field and laboratory techniques. 15 cattle representing an infection prevalence of 4.69% were infected with trypanosomes. The individual prevalence of *Trypanosoma vivax* and *T. brucei* was found to be 66.67% and 33.33% respectively. The breed prevalence of infection in Muturu, Sokoto Gudali and White Fulani were 5.45%, 3.08% and 5.0% respectively. Male cattle showed a prevalence rate of 4.52% while females showed 4.96%. Age prevalence was highest among cattle of above 3years old (5.76%) and least in cattle between 2 to 3 years (2.75%). There was no significant difference however ($P>0.05$), in breed, age and sex prevalence of infection in cattle in this study. The outcome of this study has shown that more attention is needed in controlling trypanosome infection in the study area.

Keywords: Cattle, Nigeria, Oyo State, Prevalence, Trypanosome infection

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Introduction

Nigeria is located in tropical Africa, an area that is described as 'parasites paradise' (Alfredo, 2004). Environmental factors and vector abundance have been incriminated in the distribution of most parasitic diseases (Blench, 1999). One of such parasitic infections is trypanosomosis. Trypanosomosis is a disease caused by blood and tissue dwelling protozoan parasites of the genus *Trypanosoma* and transmitted by the tsetse fly *Glossina*. Trypanosomosis is one of the most important diseases restricting livestock development in Africa today, limiting crop agricultural, animal production and forestry developments (Panin & Mahabile, 1997). The parasitic disease altered cattle distribution in the region and in addition to causing widespread disease, created local overstocking restricted to Africa where they have been responsible for the exclusion of livestock from large areas of land which are potentially capable of

problems in tsetse-free grazing areas, and enforced nomadism on breeding herds and economic loss in cattle along cattle trade routes in West Africa (Rogers *et al.*, 1996; Wilson *et al.*, 1997).

Outbreak of diseases, especially trypanosomosis in cattle herds is one of the major problems militating against the cattle industry in the tropics, including Nigeria (Vanden *et al.*, 2000). The disease in animals usually results in reduced reproduction and quality, low feed conversion ratio and possible death of animals, hence, affecting the farmer's overall profit.

The pathogenic animal trypanosomes have had a major influence on livestock productivity in tropical Africa. The tsetse fly-transmitted trypanosomes, *Trypanosoma brucei*, *T. congolense* and *T. vivax* are

supporting cattle and other ruminants (Alfredo, 2004; Jay, 2008). In recent times, increased replacement of forests with crop farming, and

livestock keeping by way of ranching has created supportive habitats for trypanosomes and their host vectors (Rogers & Randolph, 2000).

Several studies on animal trypanosomosis have been carried out in Nigeria. Such studies were carried out in the northern parts of the country (Agu *et al.*, 1990; Kalu *et al.*, 1991; Ahmed & Agbede, 1993; Kalu *et al.*, 1996; Kalu & Lawani, 1996; Onyia, 1997; Abenga, *et al.*, 2004;), and in the South (Agu & Amadi, 2001; Ameen *et al.*, 2008). Information on the status of trypanosomosis in southern Nigeria needs to be updated especially in Oyo State. This work was therefore designed to investigate the prevalence of trypanosomosis in Iddo Local Government Area of Oyo State, a community well known for its large population of cattle.

Materials and methods

The study area

The study was carried out at Tapola and Araromi-Akufo communities located in Iddo Local Government Area of Oyo State which is located at $3^{\circ} 40' 0''$ E and $7^{\circ} 35' 0''$ N. The study was carried out between March and May, 2012. The area has a rich fertile land for farming, hence, the major occupation of the inhabitants include crop production, livestock rearing and fish farming. Cattle from three farms named X, Y, and Z were sampled in the designated area of study.

Blood sample collection and laboratory analysis

A total of 320 cattle of both sexes and ages 6 months and above comprising 3 different breeds (Muturu, White Fulani and Sokoto Gudali) were randomly selected and bled. Two millilitres of blood were aseptically collected from the jugular vein of each animal. The blood from each animal was put into an Ethylene diamine tetra acetic acid (EDTA) tube which was then labelled and placed in ice pack. All samples were taken to the Veterinary Parasitology Laboratory of the Faculty of Veterinary Medicine of the University of Ibadan for analysis.

