

26

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TABLE OF CONTENTS

CONTENTS	Volume 15, September, 2013	PAGE
Animal Breeding and Genetics		
Estimation of Live Weight From Linear Body Measurements of Three African Breeds of Cattle Under Extensive Management System in Nigeria Odoguwa B.O., Adedeji A.A., Sowande S.O., Isah O.A. and Amole T.A.....		1-9
Animal Physiology		
Morphometry of the Gastro-intestinal Tract in Broiler Finisher Fed Rice Offal Supplemented with Xylanase Enzyme Abdulrashid, M., Mohammed, A. and Abdu, S. B.....		10-17
Sex Comparison of White Fulani Cattle Blood Profile in Southwestern Nigeria Ladokun A. O., Oyebode, O. A., Abiona, J. A. and Ososanya T. O.....		18-22
Non-Ruminant Nutrition, Production and Management		
Nutritive Value of Dolichos Lablab (<i>Lablab purpureus</i> CV. <i>Rongai</i>) Forage cut at Different Stages of Growth on Performance of Weaned Rabbits. Bawa, G. S., Abia, E.E., Omage, J. J. Hassan M. R. Abdu S. B.....		23-36
Replacement Value of Soybean Meal and Maize with Raw or Boiled Pigeon Pea Seed Meal in Exotic Pullet Diets Amaefule, K. U., Onwuchuruba, C. F. and Okereke, O. C.....		37-48
Effect of feeding processed <i>Cassia tora</i> seed based diets on growth performance and biochemical indices of weaner rabbits Tsado, D., Ayanwale, B.A and Aremu, A.....		49-58
Replacement Value of Maize with African Locust Beans (<i>Parkia biglobosa</i>) Pulp Meal on Performance, Haematological and Carcass Characteristics of Broiler Chickens Bot, M.H., Bawa, G.S. and Abeke, F.O.....		59-70

Performance traits, nutrient utilization and cost implication of feeding different thermally treated soyabeans to broiler chickens	
Ari, M. M., Ayanwale, B.A. Adama, T.Z and Olatunji, E.A.....	71-82
Effects of allzyme ssf® supplementation of differently processed pigeon pea (<i>Cajanus cajan</i>) seeds on performance and carcass characteristics of broiler chickens.	
Akintunde, A.R., Omage, J.J. and Bawa, G.S.....	83-94
Evaluation of Two-Stage Cooked <i>Canavalia plagiosperma</i> (Piper) Seed Meal as Feed Ingredient in Layer Diets	
Esonu. B. O., Anumni, P. E., Udedibie, A. B.I., Emenalom, O. O. Etuk, .B., Odoemelam, V and Okorie, K. C.....	95-103
Ruminant Nutrition, Production and Management	
Fattening Performance of White Fulani Cattle Fed Different Energy Sources	
Jokthan G. E., Idowu O. O. and Lamidi S. O.....	104-122
Performance Evaluation of West African Dwarf (WAD) Goats fed unripe plantain peels as replacement for <i>Pennisetum purpureum</i>.	
Okoruwa, M.I., Obiku, .A. and Agbonlahor, .I.....	113-124
Nutrient Intake and Digestibility of Red Sokoto Bucks Fed Varying Levels of <i>Gmelina (Gmelina arborea)</i> Leaf Meal.	
Abdu, S.B., Hassan, M.R., Adamu, H.Y., Yashim, S.M. and Oketona, G. F.....	125-133
Milk Yield and Composition of West African Dwarf (WAD) Does fed Bambara nut meal-based diets	
V.U. Odoemelam, F.O. Ahamefule, J.A. Ibeawuchi, E.N. Nwachukwu and I.F. Etuk.....	134-144
Growth Performance of Yankasa rams fed varying Proportions of <i>Gmelina arborea</i> Leaves	
H.Y. Adamu, O.S. Lamidi, O.W. Ehoche, S.B. Abdu, M.R, Hassan and S.M. Yashim.....	145-154
Effects of enzyme Additive on Nutrient intake, Digestibility and Rumen metabolites of yearling Cattle fed Grass-hay based diet	
K.O. Yusuf, O.A. Isah, C.F.I. Onwuka, J.A. Olanite, A.O. Oni and R.Y. Aderinboye.....	155-167

