

# Survey of Haemoprotozoan Parasites Infection in Red Sokoto Goats in Makurdi Metropolis, Nigeria

## RESEARCH ARTICLE

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## ABSTRACT

Haemoparasitemia of cattle slaughtered in three abattoirs in Makurdi metropolis was determined between the months of November 2017 to January, 2018. Blood samples were collected from cattle. Microscopic examination was carried out using thin film giemsa stain technique. Findings from the study revealed that, of the 200 cattle examined, 77 (38.5%) were positive for haemoprotozoan parasites. Males had higher prevalence 45(22.5%) than females 32(16.0%). Abattoir-specific prevalence indicated 35(17.5%), 28(14.0%) and 14(7.0%) for Wurukum, Modern market and Wadata respectively. The three genera of parasites identified were *Anaplasmaspp*, *Theileriaspp* and *Babesiaspp* indicating 48(24.0%), 16(8.0%) and 16(6.5%) respectively. According to the body condition of the cattle, those rated poor had 47(23.5%) positive, 28(14.0%) for fair and 2(1.0%) for good. Double infection indicated 12(6.0%) positive. Breed specific infection showed 58(29.0%), 12(6.0%), 4(2.0%), 3(1.5%) for white Fulani, crossbreed, sokotogudali, red bororo respectively ( $P > 0.05$ ). The study therefore calls for more research to identify the species of the parasites for control and prevalence measures to eradicate haemoparasites.

**Keywords:** Cattle, Haemoparasites, Abattoir, Makurdi.

## INTRODUCTION

Haemoparasitic infections in cattle have a global distribution. This is due to the fact that their vectors; ticks and blood sucking flies, also have a global distribution. The worldwide incidence of haemoparasitic infection in cattle has been severally reported by different workers [1].

Cattle owned by resource-poor farmers are kept on communal rangelands where they are grazed extensively. Communal grazing is characterized by poor management of cattle and low productivity. Consequently, disease and parasitism are rife and constitute major threats to cattle production in Nigeria. 90% of the cattle populations in Nigeria are raised under the pastoral husbandry system of Fulani herders. Cattle in Nigeria are infected with a wide variety of vector-borne haemoparasite [2].

The most economically important genera are the *Trypanosoma* (*T.vivax*, *T. congolense* and *T. brucei*), *Babesia* (*Bebesiabigemina*, *B. bovis*), *Anaplasma* and *Theilaria* (*T. parva* and *T. velifera*)

[3]. African animal trypanosomosis and Bebesiosis are considered as the most important constraints to the health and improved productivity of cattle in Sub-Sahara Africa [4].

Haemoparasite have generally been shown to cause destruction to red blood cells resulting in anaemia, jaundice, anorexia, weight loss, and infertility [5]. Potential outbreak of blood protozoa may occur if cattle are moved from humid area to the semi-arid region, or when cattle are transported from the semi-arid region to humid region where the vectors are prevalent.

Makurdi Benue State falls within the humid part of the country where the conditions are suitable for the breeding of several vector species such as ticks and tsetse fly. These parasites of cattle cause major economic losses globally to cattle, beef, industries and farming communities as a consequence of reduced conversion and weight gain and the condemnation of affected organs found after slaughter.

Haemoparasite is an emerging disease of cattle and it poses a major threat to their production and management. It produces a number of symptoms which if not treated may lead to death. Relatively, little published information is available on the infection within Benue state, Nigeria where most people at the slaughter houses and even rarer are not aware of this increasing menace. It is for this reason that this work seeks to address the growing concern of haemoparasitic infection through a survey of cattle slaughtered at some abattoir with a view of providing basic information that will add to the existing information on the subject area needed for the control and prevention.

## MATERIAL AND METHOD

### Study Area

The study was carried out at three selected abattoirs (Wurukum, Wadata market and modern market) in Makurdi metropolis. Makurdi is the capital city of Benue State, in the North Central region of Nigeria. It is located in the tropical grassland zone with an area of about 69,436km<sup>2</sup> and lies within latitude 7°43N and longitude 8°32E. It lies within the savannah zone with records of average rainfall of 1,237mm and an estimate population of 500,797.

