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Prevalence of Haemoparasites in Cattle Slaughtered at Central Abattoir in Igboora, Oyo State, Nigeria

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Abstract

Livestock production is a major sector of Nigeria`s economy. Ruminant livestock (principally cattle) are susceptible to hemoparasites that can cause serious clinical disease and production losses. A total of 100 blood samples were randomly collected from cattle at the point of slaughter in the Central Abattoir between the month of June and September, 2018. Packed Cell Volume (PCV) was determined and haemoparasites were studied using Giemsa' s staining of smears and haematocrit centrifugation technique was used to detect the presence of motile haemoparasites. The overall prevalence of haemoparasite infection was 70 (70%). Three genera of haemoparasite, (Babesia, Theileria and Anaplasma species) were identified. Babesia sp, 40 (40%) had the highest prevalence compared to Anaplasma sp 20 (20%) and Theileria sp with 10 (10%) had the least prevalence. The mean PCV of the infected cattle (13.5 ± 0.44a) showed significant decrease at p<0.05 when compared to the uninfected cattle (33.3 ±1.17b), also the mean PCV values of each haemoparasite genera Babesia (19.32 ± 1.46) a, Theileria (18.57 ± 1.29) and Anaplasma (20.25 ±2.19) a shows no significant difference at p<0.05. The result of this study shows that three haemoparasites are endemic in cattle in the study area and appear to be associated with lower PCV. This may result in serious disease conditions when such animals are subjected to stressful condition. In conclusion, there is need for appropriate control of these parasites in these economically viable animals for improved productivity.

Keywords: Abattoir, Cattle, Haemoparasites, Packed Cell Volume (PCV), Prevalence

Introduction

Cattle contributes about 10% of the Nigerian livestock resources while in monetary terms, it accounts for about 40% of the total livestock revenue of Nigeria (Musa *et al*., 2014). Animal agriculture is an indispensable prerequisite towards the sustainability of human development because of food provision and employment generation. Livestock production is faced with a number of constraints, which on the long run results in low productivity and reduced profitability (Anon, 2006). A leading constraint is animal diseases which constitute a major obstacle to economic development and of importance is parasitism is a primary cause of production losses due to mortality, reduction in weight gain, low fertility, losses in most cattle – producing countries of the world. (Musa *et al*., 2014). Haemoparasitism is an important disease in ruminants which affects their productivity as it causes destruction of red blood cells resulting in anaemia, jaundice, anorexia, weight loss and infertility (Gates and Westcott, 2003). This infection results into pre-immunity of the animals in which the host becomes carriers of the tick or host vector and serves as a source of infection for others (Samdi *et al*., 2010). Some haemoparasites are only present when there is clinical response to infection, while others are evident from blood smears of apparently health animals. The prevalence of haemoparasites of cattle in Nigeria is generally considered to be very high due to the preponderance of their arthropod vectors (Biu and Kabono, 2005; Kamani *et al*., 2010; Okorafor and Nzeakor, 2014; Musa *et al*., 2014). More also, 90% of the population of Cattle in Nigeria are raised under the pastoral husbandry system of Fulani herders (Musa *et al*., 2014). Under this system cattle are extensively grazed on pastures and forests and may be exposed to various arthropod vectors of haemoparasites (Kamani *et al*., 2010). Athropod transmitted hemoparasitic disease of cattle is caused by *Theleria*, *Anaplasma*, *Babesia* and *Trypanosoma* species (Alekaw, 2000). These diseases are vector borne disease of the subtropical and tropical part of the world including Nigeria. Babesia is an Apicomplexan hemoparasites (Family Babesidae, Order Piroplamida) and it is transmitted by *Rhipicephalus microplus*. *Trypanosoma* is primarily transmitted by tsetse fly and mechanically transmitted by Tabanid flies (Sumba *et al*., 1998). Anaplasmosis is a vector borne disease caused by Rickettsia parasites in cattle, it is transmitted majorly by ticks (CDC, 2009) and *Theleria parva* are typically transmitted by ticks.

