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THE PREVALENCE OF TRYPANOSOME INFECTION IN TRADE CATTLE, GOATS AND SHEEP SLAUGHTERED AT THE KADUNA ABATTOIR

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ABSTRACT

The prevalence of trypanosome infection in trade cattle, goats and sheep was investigated in slaughtered animals at the Kaduna Abattoir. Wet, thin, thick films, animal inoculation, haematocrit centrifugation technique and buffy coat methods were used to detect rypanosomes in the jugular blood of the animals. The packed cell volume (PCV) was also determined. A total of 300 cattle, 300 goats and 300 sheep were examined within five months (September, 1998 – January, 1999) and the prevalence rates in cattle, goats and sheep were found to be 5.00%, 4.67% and 3.33% respectively.

Mean PCV of infected cattle was 20.33% against uninfected cattle 35.08%. In goats, the PCV was 20.29%, uninfected goats 31.56%; while that of sheep was 19.40% and uninfected 32.85%. Trypanosoma vivax infection accounted for 60%, T. brucei 26.67% and T. congolense 13.33% in cattle. In goats, T. vivax infection accounted for 71.43%, T. brucei 21.43% and T. congolense 7.14%. Also T. vivax infection accounted for 70%, T. brucei 30% and T. congolense 0% in sheep. Sex did not significantly (P>0.05) affect infection rates. Although the prevalence rate of trypanosomiasis in cattle, goats and sheep appeared low compared with the previous works, natural trypanosomiasis remains economically importance in cattle, goats and sheep in Nigeria.

Key words: Animal Trypanosomiasis, Prevalence, Kaduna, abattoir.

INTRODUCTION

Animal Trypanosomiasis still constitute a major threat to food security in several parts of sub-Saharan Africa (1). It is estimated that not less than 46 million cattle are at risk of becoming infected by tsetse-transmitted trypanosomiasis (1). Animal trypanosomiasis has been known to cause not less than 3 million livestock deaths each year, 20%less in calving, 25% reduction in milk yields, 50% reduction in livestock numbers (2) and reduces work efficiency of animals thus hindering crop production (1). African trypanosomiasis has also been known as a major factor in the depopulation of many parts of Africa since the beginning of last century (3). Trypanosome species of major threat to cattle, sheep and goats include *Trypanosoma vivax, T. congolense and T.*

brucei brucei (3,4). Due to the absence of surveillance, the exact prevalence situation of the disease in many part of Africa is not well known. This has led to break down in the control strategy which has contributed to the current upsurge in both human and animal trypanosomiasis in several parts of Africa today (5,6). In Nigeria, Animal Trypanosomiasis currently ravages several parts of agro ecological zones of the country (7,8).

Although small ruminants may not often show clinical sings of disease and it is assumed to be rarely affected under natural conditions and that trypanosomiasis of sheep and goats is not a serious problem (9), Several experimental studies have shown that small ruminants are fully susceptible to infection with pathogenic trypanosomes (10,11). In addition, infection in sheep and goats is frequently reported from field surveys (12,13,14) and the economic impact of trypanosomiasis on small ruminants is substantial (14).

In an attempt to facilitate treatment and/or control of trypanosomiasis, it is imperative that early diagnosis be made to ascertain the prevalence of the disease. This can only be possible through the use of reliable and sensitive diagnostic procedures. The epizootiology of the disease in Nigeria (15,16) and other parts of Africa (17) indicate increases in infection rates and losses resulting from naturally acquired infections despite decades of attempt at control.

In this work, the prevalence of trypanosome infection in cattle, goats and sheep at slaughter at Kaduna Central abattoir is reported using the clinical signs and parasitological diagnostic techniques.

MATERIALS AND METHODS

Animals

The study was conducted at the Kaduna abattoir. A total of 300 cattle, 300 goats and 300 sheep making a total of 900 animals were sampled and examined, during the 5 months (September, 1998 to January, 1999) period. 5mls of blood was collected at slaughter from the cattle, goats and sheep into ethylene tetra-acetic acid (EDTA) bottle. Each

sample was kept cool by placing in a box containing ice packs immediately after collection and transported to the laboratory for examinations.