Thermophysiological Responses of West African Dwarf (WAD) Bucks Fed <i>Pennisetumpurpureum</i> and Unripe Plantain Peels.	
Okoruwa, M.I., Adewumi, M.K. and Igene, F.U.....	168-178
Pasture Agronomy and Range Management	
Effect of Planting Pattern and Irrigation Frequency on Forage Yield and Chemical Composition of Lablab (<i>Lablab Purpureus</i> (L.) Sweet) in Combination with Maize (<i>Zea mays</i> L.)	
M. R. Hassan ¹ , I.R. Muhammad ³ , G.E. Jokthan ¹ , J.T. Amodu ² , S. B. Abdu ¹ , B. Abdullahi, H.Y. Adamu, S. Yashim, M.S. Tamburawa, U. Ado and S.A. Abubakar.....	179-190
Feed Resources	
Nutritional factors in some fodder legume trees and shrubs	
I.E. Ezeagu, A.O. Akinsoyinu and G. Tarawali.....	191-198
Animal Products and Processing	
Chemical Analysis and Consumer Preference of Selected Poultry Egg Types in Zaria, Nigeria	
Olugbemi, T.S., Sule, A., Orunmuyi, M., Daudu, O.M. and Olusola, O.O.....	199-205
Livestock Economics and Extension	
Neighbourhood Acceptability of Poultry Farms Located in Residential Areas in Nigerian Metropolis	
Iyiola-Tunji, A.O., Ojo, I.H., Hiikyaa, A.N., Adesina, M.A., Iyiola-Tunji, M.O. and Ojo, O.A.....	206-215
Assessment of Antibiotic Usage in Some Selected Livestock Farms in Oyo State, Southwest, Nigeria.	
Akinwumi, A. O., Odunsi, A.A., Omojola, A. B., and M.D., Shittu.....	216-228
An Analysis of Benefit and Cost of Local Chicken Production By the Adopters and Non- Adopters of Newcastle Disease Vaccination in Kogi – State, Nigeria.	
Saliu, O. J., Sanda, M.E., Dairo, F. A. S. and Salihu, I.....	229-240

Sex Comparison of White Fulani Cattle Blood Profile in Southwestern Nigeria

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Target Audience: Physiologist, Breeder, Researchers

Abstract

Sexual dimorphism has been established in the brain regions of farm animals and poultry, but for their blood, reports do not agree as to differences at the same age. While some reports show no differences except for pregnant and lactating females, others indicate otherwise. This study was carried out to investigate the blood of white Fulani breed of cattle in southwestern Nigeria if there could be differences at same mature age (4yr). A total of 100 cattle were used consisting of 50 bulls and 50 cows. Full haematology was investigated using the Vet AutoHaemoanalyser machine. Some serum metabolites were also investigated including total Protein, Albumin and total cholesterol. Data obtained were subjected to one-way analysis of variance (ANOVA). The results show that white blood cell count (WBC) was significantly ($P<0.05$) higher in females (17.23 ± 1.08) than in males (12.25 ± 0.77). Mean Corpuscular haemoglobin concentration (MCHC) also showed sex differences with females having higher and significant ($P<0.05$) average value (33.8 ± 0.19) than males (32.6 ± 0.24). The results from Serum analysis show that bulls (with 37.8 ± 0.54) have higher and significant ($P<0.05$) Albumin values than cows (34.9 ± 0.29). Though the results obtained in this study fall within normal ranges for this species, it however does not indicate any specific sex effect for this breed.

Keywords: cattle, blood, sex

Description of problem

The blood is used amongst other things to evaluate the physiological, health and nutritional status of an animal. Hagawane *et al.* (1) emphasized the importance of haematological evaluation in livestock especially cattle as a valuable aid in the diagnosis of many diseases and extent of damage to blood cells. The significance of Profile of blood metabolites have been used widely to identify problem and to

indicate dietary causes of diseases or low production (2). The blood biochemical profiles are considered important in evaluating the health status of animals. The estimates of biochemical constituents are the prerequisites to diagnose several pathophysiological and metabolic disorders in cattle (3, 4, 5) gave ample evidence of sexual differences in the brain and in relation to behaviour. Ladokun (6) Observed differences in

swine blood. The present study was undertaken to study the hematological and some of the blood biochemical indices in white Fulani Cattle based on sex.

Materials and Methods

Animals

A total of 100 cattle were sampled from Southwestern part of Nigeria which includes: Ogun, Oyo and Osun states. Sampled animal comprises of 50-bulls and 50 'dry' cows (non-lactating or gestating). Both bulls and cows were of the White Fulani breed. These animals were owned by traditional Fulani herdsmen who have settled in these areas for 3 to 10 years. These animals were fed on natural feed. Salt licks were also provided in some farms to boost minerals and vitamins supplementation.