The prevalence of the various genera of haemoparasites of cattle (Trypanosomes, Babesia, Anaplasma, and Theileria) have been previously reported in different parts of Nigeria (Akande *et al*., 2010; Kamani *et al*., 2010; Samdi *et al*., 2010; Enwezor *et al.*, 2012; Ademola and Onyiche, 2013; Okorafor and Nzeako, 2014; Qadeer *et al*., 2015) and elsewhere in the world (Alim *et al*., 2012; Velusamy *et al*., 2014). They have been associated with the destruction of erythrocytes leading to anaemia, jaundice, anorexia, weight loss and infertility in livestock (Akande *et al*., 2010). There is paucity of information on the prevalence and importance of haemoparasites in slaughtered cattle in a rural area like Igboora, a town located in Oyo State. Therefore, this study was conducted to identify the different hemoparasites in this study area and its effect on the packed cell volume (PCV) in order to understand the current disease burden in order to advise of the needed preventive and /or/ control measures.

Materials and Methods

The study was carried out in the Central abattoir, Igboora. Which lies in the savannah forest zone on latitude 7.43^{o}N and longitude 3.48^{o}E with an elevation of 140m above the sea level. The average minimum temperature in the study area is 58.9^{o}C, the double maximum rainfall is about 214.3mm in June and 165.77mm in September (Nigerian Meteorological Agency, 2017). A total of 100 cattle comprising both sexes and different breeds of cattle slaughtered at the abattoir were randomly sampled between June and September, 2018. The breeds sampled were White Fulani, Sokoto Gudali and N`dama. Ageing was based on rostral dentition as described by Lasisi *et al.* (2002). Cattle aged less than 3 years old were categorised as young while older ones were considered as adults. About 5 mls of blood were collected from the severed jugular vein at the point of slaughter into labelled bijou bottle containing Ethylene diamine tetra acetic acid (EDTA) from each animal after proper documentation of age, body condition and breed. They were placed on icepacks and transported to the Laboratory of the Department of Veterinary Medicine, Faculty of Veterinary Medicine, University of Ibadan for analysis. A thin blood smear was prepared on a standard microscope glass slide (75 mm by 25 mm), air dried, fixed in methyl alcohol for 3-5 min, stained in 5% Giemsa stain for 30-45 min in a staining jar and rinsed in buffered distilled water (Kamani *et al*., 2010). Haemoparasites were identified by direct microscopic examination based on morphologic keys as described by Soulsby (1982), using a compound microscope (Olympus, USA). PCV was determined using microhaematocrit centrifugation technique (MHCT) as described by Brar *et al*. (2011). Blood was introduced into microhaematocrit tubes by capillary action and one end of each capillary tube was sealed with plasticine. The tubes were spun in a microhaematocrit centrifuge (Hawksley, England) at 1500 g for 3 min. PCV was measured with a hematocrit reader

(Hawksley, England), and recorded appropriately (Kamani *et al*., 2010).

Statistical Analysis

Data generated were summarized and presented in tables using descriptive statistics and the prevalence of haemoparasites was estimated as p =d/n (%). Where p= prevalence, d = number of individuals having disease at a particular point in time (Thrusfield, 2005). The mean PCV between the infected and non-infected animals were expressed as MEAN ± SEM at significant level of ($p<0.05$)

Result and Discussion

The result obtained showed that out of the 100 cattle sampled, (70%) were infected with haemoparasite and (30%) were non-infected with haemoparasite infection as shown in Table 1.

Table 1: Distribution of Haemoparasite in slaughtered cattle in Igboora Abattoir

Species	Infected	Non infected
Cattle	70 (70%)	30 (30%)

The prevalence of haemoparasitic infection in the sampled cattle were *Babesia* 40 (40%) having the highest prevalence followed by *Anaplasma* 20 (20%) and lowest with *Theileria* 10 (10%) as shown in Table 2. Significant decrease at $p<0.05$ in the mean PCV values of the infected sampled animals compared to the uninfected animals was observed in cattle as shown in Table 3.

Table 2: Prevalence of haemoparasitic infections in slaughtered cattle

S. No.	Parasite	Species	No. of Sample	No. of Infected	Prevalence
1	*Babesia spp*	Cattle	100	40	40%
2	*Theileria spp*	Cattle	100	10	10%
3	*Anaplasma spp*	Cattle	100	20	20%

Table 3: The mean packed cell volume of infected and non-infected cattle

Species	Infected	Non-Infected
Cattle	13.5 ± 0.44^{a}	29.3 ± 1.17^{b}

Within rows means with different letters (a, b) differ significantly ($p < 0.05$) among the experimental groups

There was no significant difference at $p<0.05$ in the mean PCV of cattle infected with the different haemoparasite as shown in Table 4 below. Also pictures of the haemoparasite seen are shown in plates 1, 2 and 3 below.