Clinical Diagnosis

The animals were examined physically for manifestation of clinical symptoms. The history of animals was also taken to ascertain their source and passage through tsetse fly belts and general husbandry practice. Most of the animals were brought from the more Northern parts of Nigeria namely: - Sokoto, Kano, Katsina, Jigawa, Adamawa, Borno, Zamfara and Niger States.

Parasitological Diagnosis

The 5ml of blood collected in the EDTA bottle were subjected to diagnostic techniques of the Standard Trypanosome detection methods (STDM, 30) i.e. wet film (WF), Thin film (TF), Thick film (THF), Animal inoculation (AI) and concentration techniques (1) namely, Haematocrit Centrifugation Techniques (HCT,31) and Buffy Coat Method (BCM; 24).

Differential Morphology

Any organism with a free flagellum, very well developed undulating membrane and a small sub-terminal kinetoplast was classified as *T. brucei,* while an organism with a medium sized marginal kinetoplast but without a free flagellum and inconspicuous undulating membrane was identified as *T. vivax* (8). Also for *T.congolense* are absence of free flagellum, inconspicuous undulating membrane, and kinetoplast marginal and subterminal.

Packed Cell Volume (PCV)

The packed cell volume was determined for all blood samples as a haematological index. This was carried out just like haematocrit centrifugation technique and after spinning for 5 minutes, the length of the columns of the fluid plus cells, can be taken as direct measurements of the relative amount of the solid and fluid portions of the sample since the diameter of the bore is constant. The column of packed red cells is stated as percentage of the whole and it expresses the proportion of red cells. It is used as a quantitative expression of anaemia, a most useful

index in assessing the progress of trypanosomiasis.

RESULTS

Details of the prevalence of trypanosomes in cattle, goats and sheep are shown in tables I-v. The overall infection rate revealed that 5.00% of cattle, 4.67% of goats and 3.33% of sheep sampled were infected (table iv). Trypanosome infection rates in the different sexes show that 8.43% of male and 3.69% of female cattle, 3.66% male and 5.05% of female goats as well as 3.39% of male and 3.32% of ewes sampled were infected (table vi). The differences in the mean packed cell volume (PCV%) of trypanosome infected and those of non-infected animals are also shown on table vii. The mean packed cell volume of tryponosome infected was 20.33±3.31 while those not infected was 35.08±4.61. In goats, the mean packed cell volume of infected animals was 20.29±2.40 and that of uninfected animals was 31.65±6.21. the packed cell volume of trypanosome infected sheep was 19.40±2.59 as against 32.85±3.61 of uninfected sheep. The above drop in the mean PCV of infected animals differed significantly from those of uninfected animals ($P \leq 0.05$).

TABLE **I: TRYPANOSOME INFECTION RATES IN DIFFERENT BREEDS OF CATTLE SLAUGHTERED AT KADUNA ABATTOIR**

Breed	No. Of Animal	No. of Animal +ve	*T.vivax*	*T. congolense*	*T.brucei*
White Fulani	238	11	2	8	1
Red Bororo	28	-	-	-	-
Adamawa Gudali	13	2	1	1	-
Ketekou	21	2	1	-	1
Total	300	15	4	9	2

TABLE II: TRYPANOSOME INFECTION RATES IN DIFFERENT BREEDS OF GOATS SLAUGHTERED AT KADUNA ABATTOIR

Breed	**No. Of Animal**	**No. of Animal + ve**	***T. vivax***	***T. congolense***	***T.brucei***
Red Sokoto	**200**	**10**	**6**	**1**	**3**
West African Dwarf	**72**	**4**	**4**	**-**	**-**
Kano Brown	**28**	**-**	**-**	**-**	**-**
Total	**300**	**14**	**10**	**1**	**3**

TABLE III: TRYPANOSOME INFECTION RATES IN DIFFERENT BREEDS OF SHEEP SLAUGHTERED AT KADUNA ABATTOIR

Breed	No. Of Animal	No. of Animal + ve	*T. vivax*	*T. congolense*	*T.brucei*
Yankasa	**220**	**7**	**5**	**-**	**2**
West African Dwarf	**80**	**3**	**2**	**-**	**1**
Total	**300**	**10**	**7**	**-**	**3**

