PREVALENCE OF TICK BORNE HEAMOPARASITESIN SOME BREEDS OF CATTLE AND GOATS SLAUGHTERED IN SOME ABATTOIRS WITHIN MAKURDI, NIGERIA

Comment [H1]: Haemoparasites

Abstract

This study was carried out to compare the prevalence of tick-borne haemoparasite in some variety of cattle and goat in Makurdi.The thin blood film technique was used in the study. Chi square (X^2) test was used to compare the prevalence rates. Breed of cattle examined were: White Fulani (45.2%), N'dama (35.5%) and Muturu (19.3%); While those of goats were: West African Dwarf (16.7%), Adamawa Red (37.3%) and Red Sokoto (46.1%). Haemoparasites of cattle and goats and their prevalence were:*Anaplasma centrale* (22.4%), *A. marginale* (21.1%), *Bebesia bovis* (11.4%); *A. centrale* (16.7%), *A.marginale* (12.3%), *B.ovis* (11.4%) and *Theileria ovis* (7.8%) respectively.

Introduction

Haemoparasites are parasites that live within their host's (animal) bloodstream. Heamoparasitic diseases have a global distribution due to the fact that their vectors, ticks and blood sucking flies also have a global distribution[1].Tick borne diseases (TBDs) are one of the most important constraints to livestock production in developing countries.Some of the most important TBDs of cattle and goats in Africa, especially Nigeria include theileriosis (East Coast fever),babesiosis (red water), Anaplasmosis (gall sickness)[2].Ticks feed on animals that are either sick from any of these diseases, or animals that are healthy but have the parasite in their blood (Carriers). Cattle

Comment [H2]: Haemoparasitic

and goat become infected with TBDs when the ticks feed on them. Through their saliva, a single infected tick can pass disease in to an animal during the process of feeding [3].

Comment [H3]: into

Tick borne disease may be triggered by infection with a variety of pathogens, including rickettsia and other types of bacteria, viruses and Protozoa. Because ticks can harbour more than one disease causing agent, cattle and goats can be infected with more than one pathogen at the same time [4]. Ticks and the diseases they transmit are responsible for severe losses caused either by tick worry, blood loss, blood related infections, damage to hides, udders and the transmission of toxins, or through morbidity or mortality caused by the diseases they transmit. The problem is that cattle and goats which serves as food to man has their production diminishing. Many people attribute this to diseases of cattle and goats. The most striking problem is whether haemoparasites are responsible to diminishing meat that serve as food for man. This calls for a comparative study on tick borne haemoparasites of cattle and goats slaughtered in our abattoirs.

Comment [H4]: should not included

Comment [H5]: redundant

MATERIALS AND METHODS

3.1 Study Area

Makurdi is one of the Local Government Area that makes up Benue State of Nigeria, located in the North Central geopolitical zone. It is located in the Middle Belt area of Nigeria and shares boundary with Guma, Gwer, Gwer west and Tarka local government areas. Makurdi is situated along the coast of River Benue and comprising of major places like high level, Wurukum, Wadata, North bank and Modern market.Makurdi is located on latitude 07º 74ºN and longitude 08º 51ºE. It has a tropical sub-humid climate, with two distinct seasons, namely a wet season and a dry season. The wet season lasts for seven months, starting from April to October. There is, however, usually one or more heavy rain out of the season rains in January, February and March.

Makurdi, the state capital, for example, records average maximum and minimum daily temperatures of 35°C and 21 °C during the dry season and 37°C and 16°C during the wet season, respectively (www.mapplandia). Makurdi lies in the Guinea Savannah. Persistent clearance of the vegetation has led to the development of regrowth vegetation at various levels of serai development, but more importantly, parklands with grasses ideal for animal grazing during their early growth. These succulent grasses can be cut with machinery, dried and baled for dry season livestock feeding.

Comment [H6]: What for?

The grasses however grow very tall, coarse and tough on maturity. The scattered trees are mainly those of economic value and include locust bean, shear butter, mango, silk cotton, African iron, Isoberlinia, cashew, oil palm, *Daniellia oliveri*, Gmelina.

The study area comprise of four abattoirs namely: Wurukum abattoir, Wadata abattoir, Modern Market abattoir, cattle Market in Makurdi, Benue State.

Sample Size Determination and Sample Selection

A total of 456 animals comprising of 228 each of cattle and goat slaughtered at abattoir was randomly sampled during the period of study. This size was arrived at using Yaro – Yamane's formulae;

$S = N/1 + N (e)^2$

N = Population studied.

e = Error margin (0.05)

Blood sample was collected at designated areas for the period of three (3) months (July to October 2014) when the animals were slaughtered, 3–5 mls of blood was collected immediately

from the jugular vein, into a bijon bottle containing ethylenediaminetertraacetate (EDTA) used as anti-coagulant.

The sample was labelled properly, placed in a cooler and transported immediately to University of Agriculture Veterinary Teaching Hospital laboratory, Makurdi where it was examined using thin blood film method.

