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Blood Parameters and Prevalence of Caprine Babesiosis at Azare Abattoir of Bauchi State, Nigeria

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Abstract

Babesiosis is a haemolytic disease caused by intra erythrocytic protozoan of the genus *babesia*. It is a disease of small and large ruminants. Its prevalence among goats slaughtered at the Azare abattoir of Bauchi state, Nigeria was determined in this study. A total of 30 goats (mixed sexes) raised on extensive and semi intensive system of management were selected and slaughtered at the Azare abattoir, Bauchi state, Nigeria. The blood samples were collected from the jugular vein of the animals at slaughter in bottles containing ethylene diamine tetra acetic acid (EDTA). The blood samples were taken to the protozoology laboratory for hematology, serum biochemistry and ELISA test. Sex significantly ($P < 0.05$) influenced the hematological and serum biochemical parameters of red Sokoto goats with does having higher packed cell volume values (46.11 %) than the bucks (41.21 %). The hemoglobin (8.21-8.61 g/dl), white blood cells ($11.25-11.71 \times 10^3/\text{mm}^3$), mean corpuscular hemoglobin (29.11-32.31 g/dl) and mean corpuscular hemoglobin are statistically similar ($P > 0.05$). On the other hand the results of prevalence of babesiosis in red Sokoto goats showed 10 % prevalence rate in both buck and does with 20% total prevalence rate.

Keywords: Red Sokoto goats, babesiosis, haematology, protozoa

Introduction

The average of protein intake of Nigerian is less than 35g/capita/day recommended by Food and Agricultural Organization of the United Nations (FAO, 1990). A problem caused by low production of our animals with increase in population for improve animal protein intake there is the need for improvement in the production of meat and other protein sources and other protein sources from the livestock industry. Goat production offers a great potential in this respect due to their relatively ease of breeding, management, ability to subsist on forages, hardiness, adaptation to a wide of range of ecological zones (Bogoro *et al.*, 1999; Maidala *et al.*, 2014). Goat enjoys a wide acceptability among different several cultural groups because there is no taboo against them (Peacock, 1996). The small sizes relatively to cattle contribute to the wide rearing in farms. They serve as insurance against crop failure because they can be converted to cash in times of need. Their ease of management, distribution, adaptability to a wide range of ecological zones, ability to utilize poor quality fibrous feeds and hardiness make them livestock of choice compared to other animals (Umanna *et al.*, 2011). Goats produce very past with tropical breeds producing twins and triplets hence a flock can quickly expand until it forms major part of the family asset (Peacock, 1996). Goats are considered superior in the utilization of poor quality fibre forages than other livestock (Maidala *et al.*, 2014).

The significance of determining haematological and biochemical indices of domestic animals has been well documented (Opera *et al.*, 2006). There is a great variation in the haematological and biochemical parameters as observed between breed of goats (Tambuwal *et al.*, 2002) and in this regard, it may be difficult to formulate a universal metabolic profile test for goats. These differences have further underlined the need to establish appropriate physiological baseline values for various breeds of livestock in Nigeria, which could help in the realistic evaluation of the management practice, nutrition and diagnosis of their health condition. Goats' play an important role in many communities in Nigeria and the diverse role of goats are hindered by lack standard documentation of hematological parameters, serum biochemical parameters and effects of diseases on their performance.

Babesiosis is a haemolytic disease caused by intra erythrocytic protozoan of the genus *babesia*. It is a disease of small and large ruminants, characterized by fever which may be sudden in onset (Onoja *et al.*, 2013). *Babesia* species are transmitted by ticks, which become infected when they ingest parasites in the blood of infected animal. Inside the tick, *Babesia* zygotes multiply as 'vermicules,' which invade many of the ticks organs including the ovaries; *Babesia* species are readily passed to the next generation of ticks in the egg. The documentation of these parameters can assist the stockmen and women the need to establish appropriate physiological baseline values for various breeds of livestock in Nigeria, which could help in the realistic evaluation of the management practice, nutrition and diagnosis of their health condition.

The study was conducted to assess the hematological profile, serum biochemical parameters and the prevalence of Babesiosis in goats in a semi-arid environment.