For the purpose of parasitological examination, blood samples from the EDTA tubes were transferred into capillary tubes. One end of each of the capillary tubes was sealed with plasticine and spun in a microhaematocrit centrifuge at 1500rpm for 3-5minutes. The haematocrit tubes were then taken and cut at the buffer coat level to release the contents on a clean grease-free microscope glass

slides to which a cover slip was placed for examination at X 40 objective magnification for motile trypanosomes.

Thin film smears were also made from the EDTA blood samples, air dried, dehaemoglobinised, fixed with methanol, stained with Giemsa and examined under the microscope at 40 X objective magnification for demonstration of the different species of the trypanosomes

Statistical analysis

Descriptive statistics was employed in analysing the data under the study. The prevalence rates among breeds, age and sex of the animals were expressed as percentage of the total number of animal sampled. Chi square test was used to evaluate association between the prevalence of infection and breed, sex and age of the cattle studied. A P value of $P < 0.05$ was considered significant. Inferential statistics was done using SPSS version 17.

Result

Out of 320 cattle examined, 15 were infected with trypanosomes with over all prevalence of 4.69%. *Trypanosoma vivax* and *T. brucei* accounted for 66.67% and 33.33% of the infection rates respectively (Tables 1 & 2).

Six out of the 121 female cattle examined were infected with a prevalence rate of 4.96%. Similarly 9 out of 199 male cattle examined were infected with a prevalence rate of 4.52%.

Breed prevalence showed that 3 out of 55 Muturu cattle examined were infected with a prevalence rate of 5.45%, while 2 out of 65 Sokoto Gudali cattle examined were infected with prevalence rate of 3.08% and 10 out of 200 White Fulani examined were infected with a prevalence rate of 5.0% (Table 3).

Out of the 20 cattle that were less than 2 years old examined, 1 was infested with a prevalence rate of 5.0%. Of the 109 cattle between the ages of 2 to 3 years, 3 were infected with a prevalence rate of 2.75%. Of the 191 cattle above 3 years of age, 11 were infected giving a prevalence rate of 5.76% (Table 4). The results of the study showed that there was no significant difference ($P > 0.05$) in infection prevalence among breed, sex and age of cattle in the study area.

Table 1: Prevalence of Trypanosomosis in the study area

Farms	Number examined	Number infected (%)
X	105	4 (3.81)
Y	100	6 (6.00)
Z	115	5 (4.35)
Total	320	15 (4.69)

Table 2: Prevalence of Trypanosoma species in the study area

Species	Number Positive	% Prevalence
<i>Trypanosoma vivax</i>	10	66.67
<i>Trypanosoma brucei</i>	5	33.33
Total	15	100.0

Table 3: Sex prevalence of Trypanosomosis in relation to breeds of cattle in the study area

Breed	Females		Males		Total	
	Number examined	Number positive (%)	Number examined	Number positive (%)	Number examined	Number positive (%)
Muturu (4.35)	23	1	32	2 (6.25)	55	3 (5.45)
Sokoto Gudali (3.03)	33	1	32	1 (3.13)	65	2 (3.08)
White Fulani (6.15)	65	4	135	6 (4.44)	200	10 (5.0)
Total	121	6 (4.96)	199	9 (4.52)	320	15 (4.69)

Table 4: Age prevalence in relation to sex of cattle in the study area

Age (yrs)	Females		Males		Total	
	No. examined	No. Examined	No. Positive (%)	No. Examined	No. Positive (%)	No. Positive (%)
<2	11	1 (9.09)	9	0 (0.00)	20	1 (5.00)
2-3	40	1 (2.50)	69	2 (2.90)	109	3 (2.75)
>3	70	4 (5.71)	121	7 (5.79)	191	11 (5.76)
Total	121	6 (4.96)	199	9 (4.52)	320	15 (4.69)