Thin blood film method

A thin blood film technique was employed to detect tick borne haemoparasites of cattle and goats respectively by the following methods.The blood was mix gently with the aid of an applicator stick few drops of blood was placed at the end of the slide at about 2cm to the edge of the slide. A separator was placed in front of the drops of blood and push backward to allow the separator to touch the drop (blood) and allowed to spray all to the sprayer. A firm push was made forward to make the blood dragged behind the separator slide to form a film, if the blood was push instead of pulled along the slide parasite may be crushed. The procedure was completed as quickly as possible; the smear was allowed to dry and was labelled for proper identification. The smear was fixed in absolute methanol for five minutes and allowed to dry; the smear was covered with Giamsa stain (Romanowslay stain) and allowed for 35 to 40 minutes. The smear was washed with water and allowed to dry. The smear was viewed using the Microscope (using X 100 objectives) oil immersion for identification of tick borne haemoparasite.

Comment [H7]: Simplify the method

Statistics

Data was analyzed using Chi-square test to determine whether there is a significant different between the expected frequencies and the observed frequencies in one or more categories and to examine differences within categorical variables.

Comment [H8]: differences

Results

Breed of Cattle and Goats examined for haemoparasitic infection are presented in Table 1. White Fulani were the dominant cattle 103(45.2%) and Red Sokoto Goats were the dominant Goats 105(46.1%). Isolated haemoparasites for Cattle and Goats are also presents (Table 1).

The three haemoparasites isolated from Cattle (*Anaplasma central, A. marginale* and *Bebasia bovis*) were dominant in Muturu and the four parasites isolated from Goats (*Anaplasma central, A. marginale and Bebasia ovis* and*Theileria ovis*) had *T. ovis* dominating in Adamawa Red and all the other haemoparasites dominating in West African Dwarf. X^2-test however did not show any significant difference ($p>0.05$) in variety of Cattle and Goats with haemoparasites isolated. Table 2 compared haemoparasitic infection load on the studied Cattle and Goats. *A. central* was the dominant haemoparasite in both Cattle and Goats. Single infection load comparison for Cattle and Goats showed no significant variations ($p>0.05$). Table 3 compared haemoparasitic mixed infection load on the studied Cattle and Goats. Findings however revealed no significant differences ($p>0.05$).

Table 1: Comparison of variety of cattle and goats examined for isolated tick borne heamoparasites.

Comment [H9]: haemoparasites

CattleParasites percentage (%)				Goats Parasites percentage (%)				
n	**A. central**	**A. marginale**	**B. bovis**	**n.**	**A. central**	**A. marginale**	**B. bovis**	**T.ovis**
W. Fulani 103	22(21.4)	21(20.4)	12(11.6)	W.A.D 38	7(18.4)	5(13.2)	5(13.2)	3(7.9)
N'dama 81	14(17.3)	13(16.1)	7(8.6)	A. Red 85	14(16.5)	10(11.8)	9(10.6)	7(8.2)
Muturu 44	15(34.1)	14(31.8)	7(15.9)	R. S 105	17(16.2)	13(12.4)	12(11.4)	8(7.6)
Total 228	**51(22.4)**	**48(21.1)**	**26(11.4)**	**Total 228**	**38(16.7)**	**28(12.3)**	**26(11.4)**	**18(7.8)**

x^2 =22.06df=12, P>0.05

Comment [H10]: kindly fix the table formatting

Key:W.A D=West African dwarf, A. Red=Adamawa , R. S =Red Sokoto, W. Fulani=white Fulani

Central= n= number Examined, Anaplasma central, A. marginale= Anaplasma marginale, B. bovis= Bebasia bovis, B. ovis, T. ovis= Theileria ovis

Table 2: Comparison of tick heamoparasitic single infection load on the studied cattle and goats.

Comment [H11]: haemoparasitic

CattleParasites percentage (%)				Goats Parasites percentage (%)				
ni	**A. central**	**A. marginale**	**B. bovis**	**ni**	**A. central**	**A. marginale**	**B. bovis**	**T.ovis**
W. Fulani 55	(44) 22(40)	21(38.2)	11(20)	W.A.D 21	(19.1) 7(33.3)	5(23.8)	5(23.8)	3(14.3)
N'dama 33	(27.2) 14(41.2)	13(38.2)	7(20.6)	A. Red 40	(36.4) 14(35)	10(25)	9(22.5)	7(17.5)
Muturu 36	(28.8) 15(41.7)	14(38.6)	8(22.6)	R. S 49	(44.5) 17(34.7)	13(26.5)	8(16.3)	9(18.4)
Total 124	**51(40.8)**	**48(38.4)**	**26(20.8)**	**Total 110**	**38(34.5)**	**28(25.5)**	**26(23.5)**	**18(16.4)**

x^2 =22.06df=12, P>0.05

Comment [H12]: kindly fix the table formatting

Key:W.A D=West African dwarf, A. Red=Adamawa , R. S =Red Sokoto, W. Fulani=white Fulani

Central= ni= number infected, Anaplasma central, A. marginale= Anaplasma marginale, B. bovis= Bebasia bovis, B. ovis, T. ovis= Theileria ovis