Table 4: The mean PCV of infected cattle with different haemoparasites

Hemoparasites	Mean ± SEM
Babesia sp	19.32 ± 1.46^{a}
Theleria sp	18.57 ± 1.29^{a}
Anaplasma sp	20.25 ± 2.19^{a}

Within rows means with different letters (a, b, c) differ significantly ($p < 0.05$) among the experimental groups

Haemoparasite is one of the major constraints to livestock production in Nigeria, hence its monitoring is important in other to institute of adjust prevention and control strategies. There was relatively high prevalence of haemoparasites at the central abattoir in Igboora which is located a rural area where an average of 2-3 cattle are slaughtered in a day to meet the immediate needs of the community as preservation was difficult based on available resources and facilities. The high incidence of hemoparasite in this study may partly be a reflection of the availability and uptake of Veterinary health services in livestock production in these areas. Most farmers are ignorant of the need of Veterinary health management for their livestock and this leads to high burden of animal diseases which affects the productivity and profitability of the cattle. The relatively high incidence of haemoparasites could also be attributed to the favourable environmental condition for the survival and proliferation of the arthropod vector

responsible for their transmission (Adejimi *et al.*, 2004).

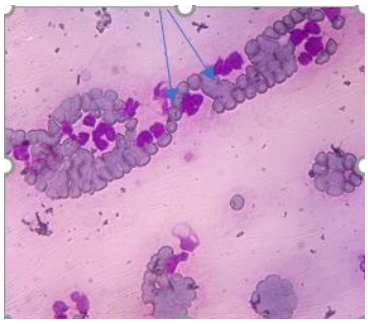

Plate 1: Blood smear showing *Anaplasma sp*

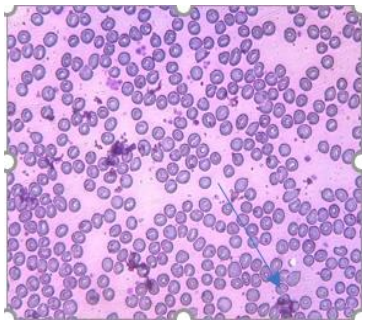

Plate 2: Blood smear showing *Babesia sp*

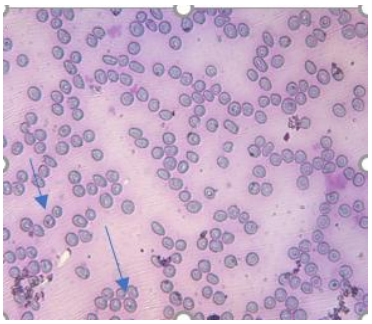

Plate 3: Blood smear showing *Theleria sp*

The high prevalence of haemoparasites (70%) in this study is similar to the findings of Talabi *et al*. (2009) who reported 50.2% prevalence of blood protozoan in the transboundary areas of Ogun state, Nigeria. However, our result is also at variance with Okorafor and Nzeako (2014) who reported a prevalence of 6.7% for various species of haemoparasites of cattle and Ademola and Onyiche (2013) who reported a prevalence of 5% in Oyo state, Nigeria. These discrepancies could be attributed to local differences in prevalence of haemoparasites due to variations in geographical location (Velusamy *et al*., 2014) which determines the distribution of the arthropod vectors of the parasites (Shah-Fischer and Say, 1989; Agbede, 2013). Furthermore, Cattle are usually herded by pastoralists under transhuman conditions in the study area which exposes them to the vectors of haemoparasites thereby increasing the risk of infection. Three haemoparasites (*Babesia, Theleria* and *Anaplasma* species) were detected in the study area at the different percentage of (40%, 20% and 10%) respectively. This finding agrees with Yismashewa (2005) in Decha Woreda Southern Ethiopia and Seyoum (2007) in Kobo and Girana valley in Amhara region who also reported high prevalence of babesiosis in cattle in their areas.