Discussion

The prevalence rate of bovine trypanosomosis obtained in this study is higher than the 3.9% previously reported in grazing cattle in Ogbomoso, Oyo State (Ameen *et al.*, 2008), and 1.2% previously reported in Zaria, northern part of Nigeria (Ahmed & Agbede, 1993). The 10.0% prevalence rate of bovine trypanosomosis reported across all the ecological zones of the country and the 31.62% incidence rate reported in communities of the derived savannah areas of Ogun state are however higher than what we found in this study (Sam-Wobo *et al.*, 2010; Onyia, 1997). Variation in trypanosome infection rates in the different ecological zones have been previously reported (Ogunsanmi *et al.*, 2000). The climatic variations across different geographical

regions and type of husbandry practices adopted are factors that can influence survival of both vector and parasite. This may thus account for the observed variation in the prevalence rate of bovine trypanosomosis reported by the different workers. The prevalence of *T. vivax* infection in this study is comparatively higher than those of other trypanosome studied. This is in consonance with previous reports on *T. vivax* epizootiology in Nigeria (Kalu *et al.*, 1996; Agu & Amadi, 2001; Ameen *et al.*, 2008). The higher prevalence of *T. vivax* may be connected with its molecular biology which may have played a role in conferring it with resistance against both drugs and host defence.

Although the prevalence rates of trypanosomosis among the three breeds of cattle sampled in the study was not statistically different, we found Muturu and Sokoto Gudali breeds the most and least susceptible to trypanosome infection respectively. In the contrary, Sam-Wobo *et al.*, (2010) found White Fulani and Red Bororo as breeds with the highest and lowest prevalence of trypanosomosis respectively. The low prevalence of bovine trypanosomosis in Sokoto Gudali, a breed not known for trypanotolerance (Ogunsanmi *et al.*, 2000; Talabi *et al.*, 2012) may have resulted from adaptability of this breed to its environment. Innate resistance of cattle has been reported to increase in face of constant exposure to the same parasite in the same environment (MacLennan, 1980). The prevalence rate for trypanosome infection was highest in Muturu compared to other breeds studied but was lower than what was reported by Ogunsanmi *et al.*, (2000). Although the relative resistance of Muturu to trypanosome infection has been reported (Roberts & Gray 1973) the high infection prevalence seen in this breed may have reflected the possibility of a favourable climatic condition which could have encouraged the survival of the vector in the studied area.

The result of this study showed that sex prevalence of bovine trypanosomosis was not significantly different between male and female animals. Sam-Wobo *et al.*, (2010) also reported no significant difference in the infection prevalence of male and female animals. Sex dimorphism in trypanosomosis has been previously reported (Abenga *et al.*, 2004; Agu *et al.*, 1990, Agu & Amadi, 2001). Our current finding may not have supported this theory because occurrence of any disease is dependent on many factors of which sex is just one of them. Some other host or environmentally related factors other than sex could therefore have played a role in influencing the susceptibility of the animals to infection.

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The prevalence according to age showed that cattle between 2–3 years of age had the least susceptibility to the infection and those above 3 years had the highest rate of infection. This pattern of prevalence was also reported by Sam-Wobo *et al.*, 2010. The grazing practice of leaving calves in the shed while the older animals get exposed to trypanosome vector along their grazing route is a plausible explanation for why calves below 2 years have a lower infection rate. In this study, the animals aged between 2–3 years had the lowest infection prevalence due to immunity acquired against the disease as a result of repeated exposure in the growing phase of their lives.

Nevertheless, the result of this study has confirmed the threat of constant trypanosome challenge to cattle found within the study area and perhaps Oyo State. This could therefore explain why trypanosomosis has remained a constant challenge and a major constraint for cattle production in Oyo state and sub-Saharan Africa (Panin & Mahabile, 1997). Cattle are of great economic importance in the southern part of Nigeria, serving as sources of protein, income and as raw material for the leather industry as well as providing vital ingredients of animal feed in terms of bone and meat and blood meals. They also serve as sources of farm yard manure. The prevalence rate of 4.69% recorded during this study may therefore constitute huge economic loss to the people in the area. Therefore, efforts should be made to further reduce to the barest minimum, the prevalence of the disease in the study areas.

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