*IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)*
*e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 10, Issue 11 Ver. I (November 2017), PP 77-81*
*www.iosrjournals.org*

# The Prevalence of Trypanosomes Infection in Cattle in Five Local Government Areas of Kaduna State, North-Western Nigeria

Machina, I.B[2]*, Suleiman, A.[1], Ladan, H.I.[3], Hassan, A[4], Abubakar, A.T.[2], Baba, U.M.[1], Abdulrafiu, A.D.[5], Tamba, Z.[1], Ubale, C.[1], Aliyu, Z.[1]

[1] *Vector and parasitological studies Research department, Nigerian Institute for Trypanosomiasis Research, Kaduna.*
[2] *Trypanosomiasis Research Department, Nigerian Institute for Trypanosomiasis Research, Kaduna.*
[3] *Katsina State Liaison Office, Nigerian Institute for Trypanosomiasis Research, Katsina State.*
[4] *Sokoto State Liaison Office, Nigerian Institute for Trypanosomiasis Research, Sokoto State.*
[5]*Nigerian Institute for Trypanosomiasis Research, South-west Zonal Office, Ibadan, Oyo State.*
***Corresponding author: Machina I. B.***

***Abstract:*** *The prevalence of trypanosomiasis in cattle was conducted between January and February 2016 in 6 selected communities of 5 Local Government Areas (LGA) in the north, south and central parts of Kaduna state, north-west, Nigeria. The objective is to assess the current prevalence rate and the trypanosome species involved. Parasitological evaluation and packed cell volume (PCV %) estimate were carried out on randomly selected cattle. 352 blood samples were collected and screened using buffy coat technique. Trypanosomes infection prevalence of 3.98% was established due to 14 infections recorded from the 352 cattle screened. The predominant trypanosome species encountered was Trypanosoma congolense, 10 (78.6%) while 4 (21.4%) was due to T. brucei. The overall average PCV recorded during the study was 28.5%. The average PCV of infected animals (21.8%) appeared lower than that of uninfected (25.0%) although, it was statistically insignificant (P> 0.05).*

***Keywords:*** *Trypanosomiasis, Trypanosoma brucei, Trypanosoma congolense, Cattle, Kaduna State and Packed Cell Volume (PCV).*

---

Date of Submission: 10-04-2017 Date of acceptance: 07-12-2017

---

## I. Introduction

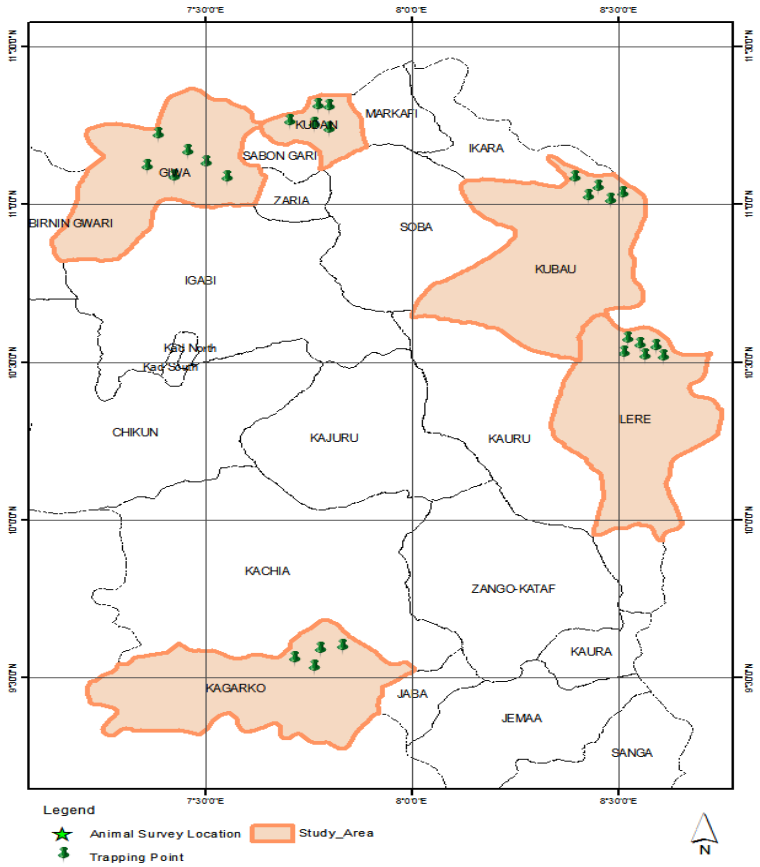
Trypanosomes are transmitted via bites by different species of Glossina and mechanically by biting flies (1). Transmission takes place mostly in rural areas where agricultural activities expose people to the bite of Tsetse fly (2, 3). The tsetse fly-transmitted trypanosomes, *T. brucei*, *T. congolense* and *T. vivax* are limited to Africa where they have been responsible for the barring of livestock from large areas of land which are possibly capable of supporting cattle and other ruminants (4, 5). Infection by one or more of these trypanosome species results in acute or chronic disease which is characterised by intermittent fever, emaciation, anaemia, loss of appetite, weakness, corneal opacity, occasional diarrhoea, parasitaemia, coma and death if not treated (6). This disease usually leads to reduced reproduction and quality, low feed conversion ratio and possible death of animals, hence, affecting the farmer's overall profit (7). Studies on Trypanosome infection rate and its impact on livestock production have revealed that they vary with sex, age, species of Trypanosomes and the tsetse fly, locality, season and depends largely on the level of interaction between tsetse flies, domestic and game animals (8, 9, 10, 11, 12 & 13). Livestock productivity in sub Saharan Africa suffers from high prevalence of Trypanosomiasis with projected annual loses due to the direct and indirect consequences of the disease running into billions of dollars with disproportionate adverse effect in rural areas (14). It creates the utmost constraint to livestock and crop production thus directly influencing hunger, poverty, protein malnutrition and suffering to entire communities in Africa (15). Animal Trypanosomiasis therefore, is an important livestock disease in Africa which is considered as a threat to the on-going effort on poverty alleviation in the continent (16).

