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Haematology of Sokoto Gudali Cattle as Influenced by Sex and Breed

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Absract: The effects of sex and breed on the haematological parameters were determined in the Sokoto Gudali breed of cattle. The Sokoto Gudali cattle had significantly higher Haemoglobin concentration (Hb) ($p<0.01$) and Mean Corpuscular Haemoglobin Concentration (MCHC) ($p<0.001$) than the White Fulani cattle. However, the values of mean Corpuscular Haemoglobin (MCH), Mean Corpuscular Volume (MCV) and Packed Cell Volume (PCV) and the Red Blood Cell (RBC), total White Blood Cell (WBC), neutrophil, lymphocyte, eosinophil and monocyte counts were similar in the two breeds of cattle. There were no sexual dimorphism ($p>0.05$) in the mean values of Hb concentration, MCH, MCHC, MCV and PCV of the Sokoto Gudali cattle. Also, the RBC, WBC, neutrophil, lymphocyte, eosinophil and monocyte counts were similar in the male and female.

Key words: Breed, cattle, haematology, Sokoto Gudali, White Fulani

INTRODUCTION

There are 3 dominant Zebu breeds of cattle in Nigeria; these are the White Fulani cattle, the Gudali cattle and the Red Bororo cattle. The Gudali cattle are further divided into two distinct types- the Sokoto Gudali (or Bokolooji) and the Adamawa Gudali. The Sokoto Gudali are typical of the shorthorned Zebu found in West Africa and has a uniform cream, light grey or dun fur, the dewlap and skin folds are highly developed and the horns are almost absent. Although the Sokoto Gudali stereotypically occurs mainly in the northwest of Nigeria, in reality it is now distributed widely throughout the country. They are estimated to represent some 32% of the national herd (Williamosn and Payne, 1984). Most of the studies on the haematology of the Zebu cattle have been done on the White Fulani cattle. These reports include those by various researchers (Oduye and Okunaiya, 1971; Saror and Coles, 1973; Olusanya, 1979; Rekwot *et al*., 1997; Olayemi *et al*., 2001; Olayemi and Oyewale, 2002a, b; Olayemi, 2004). There is however, a dearth of information on the normal haematology of the Sokoto Gudali cattle. Our search revealed only reports on the influence of trypanosomosis on the haematology of the Sokoto Gudali cattle (Murray and Dexter, 1998; Antia *et al*., 1993; Ajuwape and Antia, 2000). Also, our extensive search of literature revealed that the blood pictures of Sokoto Gudali and White Fulani cattle have not been compared before.

In our previous report, we observed breed differences in the haematological parameters of cattle breeds in Nigeria. The White Fulani cattle were observed to have significantly higher Hb, MCH and MCHC values than the N'dama cattle (Olayemi and Oyewale, 2002a). We also reported that that the Kuri breed of cattle had significantly higher Hb and PCV values than the White Fulani cattle (Olayyemi *et al*., 2006). In continuation of the study, we present in this study the influence of sex and breed on the haematology of Sokoto Gudali cattle.

MATERIALS AND METHODS

A total of 30 cattle were used for this present study, 20 of these were of the Sokoto Gudali breed of cattle (10 males and 10 females), the remaining 10, were White Fulani breed of cattle (5 males and 5 females). The animals used were among the animals brought for slaughter at the Bodija abattoir, Ibadan, Nigeria. All are apparently healthy with ages ranging between 2 and 5 years. The Sokoto Gudali cattle and the White Fulani cattle were reared in the Northern part of Nigeria and transported to the abattoir by road. These animals are reared predominantly under the extensive system of management. Both breeds were reared under a climate of high temperate that characterizes the sub-Saharan Africa. Both groups of cattle had access to water and grass during transport to the abattoir.

The blood samples were obtained from the jugular vein using sterile syringes and needles and into bijou bottles containing Ethylene Diamine Tetraacetic Acid (EDTA) (2 mg mL^{-1} of blood) as anticoagulant. RBC and WBC were counted with haemocytometer. PCV was determined using the microhaematocrit method.

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Haemoglobin concentration was measured by the cyanmethaemoglobin method. From the above data the MCH, MCHC and MCV were calculated (Jain, 1986). Blood smears were stained with Giemsa stain for differential WBC counts. All data were analyzed statistically using the Student's t-test.

RESULTS

The erythrocyte values of values of Sokoto Gudali and White Fulani breeds of cattle are shown in Table 1. The Hb concentration and MCHC were significantly higher ($p<0.01$ and $p<0.001$, respectively) in the Sokoto Gudali than White Fulani cattle but the values of RBC, PCV, MCV and MCH were similar in the two breeds.

