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Haemoparasitic Infection in Red Sokoto Goats in Makurdi,North Central Nigeria

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RESEARCH ARTICLE

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ABSTRACT

Among the various factors that cause decrease in productivity and maximum yield of livestock in Sub-tropical Africa, haemoparasitic agents causing devastating diseases are the most prominent. This study was carried out from October 2017 through January 2018, to check for the presence of haemoparasites in goats, using thin blood film procedure. Blood samples were collected from 240 Red Sokoto breed of goats from four abattoirs (Wurukum, Wadata, North bank, and Modern Market abattoirs) in Makurdi town. Of the 240 samples examined, 59(24.6%) were positive for parasites, out of which 14(5.8%) were males and 45(18.8%) were females. Wurukum and Wadata markets had a tie of 19(7.9%) infected, North Bank, 14(5.8%) and Modern market, 7(2.9%). Sex and location of the goats showed no significant difference ($p>0.05$).Parasites seen were *Babesiaspp*[33(13.8%)], *Anaplasmaspp*[13(5.4%)], *Theileriaspp*[9(3.8%)] and *Trypanosomaspp*[4(1.7%)], showing significant difference ($p<0.05$), statistically. Cases of multiple infection were also recorded in four (4) goats, two(2) animals had *Babesiaspp/Anaplasmaspp*, while *Babesiaspp/Theileriaspp* and *Theileriaspp/Anaplasmaspp* both occurred in one animal each. The study therefore confirms the presence of haemoparasites in goats slaughtered at the various abattoirs in Makurdi. This therefore paves way for in-depth study on the conditions under which goats are reared, their productivity and breeding capabilities with other animals kept under healthy and disease controlled environment. Hence, suggest measures to help tackle spread of parasites and further harm caused to livestock system of the country.

Keywords: Heamoparasites, Infections, Goats.

INTRODUCTION

Sheep and goats form an important part of livestock industry in the sub- Saharan Africa. They serve as valuable supplement to cattle in terms of animal protein supply for the teaming population including provision of manure for field crops. It has been established that over 90% of sheep and goats in the sub- Saharan Africa are found in East and West Africa [1]. These animals are important source of investment especially in the rural areas including Nigeria, where livestock is regarded as capital investment in the absence of banking facilities as well as serving as an important source of meat, milk, skin and socio- cultural values.

The benefits derived from sheep and goats in the tropics are far below the expected due mainly to low productivity. This is due to numerous factors of which disease is the most important [2].

Goats in sub-sahara Africa may be infected with a wide variety of parasites among which the gastrointestinal parasitic infection are the most commonest and these include Helminthic infections especially *Haemonchus contortus*, *Trichostronglus, Cooperi a*and protozoan diseases including Coccidiosis [3-4] as well as economically important Vector-borne prokaryotic and eukaryotic haemoparasites such as the *Rickettsiae*, *Anaplasma* and *Ehrlichia* (cowdria) and the protozoan parasites *Theileria, Babesia* and *Trypanosoma* [4,5].

Haemoprotozoan parasites are the main livestock production constraints all over the world, causing serious economic losses.Tick and tick-borne diseases (T and TBDs) still remain a major threat to animals in tropical and sub-tropical countries including Nigeria. In case of these blood parasites infection, up to 75% erythrocytes may be destroyed in fatal cases and even in milder infection, so many erythrocytes are destroyed, then a severe aneamia results. Babesiosis, Theileriosis and Ehrelichosis (cowdriosis and Anaplasmosis) are the major TBDs that cause serious diseases among central and East African animals including goats. This is however not to completely neglect the effect and subsequent damage caused by *Trypanosoma spp* which causes sleeping sickness to animals. The direct losses caused by the parasites are attributed to acute illness and death, premature slaughter and rejection of some body parts at meat inspection. Indirect losses include the reduction of productivity potential such as decreased growth rate, weight loss in young growing animals and late maturity of slaughter stock [6]. In order to pave way for launching sustainable animal disease controlling/minimizing in many parts of the country and the world at large, this study aims to investigate haemoparasitic infection in goats in Makurdi abattoirs.