In Nigeria, Tsetse and Trypanosomiasis problem is still extensively distributed in all agro-ecological regions. Outbreak of diseases especially trypanosomiasis in cattle herds is one of the major problems mitigating against the cattle industry in the tropics including Nigeria (17). There have been reported cases of the disease outbreak in some northern and southern part of Kaduna state (3, 18, 19, 20 & 21). Although, studies have been conducted in most of these areas, adequate information on the true prevalence of the disease in these areas is still scanty and not current to enable proper surveillance of the disease. These along with other factors prevent proper control of the disease (22, 23, 24 & 25). This study was carried out to investigate the prevalence of trypanosomiasis in herds of cattle in some selected areas of Kaduna State.

## II. Materials and Methods

**Study area**

Kaduna State is located on latitude 10°20'0"N, longitude 7°45'0"E and altitude 616 m above sea level. The mean annual rainfall is between 880 - 1380mm.The area lies within the sub humid zone, which is characterized by a dry season period from November to April, and a rainy season from May to October with vegetation consisting of the typical Northern Guinea savannah woodland. Sampling was carried out in six communities in five Local Government Areas (LGAs) from the north, south and central parts of the State. These are Kushigi in Kudan LGA, Madara in Giwa LGA, Ruwan sanyi in Kubau LGA, Bitarana in Lere LGA, Pantaki and Maganda in Kagarko LGA. In these communities are found nomadic Fulanis (migratory herdsmen) who rear domestic animals such as cattle, sheep and goats.




**Pre-survey and Contact Mobilisation**

Preliminary surveys of the communities were conducted and ethical clearance was obtained from the Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research (NITR) Kaduna. Consent was obtained from the camp heads (Ardos). The breed of cattle identified are mostly white Fulani breeds of cattle (Bunaji) and few Sokoto Gudali.

**Sample Collection**

A simple random sampling of 352 cattle of different ages, sexes and breed was carried out. Each of the animals was restrained before sample collection. 2mls of blood was drawn from the jugular vein using a hypodermic needle and transferred into an Ethylene-Diamine-Tetra-Acetic Acid (EDTA) sample bottle. Parasitological examination was carried out using the Standard Trypanosome Detection Method i.e. Haematocrit centrifugation technique HCT (26), Buffy coat method BCM (27), and thick & thin films. The smears were observed under oil emulsion lens as described by (28) The packed cell volume (PCV) of each animal was also determined as described by (29), while trypanosome species were identified based on their motility using the BCM and morphological features from thick & thin films. Properly stored (using cold box containing ice packs) blood samples were transported back to the institute and were spotted on filter papers, labelled and stored in a plastic container containing silica gel as preservative for future molecular analysis. Blood samples in EDTA containers were also preserved in a refrigerator at -4$^{o}$C in the institute's molecular laboratory.