Table 3: Comparison of tick haemoparasitic mixed infection load on the studied cattle and Goats

Parasitic load (%)									
Variety of ruminant	**Number Infected**	**A. c + A.m**	**A.c+ B.b**	**A.m + B.b**					
Cattle									
W.Fulani	55(44)	11 (20)	24 (43.6)	19 (34.5)					
N'dama	34 (27.2)	7 (20.6)	14 (41.2)	12 (35.3)					
Muturu	36 (28.8)	8 (22.2)	16 (44.4)	13 (36.1)					
Total	**125**	**26 (20.8)**	**54 (43.2)**	**44 (35.2)**					
		Goats							
No inf	**A.m+A.c**	**A.m+B.o**	**A.c+B.o**	**A.m+T.o**	**B.o+T.o**	**A.c+A.m**	**+B.o+T.o**	**B.o+T.o**	
W.AD	21(19.1)	3(14.3)	6(28.6)	4(19.1)	3(14.3)	2(9.5)	2(9.5)	1(4.8)	
A.Red	40(36.4)	7(17.5)	11(27.5)	8(20)	6(15)	4(10)	3(7.5)	1(2.5)	
R.Sok	49(44.9)	9(18.4)	13(26.5)	10(20.4)	7(14.3)	5(10.2)	4(8.2)	1(2.0)	
Total	**110(100)**	**19(17.3)**	**30(27.3)**	**22(20)**	**16(14.5)**	**11(10)**	**9(8.2)**	**3(2.7)**	

^{2} =26.1804, df = 20, P>0.05

key: AM=*Analplama marginale*, AC= *Anaplasma central*, BO=*Babasia ovis*, To=*Theileria ovis*

W.A D=West African dwarf, A. Red=Adamawa , R. S =Red Sokoto, W. Fulani=white Fulani

Comment [H13]: kindly fix the table formatting

Discussion

Results demonstrated the presence of *Anaplasma, Babesia* and *Theileria* species in cattle and goats in 54.8% and 48.2% respectively, with single and mixed infections.The high prevalent of parasitic infections recorded in White Fulani Cattle and Red Sokoto Goats is in accordance with [5]. This may be attributed to free range grazing on the pasture. The variability in breed specific parasitemia is in line with observations made by Agu and Amadi [6] that attribute this variability to host specific factors peculiar to individual breeds.

The relative high incidence of heamoparasite could be attributed to the favourable environmental conditions for the survival and proliferation of the arthropod vectors responsible for their transmission [7].

Single and multiple haemoparasitic infections recorded for the study are attributed to different tick borne haemoparasites that the cattle and goats were exposed to. Findings revealed that three species of parasites were singly recorded for the cattle with breeds having not more than two mixed parasites per breed as compared to more complex mixed infections in goats which recorded four single infections.Reason for this is that the more parasites the studied hosts are exposed to, the more complex the mixed infection may be.

Comment [H14]: Kindly check for the grammar in order to make the clear meaning of the sentence

Conclusion

Environmental and climatic conditions of Makurdi appears to favour many tick species. This study reviewed the prevalence of both single and mixed infections of different tick-borne pathogens in different varieties of cattle and goat slaughtered in Makurdi abattoir. The prevailing

tick–borne haemoparasites detected in were *A. central, A.marginale* and *B.bovis,* in cattle and *A. central, A.marginale, B.ovis* and *T.ovis* in goats.

References

Comment [H15]: Please use the past 5 years references

1. Zwart, D. (1985). Haemoparasitic disease of bovines. Scientific and Technical Review. *Office International des Epizootics* 4(3): 447 – 458.

2. Jenny, T. (1999). Compiled by directorate communication, National department of Agriculture in cooperation with APC – Ondersteprort Veterinary institute South Africa.

3. Makala, C.H, Mangani, P; Fujisakl, K. and Nagasawa, H. (2003). The current status of major tick borne diseases in Zambia. Veterinary Research, 34:27 - 45.

4. Lindblom, A., Wall menus, K., Nordberg, M., Grsberg, P., Eliasson, i., Pahlson, C., Nilsson, K. (2012). Seroreactivity spotted fever rickettsiae and co- infections with other tick borne agents among habitants in Central and Southern Sweden. *European Journal of Clinical Microbiology and Infectious Diseases* 32(3): 317 – 323. *LRRD* 2010., 22

5. Pam V.A., Ogbu K.I., Igeh C.P, Bit C.J. and Vincent T.G. (2013). The occurrence of gestrointestiual and Haemoparasites of cattle in Jos of Plateau State, Nigeria. *J. Animal Science Adv* 3(2):97 – 102.

6. Agu, W. E., and Amadi, I. N. (2001). Trypanosomosis of small ruminants (sheep and goats) and cattle in Abakaliki of Ebonyi state, Nigeria. *Tropical veterinary parasitology* 19 (2):1 – 8.

7. Adamu, B., Samallaand B.C., Musa (2012). Prevalence of Haemoparasites of sheep and Goats Slaughtered in Banclic Abatthoir. *International Journal of Applied Biological Research*. 4: 128 – 133.