However, there was a significant difference ($p<0.05$) in PCV between infected and uninfected cattle, and this could be attributed to the effects of haemoparasites on blood cells, this is in alignment with (Abenga *et al.*, 2008) who discovered anaemia, characterized by low PCV values of all the categories of the infected animals suggesting that the parasitic infection may cause anaemia, Adejimi *et al*. (2004) also noted that anaemia was the major clinical sign in haemoparasitic infection in livestock in the tropics.

Conclusion

Haemoparasites are endemic in cattle populations within Igboora and its environs, and their occurrence may be associated with changes in Packed Cell Volume (PCV) which is a vital tool to detect anaemia in Cattle. A higher prevalence of haemoparasites was recorded in this study compared to the recent reports in Oyo State, there is therefore need for renewed interest in finding solutions to the challenge of hemoparasitism.

Recommendation

It is therefore recommended that stringent measures of controlling haemoparasites in food animals should be instituted in Igboora and its environs where these animals are sourced. Such measures should include more aggressive chemotherapy, chemoprophylaxis and control of arthropod vectors through the use of effective insecticides, acaricides and environmental management.

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Conflict of Interests

There is no conflict of interest.

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References

1. Abenga, J.N., Enwezor, F.N.C., Lawani, F.A.G., Osue, H.O., Ikemereh, E.C.D, (2008). Trypanosome Prevalence in Cattle in Lere Area in Kaduna State, North Central Nigeria. *Revue d`elevage et de medicine veterinaire des pays tropicaux* 57(12):45-48.
2. Adejimi,J.O,. Sadiq, N.A., Fashanu, S.O., Lasisi, O.T & Ekundayo.S, (2004). Study on the blood parasite of Sheep in Ibadan, Nigeria, *Africa Journal of Biomedical Research*, 7:42-43.
3. Ademola, I.O, Onyiche, T.E., (2013). Haemoparasites and Haematological Parameters of Slaughtered Ruminants and Pigs at Bodija Abattoir, Ibadan, Nigeria. *Africa Journal of. Biomedical. Resources.* 16:101-105.
4. Agbede, R.I.S., (2013). *A Guide to Tropical Veterinary Entomology*. Mac Chin Multimedia Designers, Zaria, Nigeria, l08 p.
5. Akande, F.A., Takeet, M.I., Makanju, O.A., (2010). Haemoparasites of Cattle in Abeokuta, South West Nigeria. *Science World Journal*. 5 (4):19-21.
6. Alekaw,S.,(2000). Distribution of Ticks and Tick-Borne Diseases at Metekel ranch, Ethiopia. *Journal of Ethiopia Veterinary Association.* 4:40-60.
7. Alim, A.M, Roy, S.D.K., Sikder, M.M.S., Hassan, M.M., Siddiki, A.Z and Hossain, M.A., (2012). Prevalence of Hemoprotozoan Diseases in Cattle Population of Chittagong Division, *Bangladesh. Pakistan Vet. J.* 32(2):221-224.
8. Anon, J.E., (2006). Opening address by Mallam Adamu Bello at the 5th Nigerian economic Summit Group (NESG), Abuja. Nigerian Federal Ministry of agriculture (1999-2007).
9. Biu, A.A, Kabono, A., (2005). Prevalence of Bovine Hemoparasites in Maiduguri, Nigeria. *Journal of Experimental Applied Biol*ogy. 6:27-31.
10. Brar, R.S, Sandhu, H.S, Singh A., (2011). *Veterinary Clinical Diagnosis by Laboratory Methods*, 1 Ed. India: Kaylani Publishers, pp. 29-150.
11. Centers for Disease Control and Prevention (CDC), (2009). *Anaplasmosis, Question and Answer Tick Borne Rickettisial Disease*. Centre for Diseases Control and Prevention. Pp 8-18.
12. Enwezor, F.N.C., Samdi, S.M., Ijabor O., Abenga J.N., (2012). The Prevalence of Bovine Trypanosomosis in Parts of Benue State, North-Central Nigeria. *J. Vector Borne Dis*. 39:188-190.
13. Gates, N.C and Wescott R B., (2003). Parasite of Cattle; *Veterinary parasitology Journal*. 42(5):6-9
14. Kamani J, Sannus E, Egulu K, Dogo I, Tanko J, Kenza J, Tafariki E, Ghise S., (2010). Prevalence and Significance of Haemoparasitic Infections of Cattle in North-Central, Nigeria. *Veterinary World*. 3(10):445-448.
15. Lasisi, O.T, Ojo, N.A, Otesile, E.B., (2002). Estimation of Age of Cattle in Nigeria Using rostral dentition; Short communication. *Tropical Veterinarian*. 20(4):204-208.
16. Musa, H.I, Jajere, S.M, Adamu, N.B, Atsanda N.N, Lawal, J.R, Adamu, S.G, Lawal, E.K., (2014). Prevalence of Tick Infestation in Different Breeds of Cattle in Maiduguri, Northeastern Nigeria. *Bangladesh Journal of Veterinary Medicine*.12(2):161-166
17. Nigerian Meteorological Agency, (2017). *Temperature and rainfall distribution in Oyo State*. Available from http://www.nimet.gov.ng/.
18. Okorafor, U.P, Nzeako, S.O., (2014). Prevalence of Haemoparasites of Cattle from Three Abattoirs in Ibadan Metropolis, Oyo State, Nigeria. *International Journal Scientific Res Environmental Sciences*. 2(7):244-249.
19. Qadeer, M.A, Gumel, M.A, Chessed, G, Nganjiwa, J.I, Bernard, K, Vandi, P, Hakim, D, Fadimatu U., (2015). A Cross Sectional Study on the Gastrointestinal and Haemoparasites of Trade cattle in Girei and Yola North Local Government Areas of Adamawa State, Nigeria. *IOSR Journal of Agricultural Veterinary Science* .8(4):3-5.
20. Samdi, S.M, Abenga, J.N, Attahir, A, Haruna, M.K, Wayo, B.M, Fajinmi, A.O, Sumayin, H.M, Usman, A.O, Hussaina, J.Z, Muhammad, H, Yarnap J.E, Ovbagbedia, R.P, Abdullahi, R.A. (2010). Impact of Trypanosomosis on Food Security in Nigeria: A Review*: International Journal Animal Veterinary Advances* .2(2):4750.
21. Seyoum, Z, (2007). *Bovine Babesiosis and Vectors at Kobo and Girana Valley in Amhara Region*. M.Sc. Thesis, Addis Ababa University, FVM, Debre-Zeit, Ethiopia