Table 1: Erythrocyte values (mean±S.D) of the Sokoto Gudali and White Fulani breeds of cattle

Parameters	Sokotogudali (20)	White fulani (10)
PCV (%)	34.65±5.34	35.20±2.30
RBC ($\times10^{12}$ L^{-1})	09.63±3.04	08.63±2.11
Hb (gd L^{-1})	11.18±1.87	09.31±1.41*
MCV (fl)	38.20±9.88	43.58±11.46
MCH (pg)	12.36±3.14	11.66±4.34
MCHC (gd L^{-1})	32.42±3.78	26.28±3.93**

Number of animals in parenthesis, Value significantly lower than that of Sokoto Gudali cattle at *p<0.01 and **p<0.001

Table 2: Erythrocyte values (mean±S.D) of the Sokoto Gudali breed of cattle as influenced by sex

Parameters	Male (10)	Female (10)
PCV (%)	35.00±6.67	34.30±3.95
RBC ($\times10^{12}$ L^{-1})	9.63±3.04	9.50±3.09
Hb (gd L^{-1})	11.18±1.87	10.02±1.94
MCV (fL^{-1})	38.20±9.88	38.60±10.06
MCH (pg)	12.36±3.14	12.15±3.37
MCHC (gd L^{-1})	32.42±3.78	31.58±4.07

Number of animals in parenthesis, Value were not significantly different in the two sexes (p>0.05)

Table 3: Leucocyte values (mean±S.D) of sokoto gudali and white fulani breeds of cattle

Parameters	Sokoto Gudal^{-1}i (20)	White Full ani (10)
WBC ($\times10^{9}L^{-1}$)	11.22±5.26	11.98±4.60
Lymphocyte ($\times10^{9}L^{-1}$)	5.59±2.95	5.89±3.83
NeutrophiL ($\times10^{9}L^{-1}$)	5.57±3.63	6.00±2.91
EosinophiL ($\times10^{9}L^{-1}$)	0.02±0.04	0.05±0.13
Monocyte ($\times10^{9}L^{-1}$)	0.052±0.02	0.035±0.11
BasophiL ($\times10^{9}L^{-1}$)	0	0

Number of animaLs in parenthesis, Value were not significantl different in the two breeds of cattle (p>0.05)

Table 4: Leucocyte values (mean±S.D) of the Sokoto Gudali breed of cattle as influenced by sex

Parameters	Male (10)	Female (10)
WBC ($\times10^{9}L^{-1}$)	10.20±5.30	12.24±5.29
Lymphocyte ($\times10^{9}L^{-1}$)	5.26±2.69	5.92±3.29
Neutrophil ($\times10^{9}L^{-1}$)	4.78±3.44	6.36±3.82
Eosinophil ($\times10^{9}L^{-1}$)	0.02±0.04	0.02±0.04
Monocyte ($\times10^{9}L^{-1}$)	0.01±0.03	0
Basophil ($\times10^{9}L^{-1}$)	0	0

Number of animals in parenthesis, Value were not significantly different in the two sexes (p>0.05)

Table 2 presents the erythrocyte values of Sokoto Gudali cattle as influenced by sex. All the erythrocyte parameters (PCV, RBC, Hb, MCV, MCH and MCHC) were not significantly different (p>0.05) between sexes.

The leucocyte values of the Sokoto Gudali and White Fulani breeds of cattle are shown in Table 3. All the leucocyte parameters (total WBC counts and WBC differential counts of Lymphocyte, Neutrophil, Eosinophil, Monocyte, Basophil) were not significantly different in the two breeds of cattle.

Table 4 presents the leucocyte values (total WBC counts and WBC differentials counts of Lymphocyte, Neutrophil, Eosinophil, Monocyte, Basophil) of the Sokoto Gudali cattle as influenced by sex. In this breed of cattle, the total WBC counts and WBC differential counts were similar in the male and female.

DISCUSSION

In the present study, the erythrocyte values were similar in the male and female Sokoto Gudali cattle. This observation agrees with findings in the Keteku cattle (Awolaja *et al*., 1997) White Fulani cattle (Olayemi, 2004) and Kuri cattle (Olaayemi *et al*., 2006) in which there were no sex differences in the erythrocyte values. The similarity in the erythrocyte values of the male and female Sokoto Gudali cattle may be because the influence of testosterone on erythropoesis in the Sokoto Gudali breed of cattle is limited, it has previously been suggested that male androgenic hormone, testosterone, stimulates the production of erythropoetin, which in turn stimulates the process of erythropoesis and consequently the higher erythrocyte value in male animals (Swenson, 1984).

In the present study, there was also lack of sexual dimorphism in the total WBC counts of Sokoto Gudali cattle (Table 4). Also the male and female White Fulani cattle (Olayemi, 2004) and Kuri cattle (Olayemi *et al*., 2006) were reported to have similar total WBC value. A higher total WBC counts was however observed in the male than the female goat (Jain, 1986) donkey (Nayeri, 1978) and African giant rat (Oyewale *et al*., 1998). However, the female horse was reported to have a higher total WBC than the male (Jain, 1986).

In the present study, the Hb and MCHC values were significantly higher in the Sokoto Gudali than the White Fulani cattle (Table 1). Breed differences were also reported in the White Fulani and the N'dama breeds of cattle because the Hb, MCH and MCHC values were observed to be higher in the White Fulani cattle. It was also reported that the Kuri breed of cattle has higher PCV and Hb values than the White Fulani breed of cattle (Olayemi *et al*., 2006). It seems the higher Hb and MCHC

in the Sokoto Gudali cattle than the White Fulani cattle of the present study may also be due to breed differences. The mean values of the RBC, MCV, MCH and PCV were similar in the Sokoto Gudali and the White Fulani cattle in this present study (Table 1). Similarly the RBC counts of two different tropical breeds of cattle (N'dama and the White Fulani cattle) were reported to be similar (Hill and Esuruoso, 1976).

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