Nig J. Biotech. Vol. 28 (2014) 60-64
ISSN: 0189 17131
Available online at http://www.ajol.info/index.php/njb/index
and www.biotechsocietynigeria.org.

NIGERIAN JOURNAL OF BIOTECHNOLOGY

Short Communication

Prevalence of trypanosoma species found in cattle slaughtered in Tudun Wada abattoir Kaduna Nigeria

Andrew, T. [1], Ibrahim J. L. [1] , Maikai B.V.[2], Baraya, K. [1], Daniel J. [1],Timothy, T. [1], Kingo J L. [1], and Ogbole, M.[1]

[1]Nigerian Institute for Trypanosomiasis Research Kaduna Nigeria, [2]Ahmadu Bello University Zaria Nigeria

(Received 21:10:14; Accepted 07:12:14)

Abstract

Animal trypanosomosis is a major pathological constraint to livestock production in Africa including Nigeria thus causing serious economic loss. To determine the prevalence of *Trypanosoma* species in slaughtered cattle in Tudun Wada abattoir, Kaduna, a total of 96 blood samples were parasitologically examined using standard Trypanosome detection technique (STD) and concentration methods (HCT and BCM) for parasite detection. The Packed Cell Volume was also determined. The prevalence of *Trypanosoma* species was 15.6%. The packed cell volume (PCV) varied between 12% and 56% with a mean PCV of 32.04%. There was multi-species detection of *Trypanosomes* in the samples examined. The statistical association (χ^2= 6.18; df=2; p=0.0455) between prevalence of *Trypanosoma* species and PCV was marginally significant. There was statistical association (χ^2= 11.92; df=2; p=0.0026) between prevalence of blood parasites and PCV. The result of this study shows that trypanosomosis is still an important constraint in livestock production. This is of public health significance.

Key words; prevalence, trypanosome species, cattle

Correspondence: *Tinokandrew@yahoo.com*

Introduction

Animal trypanosomosis is a complex disease which is caused by a protozoan of the genus *Trypanosoma* which develops cyclically in the vector, the tsetse-fly. It is ranked the fourth most important disease of cattle in Nigeria after rinderpest, contagious bovine pleuropneumonia (CBPP) and dermatophilosis (streptothricosis) (Ademosun, 1973). Over 20 species and 33 sub species of the tsetse fly are responsible for the transmission of African trypanosomosis. According to WHO, 1998, 60 million people are likely to contract this disease as 48 million cattle are also at risk of the same disease (Kristjanson *et al*, 1999). Some of the species of trypanosomes of economic importance in cattle include *Trypanosoma congolense, Trypanosoma vivax* and *Trypanosoma Brucei.*

Tsetse borne African trypanosomosis is a serious threat to livestock production in sub-Saharan Africa (FAO 2001, 2003). In spite of the long attempts to control the disease it continuous to be a menace to livestock production. It is estimated that 55,000 deaths in humans and 3 million deaths in animals are caused by African trypanosomosis. (Abenga *et al*., 2002; Samdi *et al*., 2010). This reduces the work efficiency of draft animals thus, hampers mixed farming. The disease is endemic in many areas in Nigeria. Surveys of North central Nigeria conducted between 1989-1990, showed a disease prevalence of 4.3% in cattle while later studies (1993-1996) showed an increased prevalence of 10.6% (Onyiah, 1997). In the southern guinea/derived savannah regions, prevalences of 6.7% and 2.7% were recorded in Bendel and Ogun states (Ikede *et al.,* 1987).

Other prevalence is 1.5% for the montane vegetation (Anene and Ezekwe, 1995) and 44% recorded among imported Friesian cattle breeds in the forest zone (Jibike *et al.,* 1995). A lower rate

of 5% was obtained on the high plateaux of Jos, Mambilla and Obudu, areas previously reported to be tsetse-free (Anene *et al.,* 1991, Anosa, *et al.,* 1993, Dede *et al.,* 1996).