**Statistical analysis**

The data obtained from this study was analysed using the student's t-test at p-value of <0.05 or less was considered significant.

## III. Results

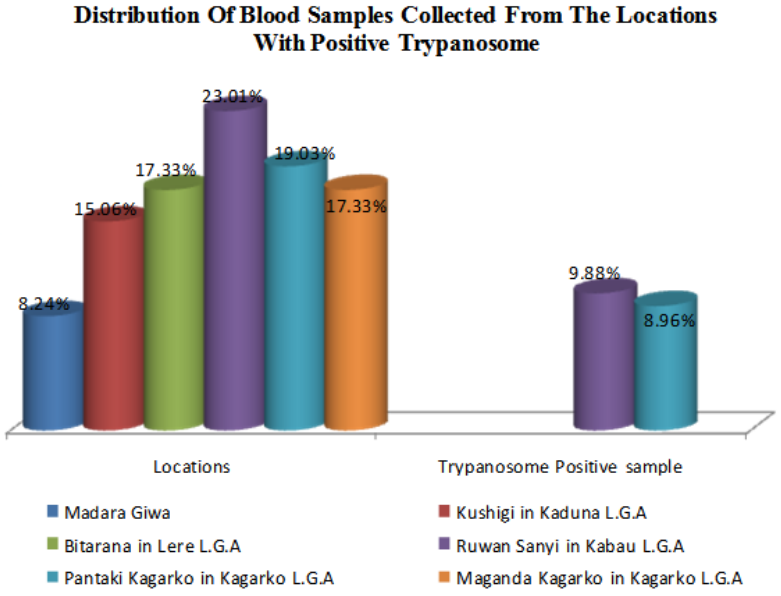
Summary of the results is summarised in table 1.0 and chart 1.0. A total of 352 blood samples were collected as follows: Madara in Giwa 29 (8.24%), Kushigi in Kudan 53 (15.06%), Bitarana in Lere 61 (17.33%), Ruwan sanyi in Kubau 81 (23.01%), Pantaki 67 (19.03%) and Maganda in Kagarko 61 (17.33%). Overall, 14 (3.98%) animals were found infected; 10 (78.57%) with *T. congolense* and 4 (21.43%) with *T. brucei*. Out of the six locations, 4 (96.02%) locations had negative trypanosome infection and only two locations had samples positive for trypanosome infection (3.97%). The highest trypanosome infection was recorded in Ruwan Sanyi (9.88%) and the least, at Pantaki (8.96%) communities.

The average PCV of 352 cattle observed was 28.50%. The average PCV of infected animals (21.75) appeared less than PCV of uninfected (25.00). The values were statistically insignificant (p>0.05). No clinical signs attributable to Trypanosomiasis were observed in all the herds sampled.

**Table 1.0: Showing Prevalence of Trypanosomiasis Infection**

| **Locations** | No. of blood samples collected | | Trypanosomes | | |
|---|---|---|---|---|---|
| | Frequency | Percent | Samples positive with trypanosome | Trypanosoma congolense | Trypanosoma brucei |
| MadaraGiwa | 29 | 8.24% | - | - | |
| Kushigi in Kaduna L.G.A | 53 | 15.06% | - | - | |
| Bitarana in Lere L.G.A | 61 | 17.33% | - | - | |
| RuwanSanyi in Kabau L.G.A | 81 | 23.01% | 8 | 5 | 3 |
| PantakiKagarko in Kagarko L.G.A | 67 | 19.03% | 6 | 5 | 1 |
| MagandaKagarko in Kagarko L.G.A | 61 | 17.33% | - | - | - |
| Total | **352** | **100.00%** | **14** | **10** | **4** |

**Chart 1.0: Displays graphical distribution of blood samples collected from the locations with infection rates**




## IV. Discussion

The overall prevalence of 3.98% observed in this survey is relatively lower than earlier reports of prevalence studies in neighbouring areas and other parts of Nigeria, (30) reported a prevalence rate of 8.4% in Kachia Local government area, Southern Kaduna State, the previous reports of 9.1% (19) in Lere local government area or even the 4.3% overall prevalence rate for Nigeria obtained from the country wide survey within the EEC-trypanosomiasis control project between 1989 and 1996. Also (31) reported a higher rate of 9.4% in parts of Kaduna State. Similarly, a much higher rate of 53.4% was reported by (32) during an outbreak