MATERIAL AND METHOD

Description of Study Area

Makurdi Local Government area was founded in 1976. It lies on the South Bank of the Benue River. Makurdi rapidly developed into a market and transportation center. Following the division of Benue Plateau states into two states in 1976, Makurdi was selected because it is the capital of Benue state.

Council wards in Makurdi local government area include: Agan, Mbalagh, NorthBank, Central South Mission, Ankpa/Wadata, Modern Market, Fiidi, Bar and Wailomayo council wards. Major indigenous groups in the local government Area are Tiv, Idoma, Igede, Jukum and Etulo. Others are Hausa, Igbo and Yoruba. While farming is the major occupation in the local government, education is the dominant industry [7].

Makurdi local government is also endowed with the establishment of many educational institutions, prominent among which are the Murtala College of Arts, Science and Technology (1976), the Federal University of Technology, an Assemblies of God Commercial Institute, a Government Craft School, the federal University of Agriculture and Benue State University. Other institutions like Nursery/ primary and secondary schools abound. Some of the schools are owned by the government, mission, non- governmental organizations (NGOs) and private individuals [7].

Makurdi has a population of about 297,398 people [8]. Makurdi has majorly six (6) abattoirs; Wurukum Market abattoir, Wadata Market Abattoir, Railway Market Abattoir North bank Market abattoir, Modern market abattoir, and High Level Market abattoir.

This study made the choice of four of these abattoirs for the sake of diversity in species availability in all these abattoirs so as to check the distribution of these parasites in the abattoirs and from the various places of production of the goat species.

Sampling method

Blood samples were collected from slaughtered goats randomly, at the abattoirs from November to December 2017.A random sample of two hundred and forty (240) goats was done across the four abattoirs selected in Makurdi. The research used simple Random Sampling technique to select the goats. The Red Sokoto breed of goats were used because, past researchers in the North Central axis of Nigeria to some extent, have not been able to deal specifically with this species. This species of goats are commonly reared in Benue State, and so it forms part of the meat supply for the town.

Sample collection

5mls of blood was collected from the severed jugular vein into a bijou bottle containing Ethylene Diamine Tetra Acetate (EDTA). The samples were properly labeled and transported to the laboratory immediately in ice packs.

Parasitological analysis

On arrival to the laboratory, the blood samples were immediately examined for the presence of parasites using wet blood film, Giemsa stained thin blood. Wet blood films were prepared as described by [9].

A drop of blood was placed onto a clean glass slide and then followed by placing a clean coverslip on the drop of blood which spread the latter into a monolayer of cells. This was then examined for trypanosomes movement using X40 objective lens.

A thin blood smear was prepared from each blood sample by placing a drop of blood on one end of a clean glass slide, a spreader was then used to spread the blood by allowing the spreader to touch the blood 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. The film was air-dried and fixed with methanol for three to five minutes, stained with giemsa followed by buffer dilution and stained for twenty five to thirty minutes then rinsed with distilled water and allowed to dry. The smear was examined with X100 magnification (oil immersion) for presence of parasites and identification according to [9].

Statistical analysis

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

RESULTS AND DISCUSSION

A total of 240 goats were sampled for this study from the four selected abattoirs. There were 51 males and 189 females. The total number of infected goats was 59. The rate of infection in male goats was 5.8% while rate of infection in female goats was 18.8% (Table 1.) Statistical analysis showed that there was no significant difference in sex ($p>0.05$)

Of the parasites found, *Babesia* spp had the highest rate of infection of goats;13.8% while the least rate of infection was seen in *Trypaosoma* spp; 1.7%. *Anaplasma* spp was 5.4%, *Theileria* spp was 3.8% (Table 2) there was significant difference between infection and parasites observed.