### Sample Collection

3mls of blood were randomly collected from 200 cattle of both sexes at the point of slaughter into EDTA (Ethylene Diamine Tetra Acetate Acid) bottles and were labeled appropriately. They were transported to the Department of Biological Science Laboratory Benue State University for examination. Parameters such as the sex, age and body condition of each animal was noted and recorded accordingly. Sex differentiation was based on the appearance of external genitalia (presence or absence of testis and udder), while body condition was recorded as poor, medium and good classes. 1 up to 3 grading system according to the procedure recorded by [6].

### Parasitological examination of blood sample

A thin blood smear was prepared from each blood sample using the standard method described by [7]. A drop of blood was placed on one end of a clean glass slide, then using a cover slip to spread the blood by allowing the spreader to touch the blood at an angle of 45° and then spread gently but firmly along the surface of the horizontal slide so that the blood is dragged behind the spreader to form the film with a feathered edge. This was then air-dry using the slide racks, and fixed in methanol for 5minutes, then stained in 1:10 Giemsa and Buffer dilution for 30 to 40minutes and then rinsed with distilled water. It was then allowed to air dry again using the slide racks. The smears were examined under the light microscope at x100 objective magnification (oil immersion) for presence of haemoparasites. Parasites were identified using the key standard characteristics of the parasites described by [8-9].

## Data Analysis

Data was entered into SPSS (Statistical Package for Social Sciences), Chicago, IL, USA version 20 and analyzed using Chi-square at 95% confidence level and  $p < 0.05$  was taken as significant value. Prevalence was presented as percentages.

## RESULTS AND DISCUSSION

### Prevalence of Haemoparasitic Infection in relation to sex

Out of the 200 cattle examined, 77(38.5%) were infected with haemoparasites. Males 45(22.5%) recorded a higher prevalence compared to the females 32(16.0%). There was a significant difference between the rate of infection in males and females ( $p < 0.05$ ) (Table 1). The highest rate of infection occurred in white Fulani with prevalence of (29.0%) and the lowest prevalence occurred in red buroro (1.5%). There was however no significant association between breed of cattle and infection. ( $P > 0.05$ ) (Table 2). The body condition of 23.5% of the cattle was poor, while 1.0% was good. There was a significant difference in the rate of infection among these body conditions. ( $P < 0.05$ ) (Table 3).

In relation to different sampling sites Wurukum abattoir recorded the highest prevalence (17.5%), while Wadata abattoir recorded the least prevalence (7.0%). There was a significant relationship in location specific parasitemia ( $p < 0.05$ ) (Table 4).

The parasites recovered from the sampling sites include *Anaplasma (spp)* (24%), *Babesia (spp)* (6.5%) and *Theileria (spp)* 16(8.0). There was however a significant difference in rate of parasitic infection ( $p < 0.05$ ), (Table 5). However, a 6.0% prevalence of *Anaplasma* and *Babesia (spp)* co-infection was also recorded.

Table 1: Prevalence of Haemoparasitic Infection in Relation to Sex

Sex	Number examined (%)	Number positive (%)
Male	149	45 (22.5)
Female	51	32 (16.0)
Total	200	77 (38.5)

( $P = 0.00df = 1$ ).