of bovine trypanosomiasis in Kaura LGA of Kaduna State. The 10.0% prevalence rate 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 also higher when compared to the findings of this study. However, the prevalence rate obtained in this study is almost similar to the previous reports of 3.9% in grazing cattle in Ogbomoso, Oyo State (33) and the 4.69% in Iddo Local Government Area, Oyo State by (34), and higher than the 1.2% previously recorded in Zaria, local government area of Kaduna state (35). Trypanosome infection was observed in only two of the communities sampled. High trypanosome infection was observed in Ruwan Sanyi (9.88%) and the least, at Pantaki (8.96%) communities in Kubau and Kagarko local government areas respectively. Further analysis of the result between the two communities shows no significant difference statistically with ($P>0.05$). The remaining 4 communities were found negative of trypanosome infection.

However, it cannot be established that trypanosome infection is not prevalent in these areas from this study due various reasons; the season in which the survey was conducted (dry season) which is not favourable for the vector of the disease (Tsetse fly) therefore minimising the rate of transmission. In support of this, (36) revealed that reproduction and development of biting flies is best suited to the climatic conditions prevalent during the heavy rainy seasons. Additionally, the natives of the communities suggest for a late dry/wet survey which the described as a period they in which they notice high activity of the vector. Furthermore, the Fulani herdsmen proudly admitted to the buying and administering drugs including anti-trypanosomal drugs from the local markets for cure and preventive measures to their animals. Also, there is reports of occasional visits of volunteers (NGOs and students) administering drugs to animals in some of the communities (Pantaki and Maganda). Furthermore, the sample sizes may also be another factor for the absence of trypanosomes in the blood samples collected when compared to other works that reported higher prevalence. Another reason might be due to the limitations of the diagnostic method used (microscopy) when compared with other works reported using molecular diagnostic technique. Similarly, studies on the variation in trypanosome infection rates in the different ecological zones have been previously reported by (37). This may therefore account for the observed variation in the prevalence rate of trypanosomiasis in cattle reported by the different workers. However, the findings from this study confirmed the endless trypanosome challenge to cattle found within the study area. This consequently explains the reason trypanosomiasis has remained a persistent challenge and a main constraint for cattle production in Kaduna State and sub-Saharan Africa.

## V. Conclusion

Trypanosomiasis is still the most neglected disease of modern times and labeled as a poor man's disease. From this study, it is conceivable to conclude that trypanosomiasis was an important disease and a potential threat affecting the health and productivity of cattle in the study areas. The recorded 3.98% in this survey could thus create economic loss to the people in the area. Hence, efforts must be made to further reduce to the barest minimum. The main trypanosome species found in the study area were *T. congolense* followed by *T. brucei*. Additionally, awareness creation on the risk of anti-trypanosomal resistance and drug usage is vital. Veterinary supervision is also insufficient. Therefore, upgrading the sector is essential in alleviating the disease and to evading or decreasing the illegal using of drugs. A late dry-wet survey is recommended which is a period of increased transmission rate and also the use of molecular diagnostic technique is strongly recommended in order to tackle the inefficiency of microscopy.

## Acknowledgement

Sincere appreciation goes to Professor Muhammad Mamman the former Director General and CE Nigerian Institute for Trypanosomiasis Research Kaduna for his guidance and financial support towards the execution of this work.

We also want to acknowledge the project officer PATTEC Nigeria in person of Dr P. M. Dede for his material and technical support to the achievement of this research. Finally we wish to sincerely thank all head of departments for their good advice and inputs throughout the course of this exercise. Above all, praised due to God almighty for keeping us healthy from the beginning to the end of this work, glory is to Him.

## References

[1]. Oluwafemi, R.A., llemobade AA. Laseinde EAO (2007). The impact of African Animal Trypanososis and Tsetse on the Livelihood and Wellbeing of cattle and their owners in the BICOT study area of Nigeria. Sci. Res. Essay 2(9):380-383.

[2]. Muturi, C. N.,Ouma, J. O.,Malele, I. I., Ngue, I. M. Rutto, J. J.Mithorfa, M. K., Enyaru, J. and Masika, D. K. (2011). Tracking the feeding patterns of Tsetse flies (Glossina Genus ) by analysis of bloodmeals using mitochondrial cytochrome genes. PLos ONE, 6(2): el17284, DO110.1371/journal. 0017284

[3]. Okoh, K. E., Anavhe,H. N., Ayakat, C. S., Anchau, R. and Ajakaiye, J. J. (2012). Trypanasomes infection in field Captured Tsetse flies of subgenus: Nemorhina in Southern Gunea Savannah zone of Nigeria. Current Research Jounal of Biological Sciences 4(6): 713-716.