Methodology

Sample collection: Five millilitres of jugular blood was collected randomly at the point of slaughter in bottles containing one milligram powder Ethylene Diamine Tetra Acetic Acid (EDTA) per millimetre of blood.

Parasitological analysis: Parasitological examination was done in the Laboratory using the haematocrit centrifugation technique, HCT (Woo, 1971), Buffy Coat Method (BCM) (Murry and McInter, 1997) and Giemsa stained thin films made after BCM examination. The Packed Cell Volume (PCV) of each animal was also determined (as haematological index for anaemic conditions) through capillary centrifugation of blood with centrifuge and hamatocrit read. Trypanosome species were identified based on their motility using the BCM and morphological features from Giemsa stained films.

Microscopy: The slides were viewed using oil immersion at x 100 objective for the presence of trypanosomes.

Data analysis: Analysis of data was carried out using the Statistical Package for Social Science (SPSS Inc., Chicago, Illinois, USA). The chi-square test was used to test for association between the prevalence of Trypanosomes and the different sites. $P \leq 0.05$ was defined as significant.

Result

The Prevalence of Trypanosoma species collected from cattle in Tudun Wada abattoir is presented in Table 4.1. Table 4.2 shows Multi- *Trypanosoma* species infection of cattle in fifteen positive blood samples collected from cattle in Tudun Wada abattoir, Kaduna State, Nigeria. Table 4.3 presents the relationship between *Trypanosoma* species and packed cell volume of blood samples collected from cattle in Tudun Wada abattoir, Kaduna State, Nigeria. Table 4.4 shows the relationship between blood parasites and packed cell volume of blood samples collected from cattle in Kwata abattoir, Kaduna State, Nigeria. Blood film showing *Trypanosoma brucei* from the sample collected at the Tudun Wada Abattoir is presented in figure 1. Blood film showing *Trypanosoma congolense* from the sample collected at the Tudun Wada Abattoir is presented in figure II

Table 4.1: The Prevalence of Trypanosoma species collected from cattle in Tudun Wada abattoir

Parasites	Positive samples	
	No	%
Trypanosoma spp.	15	15.6
Microfilaria	4	4.2
Total	19	19.8

Table 4.2: Multi- *Trypanosoma* species infection of cattle in fifteen positive blood samples collected from cattle in Tudun Wada abattoir, Kaduna State, Nigeria

Parasites	Positive samples	
	No	%
T. brucei	5	33.3
T. congolense	7	46.7
T. congo+MF	1	6.7
T. congo+*T. brucei*+MF	1	6.7
T. congo+*T. brucei*	1	6.7
Total	15	15.6

MF= Microfilaria

Table 4.3: Relationship between *Trypanosoma* species and packed cell volume of blood samples collected from cattle in Tudun Wada abattoir, Kaduna State, Nigeria

PCV (%)	Number examined	Number positive	
		No	%
1-20	11	4	36.4
21-40	71	11	15.5
41-60	14	0	0.0
Total	96	15	15.6

Chi square (χ^2) =6.18; P value=0.0455; df=2

Table 4.4: Relationship between blood parasites and packed cell volume of blood samples collected from cattle in Kwata abattoir, Kaduna State, Nigeria

PCV (%)	Number examined	Number positive	
		No	%
1-20	11	6	54.5
21-40	71	13	18.3
41-60	14	0	0.0
Total	96	19	19.8