Cases of multiple infections where more than one parasite was found to infect a particular sample were noticed. Multiple infection involving *Anaplasma* spp and *Babasia* spp was 0.8% as compared to that of *Babesia* spp and *Theileria* spp; 0.4%, while *Theileria* spp and *Anaplasma* spp was 0.4%(Table 3). Infection in relation to the presence of more than one parasite was statistically significant. Of the four locations sampled, Wadata and Wurukum had the highest infection rates where in both places,19(2.9%) samples were infected. The least infection rate was record in Modern Market where 7(2.9%) of samples were infected. North bank recorded

14(5.8%) infection (Table 4). Statistical analysis showed that there was n significant difference between location and infection of the goats (p>0.05).

Table 1: Parasitic Infection in Goats According to Sex

Sex	Number examined	Number infected(%)
Male	51	14(5.8)
Female	189	45(18.8)
Total	240	59(24.6)

χ^2=0.287, df=1, P=0.592

Table 2: Rate of Infection According to the Type of Parasite Seen

Parasite	Number positive	Rate(%)
Babesiaspp	33	13.8
Anaplasmaspp	13	5.4
Trypanosomaspp	4	1.7
Theileriaspp	9	3.8
Total	59	24.6

χ^2=240.00, df=4, P=0.000

Table 3: Multiple Infections of Parasites in Goats

Multiple infection	Number positive	Rate (%)
Babesiaspp and Theileriaspp	1	0.4
Anaplasmaspp and Babesiaspp	2	0.8
Theileriaspp and Anaplasmaspp	1	0.4
Total	4	0.02

χ^2=12.479, df=3, P=0.006

Table 4: Parasitic Infection of Goats According to Location.

Location	Number examined	Number infected(%)
Wurukum	71	19(.9)
North- Bank	61	14(5.8)
Modern Market	43	7(2.9)
Wadata	65	19(7.9)
Total	240	54(24.6)

χ^2=2.626, df=3, P=0.453

The species of haemoparasites that were found and reported in this study are in absolute conformity with those reported earlier by researchers on the range of haemoparasites found among livestock in Nigeria and specifically, in the North Central Region [10]. *Babesia* spp with occurrence rate of 13.8% and the highest among the four haemoparasites observed also agrees with the findings of [10], as being the highest occurring parasites. The relatively small number of *Tryanosoma* spp, indicates that small ruminants play little or no role in their (Trypanosomes) epidemiology.

Upon investigation at the abattoirs where supply and slaughter of the goats is done, it was inferred that most supply of the goats is from the far Northern part of Nigeria which is normally not characterized by thick forest and extreme humidity and so do not support the transmission of trypanosomes by tick vectors as can be found in the rainforest regions of the country. It is also not new that camels are herded together with small ruminants in some parts of Northern Nigeria. Therefore, disease transmission among these animals is high as a result.

There was also no observed statistical significance between infection and sex of the goats and this may be due to the reason that no sex has been found to possess greater resistance to the parasites, this is not however, to undermine the fact that the number of female animals sampled were infected more with the parasites and this can be attributed to the common reason that the females are kept for longer periods than the males at their locations of breeding, mostly for the purpose of reproduction and hence are more susceptible or more open to getting in contact with the parasites due to the longer duration which they live. Additionally, the locations of sampling did not also show any significant difference between each other on the basis of the number of parasites found. 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.

CONCLUSION

The result of this study is a clear pointer that haemoparasites are common with most animals slaughtered in abattoirs in Makurdi. One will therefore not be left in doubt that these animals carry this infection right from their places of production and as studies have revealed, the haemoparasites constitute great losses to farmers in terms of productivity, causing direct loss in milk yield, parturition rate, meat quantity and quality, and many other factors which may even lead to death of the animal if proper attention is not paid to these parasites.

Having established that haemoparasites are of devastating effect to the wellness and good productivity of livestock, adequate sensitization and awareness workshops and training should be introduced to livestock farmers and herders so as to open them up to the resulting effects of livestock diseases. Proper farm management techniques should be adhered to by farmers and livestock managers so as to reduce or stampede the spread of haemoparasites. Chemotherapy should be employed by farmers so as to reduce the spread and fluent propagation of parasites. Quarantine of infected animals should be done regularly in order to restrain their contact with other uninfected animals to avoid further spread. .In order to avoid spread of zoonotic parasites to humans upon consumption, animals should be screened before further distribution to markets.

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