[4]. Alfredo M (2004). A history of epidemiology: Methods and concepts. Birkhouse Publishers, UK. Pp. 93.1-7.

[5]. Jay LL (2008). Breeds of livestock resources. Department of Animal Science, Oklahoma State University Press. Pp 2-3.
[6]. Fasanmi O.G, UP Okoroafor1, OC Nwufoh, OM Bukola-Oladele & ES Ajibola
[7]. Survey for trypanosoma species in cattle from three farms in Iddo Local Government Area, Oyo State. Sokoto Journal of Veterinary Sciences, Volume 12 (Number 1). April, 2014 12(1): 57-61.
[8]. Ahamad, A.B., (2007). High Trypanasome infections in *Glossina palpalis* RobineauDesvoidy 1830in Southern Kaduna State, Science *World Journal*, 2:
[9]. Van den Bossche, P. and De Deken, R., " Seasonal Variation in the Distribution of and Abundance of the Tsetse Fly, *Glossina mortisans* in East Zambia", *Medical and Vet nary Entomology*, Vol. 16, No. 1, 2002, pp. 170-176. Doi: 1046//j. 1365-2915.2002.00360.x
[10]. PATTEC (2002). Pan African Tsetse and Trypanosomiasis Eradication Campaign; Plan of Action. Organization of African Unity. June 2001. Addis Ababa, Ethiopia, pp1-31.
[11]. Wint, W., Shaw, A., Cecchi, G., Mattioli, R. and Robinson, T. (2010). Animal trypanosomiasis and poverty in the Horn of Africa Workshop Report. IGAD Livestock Policy Initiative, July 6–7, 2010 at Regional Centre for Mapping of Resources for Development (RCMRD).
[12]. Vanden P, Shumba W & Makhanbera P (2000). The distribution and epidemiology of bovine trypanosomosis in Malawi. Journal of Veterinary Parasitology, 88(3-4):165-170.
[13]. Fajinmi, A. O., Abenga, J. N., Lawani, F. A. G., Ukah, J. C. E., Ikimere, E. C. D., and Uwanbuko, P. U., (2006). An Outbreak and Observation of Trypanosomiasis in Friesian cattle at Sabon Birni, Kaduna State of Nigeria. *African Journal of clinical and Experimental Microbiology, 7(3): 28-34*
[14]. Maikaje, D. B., Sanusi ,A., Kyewalabye, E. K. and Saror, D. I. (1991). The Cause Experimental Trypanasoma Infection in Uda Sheep. Veterinary Parasitology, 38:267-274.
[15]. Maikaje,D.B.(2002). An outtbeak of Biting flies and Bovine Trypanosomiasis in Kaua L.G.A., Kaduna State, Nigeria.West African Journal of Biological Sciences.
[16]. Kalu. A.U.,Oboegulem,S.I. and Uzoukwu, M. (2001). Trypanosomiasis in small Ruminants maintained by low riverine tsetse population in central Nigeia. Small ruminant Research, 40:109-115.
[17]. Samdi, S. M., Abenga, J. N., Fajinmi A. O., Kalgo, A., Idowu, T. and Lawani, F. (2008). Seasonal Variation in Trypanosomiasis rates in small ruminants at the Kaduna Abattoir, Nigeria. African Journal of Biomedical Research, 11: 229-232.
[18]. Samdi, S. M., Fajinmi, A. O., Kalejaye J. O., Wayo, B., Haruna, M. K., Yarnap, J.,Msshelia W. P., Usman, A. O., Hama, S. M., Jijitar, A., Ogunwale, R., Ovbagbedia, R. P. and Bizi, R. (2010). Periodic Variation in Trypanasome Infection Rate In Trade Small Ruminants at Slaughter in Kaduna Central Abattoir. Esearch Journal of Veterinary Sciences, 3:189-193.
[19]. Samdi, S. M., Fajinmi, A. O., Kalejaye J. O., Wayo, B., Haruna, M. K., Yarnap, J. E., Msshelia W. P., Usman, A. O., Hamra, S. M., Jijitar, A., Ogunwale, R., Ovbagbedia, R. P. and Bizi, R. (2011). Prevalence of Trypanosomiasis in cattle at slaughter in Kaduna Central Abattoir. Asian Journal of Animal Sciences, 5(2): 162-165.
[20]. Murray, M., Trai, J.C.M., Davis, C.E. and Black, S. J. (1983). Genetic Resistance to Africa Trypanosomiasis. J. Infect. Dis. 149:311-319.