Chi square (χ^2) =11.92; P value=0.0026; df=2

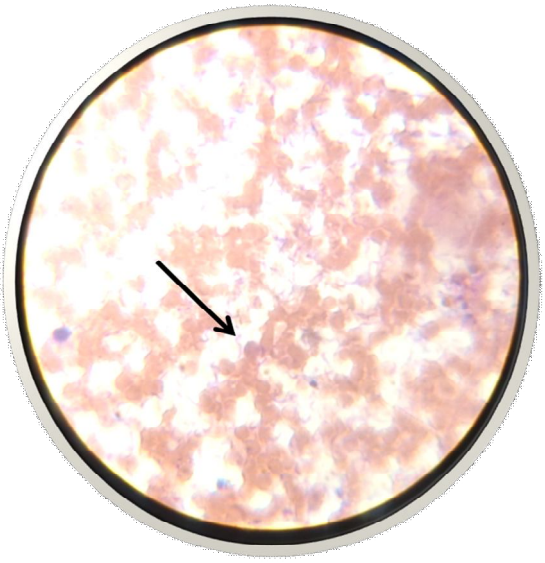

Figure I: *Trypanosoma brucei* in a blood film from Tudun Wada Abattoir

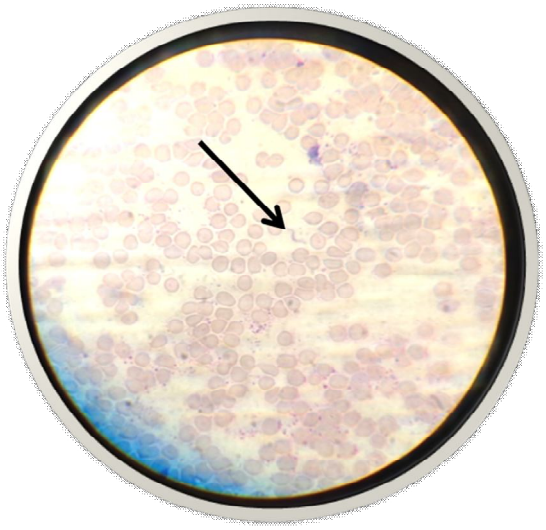

Fig II: *Trypanosoma congolense* in a stained blood film from Tudun Wada Abattoir

Of the eleven blood samples within PCV range of 1-20, 6 (54.5%) were positive for blood parasites, while 13 (18.3%) out of the 71 samples examined within PCV range of 21-40 were positive. However, none was positive out of the 14 samples within PCV range of 41-60. There was statistical association (χ^2= 11.92; df=2; p=0.0026) between prevalence of blood parasites and PCV (Table 4.4).

Discussion

The prevalence of 15.6% of *Trypanosome* species in this study is relatively high compared to the 2.2% by Abenga *et al*. (2004) in Lere Local government Area (LGA) Kaduna, 3.7% by Ohaeri, (2010) in Abia, 3.8% by Enwezor *et al*. (2012) in Benue, but lower than the 46.8% repoted by Majekodunmi *et al*., 2013 in Jos Plateau, 21.5% by Ahmad in Kaura LGA of Kaduna State. The differences may be attributed to differences in geographic regions and the sensitivity of the methods used, especially in low parasitaemic conditions. Also, the samples in this study were collected from cattle at salughter rather than in farms and this may have contributed to the differences in prevalences that were recorded. Though a similar abattoir survey recored a lower prevalence of 2.2% (Samdi *et al*., 2011) as compared to the 15.6% in this study.

The prevalence in this study in cattle at slaughter in Kaduna is different from the national trypanosomiasis prevalence rate in cattle obtained by the EEC-Trypanosomiasis control project between 1989 and 1991 (Onyiah, 1997). Surveys conducted between 1989 and 1991 in Northern Nigeria, where two thirds of Nigeria's livestock resources are concentrated showed a prevalence rate of 4.3% in cattle. A higher prevalence rate of 10.0% was obtained in a wider survey of all agro ecological zones between 1993 and 1996 (Onyiah, 1997; Samdi *et al*., 2011). More recent studies in the region have revealed prevalence ranging from 5.5 to 17.8% to over 50% (Qadeer *et al*., 2009).
Indications from the results showed that there were mixed infections caused by *T. congolense* and *T. brucei* in the animals sampled, with *T. congolense* having the highest prevalence. The findings depict a contrary view to that reported by (Enwezor *et al*., 2012) where it was said that *T. vivax* was more prevalent in northern Nigeria and elsewhere but is similar to the observations of Akinboade, (1982) who reported that a mixed infection due to *T. congolense* and *T. brucei* was most prevalent in cattle. Samdi *et al*. (2011) also reported a higher prevalence in *T. congolense* than the other species in Kaduna, northern Nigeria. Different *Trypanosome* species have been reported to have the highest prevalence rates. In a study conducted in Sokoto Fajinmi *et al*., (2011) recorded more prevalence of *T. vivax* than *T. brucei* or *T. congolense*. Likewise a study by Enwezor *et al*. (2012) in Benue showed *T. vivax* to be more prevalent than the others. Ohaeri, (2010) also demonstrated in his study in Abia that T. vivax was more prevalent than *T. brucei* or *T. congolense*. The differences in species reported may be that since this is an abattor –based study, the animals may have been brought from areas that have *T. congolense* infections more than *T. vivax* or *T. brucei* and since no *T. vivax* was