Table 2: Prevalence of Haemoparasitic Infection in Relation to Breed

Breed	Number examined (%)	Number positive (%)
White Fulani	149	58 (29.0)
Sokotogudali	12	4(2.0)
Cross breed	27	12(6.0)
Red buroro	12	3(1.5)
Total	200	77 (38.5)

( $P = 0.688, df = 3$ )

Table 3: Prevalence of Haemoparasitic Infection in Relation to Body Condition

Body Condition	Number examined (%)	Number positive (%)
Poor	47	47(23.5)
Fair	75	28(14.0)
Good	78	2(1.0)
Total	200	77 (38.5)

(P = 0.00, df = 2)

Table 4: Prevalence of Haemoparasitic Infection in Relation to Location

Locations	Number examined (%)	Number positive (%)
Wurukum	70	35(17.5)
Modern market	69	28(14.0)
Wadata	61	14(7.0)
Total	200	77 (38.5)

(P = 0.01, df = 2)

Table 5: Prevalence on Protozoan Haemoparasitic Infections

Parasite	No of Parasite recovered (%)
	N=200
<i>Anaplasma (spp)</i>	48(24.0)
<i>Babesia (spp)</i>	13(6.5)
<i>Theileria (spp)</i>	16(8.0)
Total	77 (38.5)

(P = 0.00, df = 3)

The 77(38.5%) prevalence rate of haemoprotozoanparasitemia in this study is relatively high. This result is in close conformity with that of [10-11] who separately reported a relatively high prevalence of 41.8%, 33.0% and 51.0% respectively. According to [12], the high incidence of haemoparasities recorded could be as a result of favourable environmental condition that helps in the survival and proliferation of the arthropod vectors responsible.

High prevalence of haemoparasites agrees with findings by [10], that showed the prevalence of 32.5%. With 11% for *Anaplasmaspp* and *Babesiaspp* respectively. The relatively small number of *Theileriaspp* suggests that cattle play little role in their epidemiology [13]. The high prevalence rate of *Anaplasmaspp* could be due to the broad range of vectors and the difficulties of efficient vector control [14] that transmit *Anaplasma spp*.

Breed-specific parasitemia shows that white Fulani had the highest prevalence of (29%), cross breed (6%), Sokotogudali (2%), redburoro (1.5%). It can be thought of that, the difference in prevalence between the breeds could be as a result of some genetic factors which either foster or reduce susceptibility of the specific breed to infection and also the high infection rate among white Fulani could be attributed to their mode of life which is usually free ranging which bring them in contact with the tick vectors. In addition, these breeds of cattle are the most preferred by pastoralist whereas the low infection rate among Sokoto Gudali, red buroro and cross breed could be attributed to the fact that these breeds of cattle are usually kept at low concentration for fattening and are usually restricted. Hence, they are less exposed to tick infestation.

The finding of the study revealed higher infection rate of haemoparasites in cattle with poor body condition score (23.5%). Progressive emaciation in cattle in some instance might be due to physiological wasting away or poor nutrition, poor nutrition lowers the resistance of the animal to infectious disease, thus enhancing the establishment of haemoparasitaemia and increasing

the pathogenicity of the parasites [11]. It is also well known that adequately fed animals are more able to tolerate parasitism than animals on a low plane of nutrition. Moreover, haemoparasitaemic animals are reported to be anemic and emaciated with poor performances and decreases in milk and meat production [12]. This means that as haemoparasites increased in the blood, the infected animal continues to emaciate and vice versa and is in line with the report of [15].

The finding of this study also revealed a higher haemoparasitemia in males cattle compared to the females. Moreover, most of the Fulani pastoralist keep large number of female cattle while the males are usually sold out thus leading to high number of sampled males at the abattoir.

## CONCLUSION

In this study, Survey of Haemoprotozoan Parasites Infection in Red Sokoto Goats in of Cattle in Makurdi Metropolis is presented. From the results, the observed mixed parasites in the study could be due to the mixed livestock nomadic grazing system perceived by the Fulani pastoralist. Where the cattle are usually herded and grazed with other ruminant. With respect to location, prevalence showed that Wurukuma battoir had 35(17.5%), Modern market (14.0%), Wadata 14 (7.0%). The locations of sampling did show statistical significance between each other in relation to the positive samples observed. It is however important to note that the conditions under which the animals are kept preparatory to slaughter can increase slightly, the rate of infection in such an area or location. For this reason, it is suggested that cattle rarer should ensure a routine examination of their animals by administration of vaccines and other drugs to curb infection by haemoparasites.

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