[21]. Paris, J., Murray, M., Odimba, F.M. (1992). A comparative Evaluation of the Parasitological Techniques Currently Available for the Diagnosis of *Trypanosoma vivax, T. congolense* and *T. brucei* infections in cattle. Acta Trop. 39: 307-316.
[22]. Enwezor, F.N.C.and Ukah, J.C.A. (2000). Advanced Trypanosomiasis (Sleeping Sickness) in a child: Case report. *Niger. I. Parasitol.*, 21: 143-146.
[23]. MAIKAJE, D.B., 1998. Some Aspects of Epidemiology and Drug Densitivity of Bovine Trypanosomiasis in Kaura LGA of Kaduna State. PhD Thesis, Ahmadu Bello University, Zaria, Nigeria, p. 147. 12
[24]. Ahmed M I & Agbede RIS (1993). A three-year retrospective study of the prevalence of trypanosomes infection in cattle, sheep and goats in Zaria, Northern Nigeria. OAU/STRC Publication No. 116, Nairobi, Kenya.
[25]. Sinshaw, A., Abebe, G., Desquesnes, M. and Yoni, W. (2006). Biting flies and trypanosome vivax infection in three highland districts bordering Lake Tana,
[26]. Maya, J. D.,Cassels B. K.and Iturriaga-Vasuespz, P. (2007). "Mode of Action of Natural and Synthetic drugs against *Trypanasoma Cruzi* and their interaction with the mammalian host". Comparative Biochemistry and Physiolog, a part of molecular and intergrating physiology 146(4): 601-20
[27]. F.A.O. (2005). The Influence of Trypanosomiasis on African Animal Production. *Zootechnia pp* 12.
[28]. Gasseer, R. P., (1998). Recent Studies of The Biology of *Trypanosoma vivax*. Adv. Parasitol. 28:229-317.
[29]. Grebaut, P., Chuchana, P., Bruzard, I. P., Demettre,. Seveno M., Bossard G., Jouin, P., Vincendeau, P., Bengaly, Z., Boulanga, A., Cuny, G. and Holzmuller, P. (2009). Identification of Total and differentially expressesd excreted-secreted protiens from *Trypanasoma Congolense* Strains exhibitingdifferent Virulence and pathogenicity. *International journal of parasitology*, 39(10): 1 137-1 150.
[30]. Hargrove, J. W., R. Ouifki, D.Kajungari, G. A. Vale and S. T. Torr, 2012. Modelling the control of Trypanosomiasis using trypanacides or insecticide-treated livestock. *Trop. Dis. Plos. Negl., (spanish),6(5); e1615. DOI: 10:1371/journal.pntd.0001615*
[31]. Kneeland K. M., Skoda S., Hogsette, J. A., Li, A. Y.,Molina Ochoa, J., Lohmeter, K. H., and Foster J. E. (2012) A century and a half of Research On the Stable fly, Stomoxys calcitrans (L.) (Diptera Muscidae), 1862-2011: An AnnotatedBibliography. United State Department for Agricuture. *Agricultural ResearchService, ARS-1 73*
[32]. Kalu, A.U. (1991). An outbreak of Trypanosomiasis on the Joss Plateau, Nigeria.Trop. Anim. Hlth. Prod. Afr. 39: 3-8.
[33]. Onyia JA (1997). African Animal Trypanosomosis: An overview of the current status in Nigeria. Tropical Veterinarian, 15(3): 111−116.
[34]. Sam−Wobo SO, Igenezoa AJ, Idowu OA, Otesile EB, Ekpo UF & Kehinde OO (2010). Bovine trypanosomiasis and its impact on cattle in derived Savannah areas of Ogun state, Nigeria. Journal of Public health and Epidemiology, 2(3): 43−47.
[35]. W. H. O, 2013. Human African Trypanosomiasis (sleeping sickness). URL: Fact sheet
[36]. N259: African Trypanosomiasis or sleeping Sickness. Accessed 27th Augustst, 2013

Machina, I.B"The Prevalence of Trypanosomes Infection in Cattle in Five Local Government Areas of Kaduna State, North-Western Nigeria." IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS) 10.11 (2017): 77-81.