detected, it may also mean that the cattle sampled were from a far and different geograhic region other than Kaduna and surrounding states.

The finding of higher infection rate in the lower PCV range may be connected to the fact that mean PCV values are reduced in trypanosome- positive cattle. This may be as a result of the effect of the parasites on blood cells. Trypanosomiasis main symptom is anaemia which manifests by drop in PCV value (Esievo *et al*., 1985). The low PCV may also be attributable to other blood parasites like micofilaria.

Conclusion

The result of this study signifies that trypanosomiasis is still an important constraint in livestock production and productivity as signified by the 15.6% recorded in this study. This can reduce meat quality and result in serious economic losses.

There were mixed infections with *T. congolense* (46.7%) more prevalent than *T*. *brucei* infection (33.3%)

Packed Cell Volume was markedly low in blood samples that were positive for *Trypanosme* species

References

Abenga, J.N., Enwezor, F.N.C., Lawani, F.A.G., Osue, H.O. and Ikemereh, E.C.D. (2004). Trypanosome Prevalence in Cattle in Lere Area in Kaduna State, North Central Nigeria*. Revue Elev. Médical. véterinary.* Pays tropical*. 57* (1-2):45-48.

Ademosun, A. A. (1973). The development of the livestock industry in Nigeria: Ruminants'. Proceedings of Agricultural Society of Nigeria. 10:13-20.

Akinboade A.O. (1982). The prevalence of Babasiosis in Nigeria trade cattle Ph.D thesis

Abenga, J.N., F.N.C. Ewenzor, F.A.G. Lawani, C. Ezebuiro, J. Sule and K.M. David, (2002). Prevalence of trypanosomiasis in trade cattle at slaughter in Kaduna State, Nigeria. Journal of Parasitology., 23:107-110

Anene, B.M, and Ezekwe, A.G (1995). Trypanosomiasis in intensively reared Muturu calves in Nigeria. *Tropical Animal Health and Production* 27(4):229-230

Anene, B.M., Chima, A.B., Jibike, G.I., and Anika, S.M. (1991). Prevalence of trypanosomiasis in Zebu at Obudu ranch –a tsetse free zone in Nigeria. Preventive Veterinary Medicine 10(4): 257-260

Anosa, V.O., Anitia, R.E.,Ohore, O.G., Agbede, R.I.S., Anika, S.M., Lawani, F., Ogunsusi, R., and Okoro, H.O. (1993). prevalence of trypanosomiasis in ruminants in southwestern Nigeria as determined by parasitological and antigen ELISA methods. OAU/STRC 22nd meeting, Kampala, Uganda. Publication No. 11

Dede, P.M., Omoogun, G.A., Uzoigwe, N.R., Njoku, C.I., Daniel, A.D., Daddah, A.J. and Ajagbonna, B.O. (1996). evaluation of tsetse and trypanosomiasis situation on the Jos Plateau, a tsetse free zone in central Nigeria. 27th Annual Scientific Conference of the Entomological Society of Nigeria ESN, PortHarcourt, 7-10th October, 1996

Enwezor, F.N.C., Samdi, S.M., Ijabor, O.; Abenga, J.N (2012). The prevalence of bovine trypanosomes in parts of Benue state, north-central Niger. *Journal of Vector Borne Diseases.* Http//www.thefreelibrary.com. Acessed 12th January, 2014 at 3.45pm

Esievo K.A.N., Saror D.I., Ilemobade A.A. and Hallaway M.H. (1985). Variation in erythrocyte surface and free serum sialic acid concentrations during experimental *Trypanosoma vivax* infection in cattle. Research Veterinary Science; 32: 15.

