



Full Length Article

Haemato-biochemical Findings of Indigenous Goats in Mubi Adamawa State, Nigeria

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ABSTRACT

Haematological studies of common indigenous goats breeds found in Mubi kept under varying husbandary conditions was carried out aimed to determine the base line information of haematological parameter of these animals as influenced by breed, sex and age. Significant ($P < 0.001$) breed, sex and age differences were evident on packed cell volume (PCV). West African Dwarf (WAD) goat had highest (57.44 ± 1.11) value, while similar values were observed on other breeds: Sokoto red (SR) goat ($31.31 \pm 0.87\%$), Kano brown (KB) goat ($30.87 \pm 0.56\%$), Borno white (BW) goat ($31.74 \pm 0.93\%$). Males had higher values than females on most parameters in this study. On haemoglobin concentration (Hb) SR, KB and BW had similar highest values than WAD goat. Highest Hb values (54.72 ± 2.36 g/dL) were recorded on age group $3\frac{1}{2}$ –4 years followed by age group $2\frac{1}{2}$ –3 years, while least values were on age group ≥ 4 years. Significant ($P < 0.05$) age group differences was observed on blood serum protein (BSP) with age group $1\frac{1}{2}$ –2 years had the highest (66.59 ± 1.04 g/L) value and least (64.08 ± 0.61 g/L) value was on age group ≥ 4 years. Significant sex variation were recorded on PCV, Red blood cell count (RBC) and mean corpuscular volume (MCV). With male goats having highest values: $38.93 \pm 1.48\%$, $88.89 \pm 0.76 \times 10^{12}/L$ and 3.64 ± 0.02 fl, respectively. Generally it has been observed that animals in the area of study were found to be averagely healthier as shown by the non-significant differences of breed, age groups and sex on the white blood cells count (WBC). However extent of adaptation affects productivity and health status of goats. © 2010 Friends Science Publishers

Key Words: Haematology; Goat; Breed; Age; Sex

INTRODUCTION

Small ruminants are one of the domestic animals of the inhabitants of Mubi metropolis. They provide meat, money, hides, skin and farm yard manure. It has been reported that regardless of sex and climate, goats reared under traditional husbandry system have low haematological value compared to those reared under modern husbandry (Schalm *et al.*, 1975; Coles, 1980). Low nutritional grassland pasture, stress, parturition and climatic factors greatly alter the blood values of goats and sheep (Anosa & Isound, 1979). Blood is an important and reliable medium for assessing the health status of individual animals (Oduye, 1976).

There is a great variation in the haematological and biochemical parameters as observed between breeds of goats (Tambuwal, *et al.*, 2002) and in this regard it may be difficult to formulate a metabolic profile test for indigenous goats. These differences has further under lined the need to establish an appropriate physiological baseline values for various breeds of livestock in Nigeria which will help in realistic evaluation of the management practices, nutritional and diagnosis of health conditions. These variations also limit the effort of animal scientist to come up with a uniform test for indigenous Nigerian goat breeds. These variations

lead to the need for the establishment of a discrete and direct baseline values for various breed/species of livestock in Nigeria so as to help in the evaluation of basic management practices for increased productivity.

This work intends to come up with baseline information on haematological data of goats breed raised under native husbandry practices in Mubi as influenced by breed, sex and age on which little or no work was done on it in this environment.

MATERIALS AND METHODS

The most common Nigerian indigenous breeds of goat: SR, BW, KB and WAD were used for this study. Blood samples were collected from animals coming from all over Mubi north and South local government areas and beyond for sale at the Mubi main cattle market. Five (5 mL) blood from jugular vein was collected following proper restraining by attendants with minimal excitement. Samples were collected at random. Red blood cell (RBC), white blood cell (WBC), packed cell volume (PCV), haemoglobin concentration (Hb), blood serum protein (BSP), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) were determined as

described by Schalm, *et al.* (1975). Dentition method as described by McNitt (1983) was adopted for age determination in this study.

Statistical analysis: Data obtained were subjected to analysis of variance and means separated using Duncans Multiple Range Test (SAS, 1993).

RESULTS AND DISCUSSION

Significant (P<0.001) breed, age and sex differences on PCV was observed. WAD goat had the highest, followed by similar values on SR and KB, while least values were recorded on BW. Age group 3¹/₂-4 years had highest (40.79±2.34%) PCV values while age group 1¹/₂-2 years had the least (32.34±2.35%). Sex effects however indicated that males had higher (38.93±1.48%) PCV values than females (36.13±1.58%).