TABLE IV: OVERALL ANIMAL SAMPLED BOTH INFECTED AND UNINFECTED SLAUGHTERED AT KADUNA ABATTOIR

Animal	Total Nos.	Infected	Uninfected	Percentage infected (%)	Percentage Uninfected (%)
Cattle	300	15	285	5.00	95.00
Goats	300	14	286	4.67	95.33
Sheep	300	10	290	3.33	96.67

TABLE V: OVERALL PERCENTAGE (%) INFECTION RATE OF DIFFERENT ANIMALS SLAUGHTERED AT KADUNA ABATTOIR

Trypanosomes	Cattle (%) (15)	Goats (%)% (14)	Sheep (%) (10)
T. vivax	**60.00**	**71.43**	**70.00**
T. brucei	**26.67**	**21.43**	**30.00**
T. congolense	**13.33**	**7.14**	**0.0**
TOTAL	100(15)	100(14)	100(10)

TABLE VI: SEX DIFFERENCES IN TRYPANOSOME PREVALENCE PERCENTAGE OF ANIMALS SLAUGHTERED AT KADUNA ABATTOIR

Animal	Sex	No. of Samples Examined	*No. of Positive Samples*	*Percentage Positive (%)*
Cattle	**Male**	**83**	**7**	**8.43**
	Female	**217**	**8**	**3.69**
Goats	**Male**	**82**	**3**	**3.66**
	Female	**218**	**11**	**5.05**
Sheep	**Male**	**59**	**2**	**3.39**
	Female	**241**	**8**	**3.32**

TABLE VII: MEAN PACKED CELL VOLUME OF DIFFERENT ANIMALS SLAUGHTERED AT KADUNA ABATTOIR

Animal	*TRYPANOSOME* Infected (PCV %) Mean± *S.E*	Uninfected (PCV%) Mean ± S.E.
Cattle	**20.33±3.31**	**35.08±4.61**
Goats	**20.29±2.40**	**31.65±6.21**
Sheep	**19.40±2.59**	**32.85±3.61**

DISCUSSION

The trypanosome prevalence rate in different breed of animals for the past few years in ruminant ranged from 8.4% to 15.53% (5,18,19,20). Our findings of low overall infection rate in cattle, goats and sheep suggest that difference in prevalence of trypanosomes among ruminants may be as a result of the chemotherapeutic and chemoprophylatic campaigns of Governments or herd owners.

Since the majority of the animals sampled were brought from Northern part of Nigeria, its shows that the risk of bovine trypanosomiasis still exists, and the nomadic nature of husbandry practice is an important factor in the maintenance of transmission cycles of the disease (18).

Out of the cattle sampled in Kano, 7.6% were positive (19), out of 39 goats blood samples examined at Ilorin abattoir, only two were found with trypanosome infection (21). On the other hand, out of 58 goats blood samples examined at Nsukka, eight (13.9%) were positive for trypanosome

infection (22,23). At the Jos abattoir, out of a total of 960 goats screened, a 5% infection was found (23). This suggest that trypanosome infection rate in animals differ from one geo-epidemiological zone to the other.

From the number of male animals sampled, this probably indicates that sex does not influence their susceptibility to the infection (9). The combination of parasitological techniques employed reduced the chances of missed diagnosis (15, 24) even though few cases of false negatives by microscopic examination were later confirmed to be positive through mice inoculation. Every parasitological diagnostic technique is an important tool in the epidemiological study of trypanosomiasis. However, their sensitivity cannot be compared with modern techniques such as ELISA (25,26-31). However, the combination of both techniques are necessary for improvement in trypanosomiasis

surveillance which is essential in the management of control strategy. The findings in this study suggests that animal trypanosomiasis still constitutes a major threat to livestock and meat quality in Nigeria. Sustained surveillance of trypanosomiasis in cattle, goats and sheep is an important prerequisite for the enhancement of livestock production in Nigeria. The present effort to expand the animal industry in the country requires the knowledge of the disease problems that could be prevented and controlled. It will therefore be beneficial if the incidence and prevalence of trypanosomiasis in cattle, goats and sheep is investigated periodically.

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