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Study of Some Haematological Parameters of Selected Extensively and Semi-Intensively Reared Cattle in Umudike

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Abstract: Haematological parameters are good indicators of an animal's health status. This study was carried out to assess the effect of management on the haematological performance of White Fulani Cattle reared under extensive and semi-intensive management systems. A total of 30 randomly selected cattle were used in this study. Results showed significant differences ($P< 0.05$) in the mean Packed cell volume (PCV) and haemoglobin (Hb) values of calves but no significant difference ($P>0.05$) in the RBC and WBC counts of adult cattle. The WBC counts of calves showed significant difference. Information provided in this work would help farmers to improve the production of their cattle.

Key words: Haematological · Management · White Fulani · Erythrocyte

INTRODUCTION

Blood is the specialized body fluid in animals that plays an important role in the delivery of vital substances such as oxygen and nutrients across body cells and removal of metabolic wastes from cells [1].

Haematology is the study of the number and morphology of the cellular elements of blood and the use of the result in disease diagnosis and monitoring [2].

Examination of blood provides parameters that reveal the physiological status of the animals and serve to detect any deviation from normal in the body of the animal [3]. These parameters often provide important information for diagnosis of diseases in animals [4, 5] because blood constituents change in relation to the physiological conditions of health [6]. These changes in haematological values can be used in the selection of genetically disease-resistant animals and to determine the various health status of the body [1, 7]. Haematological examination therefore, helps to distinguish the normal status from stressful status of which may be influenced by environmental, managemental, nutritional or pathological conditions [8].

Cattle is an important source of protein to humans and according to NseAbasi *et al.* [8] livestock in Nigeria are reared for meat, milk, hides, generation of income, farm power and employment. They are therefore, necessary for the economic growth of both their owners and the nation at large.

In Abia State, cattle are managed either extensively or semi-intensively. This work aimed to determine difference in the haematological parameters in cattle reared under extensively or semi-intensively systems of management.

MATERIALS AND METHODS

Study Area: This study was carried out in Umudike. Umudike is a semi-urban, agrarian settlement in Ikwuano local government area in Abia State, Nigeria. Its coordinates are 5° 28 ´33 ´N 7° 32 ´56´E.

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Study Population: A total of 30 white Fulani cattle were selected for this study. A total of 12 White Fulani cattle were randomly selected from the farm of the Michael Okpara University of Agriculture, Umudike. These animals on semi-intensive management system were fed on green pastures supplemented with concentrates, while the calves were fed on the dam's milk and concentrates. The extensively reared cattle were sourced and selected from nomadic herdsmen in the area. This work was carried out in the rainy season. Age of the animals were observed and recorded for each animal. Ageing was based on dentition as described by Lasisi *et al.* [9] cattle aged below two years were categorized as young while those above two years were grouped as adults.

Collection of Blood Samples: Blood was collected from the jugular vein seven calves (3-4 months old) and five cattle (≥2 years) from the university farm, and also 6 calves (3-4months old) and 12 cattle (≥2 years) from the nomadic herd. The blood samples were transferred immediately after collection into an EDTA bottle, labeled properly and placed on ice packs and transported to the Veterinary Pathology laboratory of the College of Veterinary Medicine, Michael Okpara University of Agriculture, Umudike for analysis.

Determination of Haematological Parameters: Haematological indices assessed were Packed Cell Volume (PCV), Hemoglobin concentration (Hb), Red blood cell (RBC) and White blood cell (WBC) counts.

The PCV was determined using the microhaematocrit method as described by Brian *et al*. [10]. The blood samples were carefully drawn into microheamatocrit tubes by capillary action and one end of the tube was sealed with plasticine. Tubes were placed in a microheamatocrit centrifuge and spun at 10,000-revolutions per minute for 5 minutes. The capillary tubes were then removed from the centrifuge and the PCV of each of the blood sample was read using the microheamatocrit reader and recorded [11]. Haemoglobin concentration (Hb) was determined using the Sahli-hellige procedure .The readings were taken and recorded.

Total red blood cell count (RBC) and total white blood cell count (WBC) were determined by the haematocytometer methods described by Coles [12].

Statistical Analysis: Mean values and standard errors were calculated for all haematological parameters collected and results were statistically analysed using the student's T- test method [13]. P values were regarded as significant when P <0.05.

Table 1: Mean Hematological Values Of Calves

Parameters	Semi-Intensive System	Extensive System
PCV (%)*	32.0±5.23	28.0±2.61
Hb (g/dl)	8.6±2.12	7.4±0.94
RBC (x10^6 µl)	6.7±0.45	5.6±1.01
WBC** (x10^3 µl)	10.3±1.80	13.9±2.12

*Means significant at P< 0.05

Table 2: Mean Hematological Values Of Cattle

Parameters	Semi-Intensive System	Extensive System
PCV* (%)	29.0±3.0	32.0±2.7*
Hb* (g/dl)	6.1±1.01	8.9±1.14*
RBC* (x10^6 µl)	5.02±0.17	8.3±1.5*
WBC (x10^3 µl)	17.34±1.48	17.20±4.12

*Means significant at P< 0.05

RESULTS

Table 1 represents the mean and standard error of the haematological parameters of calves reared under the different management systems reared while that of the adult cattle is represented in Table 2. There is a significant difference (P< 0.05) in the erythrocyte values of adult cattle. Adult nomadic cattle had higher erythrocyte (PCV, Hb, RBC) values than those reared under the semi-intensive system**.** In contrast, calves reared under the semi-intensive system had higher PCV, Hb and RBC values than those from the nomadic herdsmen. There was no significant difference in the WBC count of the adult cattle from both management systems but the calves showed significant difference in their total white blood cell count. Calves reared under the extensive management system had higher white blood cell count than those from the university farm.

DISCUSSION

There is a significant difference (P<0.05) in the erythrocyte values of adult cattle. Adult nomadic cattle had higher erythrocyte values than those from the university farm. This counters the expectation, as those from the university farm were expected to be better managed in terms of feeding and routine veterinary care. Although, this may lead to questioning the quality of management given to these animals, consideration is given to the fact that this work was carried out during the rainy season when it is believed that high quality pasture is available [4]. Nomadic cattle had a wider grazing range and unlimited grazing time thus are more exposed to high quality pasture unlike cattle reared under the semi-intensive system that have limited grazing range and limited grazing time (Only in the morning hours). Gastro

inestinal parasites from their grazing may be responsible for the low erythrocyte values observed in the animals reared under the semi-intensive system. Quality and quantity of concentrates fed to the animal in the semi-intensive management system may also be questionable. There was no significant difference in the WBC count of the adult cattle from both management systems. This agrees with the report of Daramola *et al.* [14]. On the other hand, calves reared under the semi-intensive management system had higher erythrocyte values than those from the nomadic herdsmen. This could be as a result of stress due to constant trekking of the nomadic calves with the adult cattle and thus, little time to suckle from their dam unlike calves from the university farm that are well rested because they are confined, given concentrates, and also have more time to suckle from their dam. Calves showed significant difference in their total white blood cell count, with higher counts from the nomadic calves. The higher white blood cell count recorded from the nomadic calves may be as a result of their early exposure to infection (Due to nomadism) which stimulates their haematopoietic system to produce more white blood cell unlike those reared semi-intensively that are confined, and thus less exposed to infection.

Based on our findings, we recommend that farmers who rear their animals under the semi-intensive or intensive system could take advantage of the rainy season to improve the quality of their feed by sourcing and using quality pasture in feed preparation. This, together with optimal veterinary care will greatly improve the general well-being of the animals.

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