22. Shah-Fischer M, Say R., (1989). *Manual of Tropical Veterinary Parasitology*.CAB International: The Technical Center for Agricultural and Rural Cooperation (CTA), Nairobi, Kenya. Pp. 351-363.
23. Soulsby, E.J.L., (1982). *Helminths Arthropods and Protozoa of Domesticated Animals*, 7th Ed. U.K: Bailiere Tindall, London, 809 Pp.
24. Sumba, A.L., Mihok, S, Oyieke, F.A., (1998). Mechanical transmission of *Trypanosoma evansi* and *T. congolense* by *Stomoxys niger* and *S. taeniatus* in a laboratory mouse model. *Medical Veterinary Entomolology*. 12(4):417-422.
25. Talabi, A.O., Oyekunle, M.A., Oyewusi, I.K., Otesile, E.B., Adeleke, G.A. and Olusanya, T.P. (2009). *Parasites of Cattle in the Trans-boundary Areas of Ogun State, Nigeria. Synopses*, FAO/IAEA International Symposium on Sustainable Improvement of Animal Production and Health. Vienna, Austria. Pp331.www.naweb.iaea.org/nafa/aph/Book of Synopses.pdf Published by FAO/IAEA.
26. Thrusfield. M.V, (2005). *Veterinary Epidemiology*. 3rd Ed. UK: Blackwell Science Oxford, London, P 483.
27. Velusamy, N, Rani, G.I, Ponnudurai, T.J., Harikrishnan, T, Anna, K, Arunachalam, K.S, Anbarasi P., (2014). Influence of Season, Age and Breed on Prevalence of Haemoprotozoan Diseases in Cattle of Tamil Nadu, India. *Veterinary World* 7:574-577.
28. Yismashewa, W., (2005). *Epidemiology of Tick- and Tick-Borne Protozoan Disease of Cattle in Decha Woreda, Southern Ethiopia*. M.sc. Thesis, Addis Ababa University, FVM, Debre-Zeit, Ethiopia.

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