Materials and Methods

Experimental site: Katagum local government is situated on the northern part of Bauchi state, Nigeria. It is located between latitudes 11° 42' and 11° 40' and longitude 10° 31' and 10° 11' east (Anon, 2009). It shares common boundary with Itas/Gadaru

local government in north west, Jama'are to the west, Dambam to the east, Misau to the south west, Giade to the south and Shira to the southwest (Azare, 2013). It has a landmass of 1,120 square kilometers (NPC, 2009). The climate of the study area is controlled by the Inter tropical convergent zone (ITCZ) which is marked by the rainy and dry season. The major climate elements that influence the climate of the study area and affecting the farming system are temperature and precipitation (rainfall), the annual temperature ranged between 22-33^o C from April to May (Bashir *et al.*, 2001). The mean annual rainfall ranged between 615.6-985mm with peak between July- Augusts. The study area is in the Sudan savanna, the vegetation is greatly determined by the nature of the soil. The soil in the study area is aerosol with sandy and loamy sand texture and a high percolation rate.

Blood sample collection: Animals were raised in extensive and semi intensive system of management. Animals were selected when presented for slaughter and presence of ticks was considered in the selection criteria. Thirty animals were selected which comprised of both buck and goat. A paired blood samples were collected from the jugular vein of the animals at slaughter in bottles containing EDTA. Of the 30 animals sampled at Azare abattoir. The animals were bled by Veni-puncture using hypodermic needle and syringes and taken to protozoology laboratory for hematology, Serum biochemistry and ELISA test respectively. Babesiosis can be confirmed by microscopic examination of stained blood smears. Serological testing for antibodies may also be useful, particularly in convalescent animals, or for assessing the disease status of an individual or herd, ELISA tests have been developed.

Data analysis: The data set generated were analyzed by Minitab statistical software (Steel and Torrie, 1980) and the prevalence rate was analyzed using percentage.

Results and Discussion

Table 1 showed the effect of sex on hematological and serum biochemical parameters of red Sokoto goats. Packed cell volume was significantly affected the blood parameters ($P < 0.05$) with goats having higher values than bucks, this can be attributed to higher metabolic rate in female animals than male animals coupled with hormonal activities and values reported in this study are higher than those reported by Ladokun *et al.* (2014) in Abeokuta on west African dwarf goats and red Sokoto goats. The heamoglobin (8.21-8.61 g/dl), white blood cells ($11.25-11.71 \times 10^3/\text{mm}^3$), mean corpuscular heamoglobin (29.11-32.31 g/dl) and mean corpuscular heamoglobin are statistically similar ($P > 0.05$) and values fall within the range of values reported by Mitruka and Rawnsley (1977). Similarly, all the heamatological and serum biochemical parameters reported in this work are in conformity with the earlier reports of Etim *et al.* (2014) on sheep and goats.

Table 1: Heamatological and serum biochemical parameters of goats in Azare abattoir

Blood parameters	Bucks	Does	LS
Packed cell volume (%)	41.21 ^b	46.11 ^a	5.12*
White blood cell ($\times 10^3/\text{mm}^3$)	11.25	11.71	0.21NS
Heamoglobin (g/dl)	8.61	8.21	0.3.7NS
Heamoglobin concentration (g/dl)	30.11	32.18	2.07NS
Mean corpuscular heamoglobin (pg)	29.11	30.11	0.19NS
Mean corpuscular heamoglobin concentration (g/dl)	27.11	30.11	2.29NS

L.S= Level of significant, * = ($p < 0.05$)

Table 2 showed the prevalence of babesiosis of red Sokoto goats, result showed 10 % prevalence rate in both bucks and does with 20% total prevalence rate. This result disagrees with the findings of Onaja *et al.*, (2013) who reported 0% prevalence rate of goat babesiosis in Zaria north central Nigeria. The overall prevalence rate of babesiosis was 20% with 10% in bucks and 10% in does. Proper control measures of babesiosis and control of ticks is recommended. The results obtained in this work showed that blood parameters of goats in the study area fall within the earlier reports and are significantly affected by the sexes. Babesiosis prevailed in the study area and government and other stake holders attention is needed to prevent the infection of new cases so that the disease can be controlled.

Table 2: Prevalence of babesiosis among goats in Azare abattoir

Prevalence	Bucks	Does	Total
	10%	10%	20%

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