The similar PCV values on the SR, KB and BW might be an indication of the extent of adoptability and productivity of these breed in the study area than the WAD goat. The highest PCV values on the age group 3¹/₂-4 years might likely be a sign of healthier and most productive age group than the other groups. While males having higher PCV values than females is a likely hood of inherent sex differences among male and female as reported by Egbe-Nwiyi *et al.* (2000). Significant (P<0.001) breed and age differences were observed on Hb. Highest and similar Hb values on SR (57.25±1.60 g/dL), KB (57.59±1.01 g/dL) and

BW (57.78±0.98 g/dL) while least (31.45±0.51 g/dL) Hb value was recorded on WAD goat. Age effect on Hbc however indicated that animals of age group 3¹/₂-4 years had highest value (54.72±2.36 g/dL) followed by age group 2¹/₂-3 years (52.57±2.25 g/dL), then animals of age group 1¹/₂-2 years (51.93±2.30 g/dL), while age group ≥4 years had least (46.13±1.97 g/dL) value. Non significant sex difference was observed on Hb. The significant breed and age effect observed in this study might be an indication of productivity and adoptability in relation to the area of research unlike the WAD goats that are highly adapted to the tsetse fly infested areas of the Southern forest zone of Nigeria (Smith & Van Houtert, 1988).

Non-significant breed, age and sex variations were observed on WBC, which might be an indication that breeds, age and sex had little or no effect on the health status of these goat breeds. On the other, significant (P<0.001) age and sex differences were noticed on RBC with animals of age group ≥ 4 years had highest (92.63±0.4 x 10¹²/L) value followed by age group 1¹/₂-2 years (86.57±1.70 x 10¹²/L), while least and similar values were depicted on age groups 2¹/₂-3 years and 3¹/₂-4 years (83.47±0.57 x 10¹²/L & 85.09±0.61 x 10¹²/L, respectively). Males however had higher (88.89±0.76 x 10¹²/L) RBC values than females (86.43±0.57 x 10¹²/L). The differences due to age and sex is a signal of the health status of the various age groups and sex among the goats breed studied, which is in agreement with the findings of Schalm *et al.* (1975).

Table I: Haematological parameters (Means ±SE) of various goats breed kept in Mubi

Variable	SR	KB	BW	WAD	Breed
N	87	81	73	41	
PCV (%)	31.31±0.87 ^b	30.87±0.56 ^b	31.74±0.93 ^b	57.44±1.11 ^a	***
Hbc (%)	57.25±1.60 ^a	57.59±1.01 ^a	57.78±0.98 ^a	31.45±0.51 ^b	***
WBC (x10 ⁹ /L)	12.52±0.20	12.39±0.31	14.15±0.16	16.92±46.42 ^a	NS
RBC (x10 ¹² /L)	87.38±1.00	87.81±0.97	87.28±1.00	88.20±0.97	NS
BSP (g/L)	67.30±0.73 ^a	64.03±0.77 ^b	67.50±1.00 ^a	63.33±0.71 ^b	***
MCV (fL)	3.58±0.11	3.52±0.08	3.60±0.12	3.57±0.08	NS
MCH (pg)	10.13±2.50 ^a	6.33±0.29 ^b	6.36±0.21 ^b	6.49±0.17 ^b	*
MCHC (g/dL)	22.14±0.46	19.35±0.68	18.59±0.25	10.66±1.21	NS

N= Number of observation, *= P<0.05, **= P<0.01, ***= P<0.001, SR= Sokoto red, KB= Kano brown, BW= Borno white, WAD= West African Dwarf, PCV= Packed Cell Volume, Hb= Haemoglobin concentration, WBC= White Blood Cell, RBC= Red Blood Cell, BSP= Blood Serum Protein, MCV= Mean Corpuscular Volume, MCH= Mean Corpuscular Haemoglobin, MCHC= Mean Corpuscular Haemoglobin Concentration

NOTE: Means for groups in Homogenous subsets and with same super script(s) are statistically similar

Table II: Haematological parameters (Means ±SE) of indigenous goats as affected by age and sex