Fajinmi, A.O., Faleke, O.O., Magaji, A.A., Daneji, A.I. and Gweba, M. (2011). Presence of *Trypanosome Species* and Determination of Anaemia in Trade Cattle at Sokoto Abattoir, Nigeria. Research Journal of Parasitology, 6: 31-42

FAO (2003). Available from :http//www.spc.int/rahs/(Accessed on August 27, 2009)

FAO (2000). A field guide for the diagnosis, treatment and prevention of African animal trypanosomiasis, 2nd edition. FAO, Rome, Italy.

Ikede, B.O., Renolds, L., Ogunsanmi, A.O., Ekwuruke, J.O. and Taiwo, V.O (1987). The epizootiology of bovine trypanosomiasis in the derived savanna zones of Nigeria: A preliminary report. Paper presented at the presented at 19th meeting of the ISCTRC, Lome, Togo, March 30th- April 3rd, 1987

Jibike, G.I., Anene, B.M., Onyekwendiri, E.O., Chima, B.A. and Anika, S.M. (1995). Rainy season Prevalence pf bovine trypanosomiasis in south-eastern Nigeria. *Journal of the Pasteur Institute (Romania*) 3:93-102

Kristjanson, P.M., B.M. Swallow, G.J. Rowlands, R.L. Kruska and P.N. de Leeuw, (1999). Measuring the costs of African animal trypanosomosis, the potential benefits of control and returns to research. Agriculture. System., 59: 79-98.

Majekodunmi, A.O. Fajinmi, A., Dongkum, C Picozz, K., Thrusfield M.V. and Wellburn, S.C (2013). A longitudinal survey of African animal trypanosomiasis in domestic cattle on the Jos Plateau, Nigeria: Prevelence, distribution and risk factors, Parasites and vectors 6:239

Murry, M. and W.I.M. McInter, (1997). An improved parasitological technique for the diagnosis of African Trypanosomiasis. Transactions of the Royal. Society of Tropical Medicine and Hygiene, 71: 325-326.

Ohaeri, C.C. (2010). Prevalence of Trypanosomiasis in Rumimants in Parts of Abia State, Nigeria. *Journal of Animal and Veterinary Advances 9 : 2422-2426*

Onyiah J.A. (1997): African animal trypanosomosis: An overview of the current status in Nigeria. Tropical Veterinarian, 15: 111-116.

Samdi, S.M., J.N. Abenga, J.N., Attahir, A., Wayo, B.M and H.M. Sumayin (2010). Constraints in the control of African trypanososmiasis: the prevailing factors in Kurmin Kaduna. International journal. Animal Veterinary. Adv., 2:31-36

Qadeer, M.A., O.B. Akogun, Gundiri M.A and Dede, P. (2009). Epidemiological studies of bovine trypanosomiasis in Adamawa slaughter houses. Proceedings of the 33rd Annual congress of the Parasitology and Public Health Society of Nigeria, November 2009 control of African Trypanosomiasis: The prevailing factors in Kurmin. Kaduna International. Journal. Animal. Veterinary. Adv., 2: 31-36.

W.H.O (1998). *Control and surveillance of African trypanosomiasis*. A report of W.H.O expert committee W.H.O technical report series no. 881 W.H.O Geneva

Woo, P.T.K., (1971). Evaluation of heamatocrit certifuge and other techniques for field diagnosis of trypanosomiasis and filariasis. Acta. Tropical, 28: 298-303