Blood collection and Analysis

Animals were randomly selected from each herd and bled from jugular vein venipuncture and blood collected into heparinized and non heparinized bottles. The former was for haematology, while the latter was used for serum analysis. Age estimation during sampling was done by dentition. Haematological analysis was done using the Mindray (BC-2800 Vet) autohaematology analyser at the Animal Physiology Laboratory, Federal University of Agriculture, Abeokuta.

Serum analysis

Serum analysis for Total protein (7), Albumin (8), Total Cholesterol (9), Triglyceride (10), Urea by the method of (11), Creatinine by the method of (12), Serum Alanine Transaminase (SALT) and Serum Aspartate Transaminase (SALT) was by Spectrophotometry (13) using the appropriate reagent kits by Randox..

Statistical analysis

Data obtained were subjected to one way analysis of variance (ANOVA) using SAS, 2001 package (14). Significant means were separated using the Duncan test of the same software.

Results and Discussion

The results of the haematology of white Fulani cattle are shown in Table 1. For haematology, sex difference was only observed for white blood cell count (WBC) with cows having a significantly ($P<0.05$) higher average value (17.23 ± 1.58) than bulls (12.25 ± 0.77). Sex difference was also observed for mean corpuscular haemoglobin concentration (MCHC) with females also having higher and significant ($P<0.05$) average values (33.84 ± 0.19) than bulls (32.69 ± 0.24). All other parameters for haematology were similar between cows and bulls. For Serum biochemical parameters (Table 2), only albumin was significant for sex, with bulls having higher and significant ($P<0.05$) average value (37.84 ± 0.54) than cows (34.98 ± 0.29).

Table 1: Effect of Sex on the Haematological Parameters of White Fulani Cattle reared in South West Nigeria

Haematological indices	Sex	
	Female	Male
PCV (%)	28.83±1.52	33.33±2.03
Hb (g/dl)	9.75±0.53	10.80±0.69
WBC ($\times 10^9/l$)	17.23±1.58 ^a	12.25±0.77 ^b
RBC ($\times 10^{12}/l$)	6.65±0.24	7.08±0.32
MCV (fl)	42.82±1.14	45.72±1.14
MCH (g/dl)	14.66±0.36	15.11±0.48
MCHC (g/dl)	33.84±0.19 ^a	32.69±0.24 ^b
Neutrophils (%)	59.92±2.03	53.17±2.69
Lymphocytes (%)	38.92±2.03	45.83±2.79
Monocytes (%)	0.92±0.36	0.67±0.31
Eosinophils (%)	0.25±0.18	0.25±0.18
Basophils (%)	0.00±0.00	0.00±0.00

abc: means with different superscript vary significantly ($P < 0.05$)

PCV – Packed Cell Volume HB – Haemoglobin WBC – White Blood Cell MCV – Mean Corpuscular Volume MCHC – Mean Cell Haemoglobin MCHC – Mean Cell Haemoglobin Concentration

All other blood biochemical indices examined were similar for cows and bulls. The results obtained in this study falls within the range of values for bulls and non-lactating and non-gestating cows as outlined by 15. The reports by other workers (1, 16, 17, 18, 19, 20.) were only for lactating cows at different stages, without sex comparison while others were on disease challenge. Sekoni *et al.*

(21) worked on plane of nutrition especially protein. Rekwot *et al.* (22) also considered the effects of breed and sex in swine species. Though the values observed in this study fall into estimated ranges, they do not indicate specific sex differences, except for WBC (total). However, WBC differential does not support sex differences (20).

Table 2: Effect of Sex on Some Serum Indices in White Fulani Cattle reared in South West Nigeria

Serum indices + Unit	Sex	
	Femle	Male
Total Protein mg/dL	75.25±2.24	77.28±1.02
Albumin g/100ml	34.98±0.29 ^b	37.84±0.54 ^a
Globulin g/100ml	40.25±1.95	39.44±0.48
Total Cholesterol mg/dL	138.44±8.53	131.25±2.52
Triglyceride mg/dL	112.47±8.85	102.24±2.52
Urea mg/dL	28.42±1.27	29.35±2.15
Creatinine mg/dL	0.99±0.29	0.98±0.27
SAST µL	35.58±3.73	41.00±5.85
SALT µL	15.00±1.99	18.92±2.32

abc: means in the same row differently superscripted differ significantly (P<0.05)

SAST: Serum Aspartate Transaminase SALT: Serum Alanine Transaminase

Conclusion and Application

It can be concluded from this study, that for white Fulani cattle at 4 years of age reared in South west Nigeria, there are similarities in sexes for the haematology and some serum biochemical values.

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