Variables	1 ¹ / ₂ -2yrs	2 ¹ / ₂ -3yrs	3 ¹ / ₂ -4yrs	≥4yrs	Age	Male	Female	Sex
N	39	43	88	114		178	104	
PCV (%)	32.34±2.35 ^c	38.62±2.31 ^b	40.79±2.34 ^a	38.05±1.54 ^b	***	38.93±1.48 ^a	36.13±1.58 ^b	***
Hbc (%)	51.93±2.30 ^b	52.57±2.25 ^{ab}	54.72±2.36 ^a	46.13±1.97 ^c	***	50.95±1.66	51.71±1.56	NS
WBC (x10 ⁹ /L)	13.70±0.28	13.17±0.25	13.46±0.27	62.80±49.56	NS	37.00±23.60	35.38±0.18	NS
RBC(x10 ¹² /L)	86.57±1.17 ^b	83.47±0.57 ^c	85.09±0.61 ^c	92.63±0.45 ^a	***	88.89±0.76 ^a	86.43±0.57 ^b	***
BSP (g/L)	66.59±1.04 ^a	65.15±0.70 ^{ab}	65.55±1.04 ^{ab}	64.08±0.61 ^b	*	65.47±0.55	65.68±0.68	NS
MCV (fL)	2.93±0.03 ^c	3.79±0.11 ^a	3.93±0.06 ^a	3.59±0.05 ^b	***	3.64±0.02 ^a	3.50±0.07 ^b	*
MCH (pg)	10.09±2.68 ^a	6.76±0.26 ^b	7.17±0.13 ^{ab}	5.52±0.2 ^b	***	8.08±1.30	6.60±0.14	NS
MCHC (g/dL)	20.28±1.24 ^a	18.88±0.51 ^b	18.96±0.76 ^b	18.38±0.48 ^c	***	18.84±0.60	19.43±0.56	NS

N= Number of observation, *= P<0.05, **= P<0.01, ***= P<0.001, PCV= Packed Cell Volume, Hb= Haemoglobin concentration, WBC= White Blood Cell, RBC= Red Blood Cell, BSP= Blood Serum Protein, MCV= Mean Corpuscular Volume, MCH= Mean Corpuscular Haemoglobin, MCHC= Mean Corpuscular Haemoglobin Concentration

NOTE: Means for groups in Homogenous subsets and with same super script(s) are statistically similar

Blood serum protein (BSP) variations due to breed was pronounced. KB and BW breed had similar highest values (67.30 ± 0.73 g/l & 67.50 ± 1.00 l, respectively) followed by similar values on KB (64.03 ± 0.77 g/L) and WAD (63.33 ± 0.71 g/L). Significant age difference was also noticed on BSP with age group $1\frac{1}{2}$ -2 years had highest (66.59 ± 1.04 g/L) followed by similar values of age groups $2\frac{1}{2}$ -3 years (65.15 ± 0.70 g/L) and $3\frac{1}{2}$ -4 years (65.55 ± 1.04 g/L), while age group ≥ 4 years had least (63.33 ± 0.71 g/L) values.

The breed and age group effect observed on BSP has been documented, Obi and Anosa (1980), Oduye (1976) and Oduye and Adadevoh (1976), which might be an explanation to the reduction of protein content of blood and increase of carbohydrates as animals grow older.

Significant ($P < 0.001$) age group differences on males was evident, with age group 21/2-3 years (3.79 ± 0.11 fl) and $3\frac{1}{2}$ -4 years (3.93 ± 0.06 fl) had higher and similar values followed by age group ≥ 4 (3.59 ± 0.05 fl), while animals of age group $1\frac{1}{2}$ -2 years had least (2.93 ± 0.03 fl). Males also had higher (3.46 ± 0.07 fl) MCV values than females (3.50 ± 0.07 fl). Also for MCH, significant ($P < 0.05$) genotype difference was observed, KB goat having highest (10.13 ± 2.51 pg), while similar effect were noticed on the other genotypes. Significant ($P < 0.001$) age group effect was recorded with animals of age group $1\frac{1}{2}$ -2 years had highest (10.09 ± 2.68 pg) followed by age groups $3\frac{1}{2}$ -4 years (7.17 ± 0.13 pg), while similar and least values were observed on age groups $2\frac{1}{2}$ -3 years (6.70 ± 0.26 pg) and ≥ 4 years age group (5.52 ± 0.2 pg). On MCHC, significant age group differences were recorded. Age group $1\frac{1}{2}$ -2 years had highest (20.28 ± 1.24 g/dL) values followed by similar values of age groups $2\frac{1}{2}$ -3 years and $3\frac{1}{2}$ -4 years, while ≥ 4 years age group had least (18.38 ± 0.48 g/dL).

Significant age groups and sex differences recorded on MCV, MCH and MCHC in this study might suggest physiological activeness of various age groups and males among the goat breeds studied. The findings are not contrary to what Olayiwole and Adu (1989) discovered. They reported physiological activeness among sheep and goat breeds of different age groups and sex. Also in line with these findings are the report of Islam *et al.* (2004); Ismailov (2005), who recorded differences in productivity among sheep and goat breeds of different sex and age. In agreement to this work also are the report of Butswat and Zahradeen (1998) who reported differences of productivity in SR and KB breeds of bucks.

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