

**NSAP****47th Annual
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(JOS 2022)****CONFERENCE
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**SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES****EVALUATION OF HAEMATOLOGICAL PARAMETERS OF CHINCHILLA AND
NEW ZEALAND WHITE RABBITS ON THE JOS PLATEAU**

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ABSTRACT

This study aimed at investigating haematological parameters of apparently healthy Chinchilla (CHA) and New Zealand White (NZW) rabbits. Forty rabbits at an average age of 7 weeks comprising 20 each of CHA and NZW in a sex ratio of 1:1 were used for the study. Five millilitres of blood was collected from the ear vein of each rabbit at the 20th week of age and poured into a well labeled (breed and sex) plastic bottles containing Ethylene Diamine Tetra acetic acid (EDTA) for Haematological profile determination. Data were using t-test and significant differences between groups were set to $P < 0.05$ in JMP SAS 13. Results showed that NZW had higher ($P < 0.05$) Packed cell volume (PCV, 37.75%), Haemoglobin concentration (HB, 12.65 g/dl) and Red blood cell (RBC, $5.45 \times 10^6/L$) than CHA with respective values of PCV (33.75%), HB (11.28 g/dl), RBC ($3.95 \times 10^6/L$). There was no significant ($P > 0.05$) difference between breeds in White blood cell (WBC), Neutrophils, Lymphocytes, Monocytes, Eosinophils and Basophils. Similarly, sex of rabbit did not influence any other haematological values. It was concluded that NZW and CHA vary in PVC, HB and RBC. This should be noted when making references to normal haematological values during diagnosis.

Keywords: Rabbits, packed cell volume, haemoglobin concentration, differential counts, sex, breed.

INTRODUCTION

Haematology, the study of the numbers and morphology of the cellular elements of the blood— the red cells (erythrocytes), white cells (leucocytes), and the platelets (thrombocytes) and the use of these results in the diagnosis and monitoring of disease is useful in the diagnosis of many diseases as well as investigation of the extent of damage to blood. Haematological tests are important tools for evaluation of physiological and health status of farm animals. The commonly investigated haematological parameters are erythrocytes (Red Blood Cells, RBC), leucocytes (White Blood Cells, WBC), haemoglobin concentration (HBC), Packed Cell Volume (PCV) and values which include Mean Corpuscular Volume or cell (MCV), Mean Corpuscular Haemoglobin (MCH) and Mean Corpuscular Hemoglobin Concentration (MCHC) (Carlson, 1996). Kopp and Hetesa (2000) reported that high PCV indicated either an increase in the number of circulating RBC or reduction in circulating plasma volume. Adejumo (2004) stated that haematological traits such as PCV and HB were correlated with the nutritional status of the animal. However, the primary functions of the erythrocyte are to serve as a carrier of hemoglobin. It is this hemoglobin that reacts with oxygen carried in the blood to form oxyhaemoglobin during respiration and also helps in distinguishing normal state from state of stress, which can be nutritional, environmental or physical (Chineke *et al.*, 2006). Schalm *et al.* (1975) reported that blood pictures of animal might be influenced by certain factors such as nutrition, management, breeds of animals, sex, age, diseases and stress factors. Besides, physiological and environmental factors that might affect blood values as: age of the animal such as estrus cycle, pregnancy and parturition, genetics, method of breeding, breeds of animal, housing, feeding, fasting, extreme climatic conditions, stress, exercise, transport, castration and diseases had been identified (Carlson, 1996; Johnston and Morris, 1996). Normal reference haematological values might therefore differ due to location and any of such influencing factors. A lot of work has been carried out on the blood parameters of various domestic animals and livestock (Kral & Suchy, 2000; Singh *et al.*, 2002; Ahamefule *et al.*, 2006). More information on the reference haematological values of rabbits reared in areas of high altitude is useful. This study was therefore undertaken to examine the values of Packed cell volume (PCV), Haemoglobin (HB) concentration, Red



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blood cell (RBC), White blood cell (WBC), Neutrophils, Lymphocytes, Monocytes, Eosinophils and Basophils of obviously healthy rabbits reared on the Jos Plateau with a view to ascertain their conformity with established reference values and determine the effect of breed and sex on the values. .

MATERIALS AND METHODS

Location of the study

The experiment was conducted at Veterinary Treats Integrated Solutions Rantya Jos, Plateau State. The latitude of Jos is 9.896527 and the longitude is 8.858331. Jos has an elevation of 4,250 feet (1,295 metres) above sea level. It has an equable climate with temperature averaging 22°C (75°F) daily; average humidity is 60% and average annual rainfall of 1400mm (56") with wet season spanning from April to September.

Rabbits and their management

Forty weaned rabbits at an average age of 7 weeks were sourced from local farmers within the Jos metropolis. They were kept for up to 20 weeks of age for the study. . They comprised of 20 each of Chinchilla and New Zealand white in a 1:1 sex ratio. They were housed separately according to sex in pens constructed with concrete blocks and floored and roofed with iron sheets. They were fed every morning with commercial feed containing 15% crude protein and 2300KcalME/kg supplemented in the afternoon with household wastes. Water was supplied *ad libitum* and all necessary veterinary care was provided.

Blood sample collection and laboratory analysis

At the 20th week of age, 5 millilitres of blood was collected from the ear vein of each rabbit and poured into well labeled (breed and sex) plastic bottles containing Ethylene Diamine Tetraacetic Acid (EDTA) for haematological profile determination. Haematological parameters were analyzed within 24 hours after collecting blood. All haematological parameters were determined by conventional laboratory methods as outlined by Lamb (1981) briefly described as follows: Packed cell volume (PCV) was determined by the microhaematocrit method; Haemoglobin (Hb) concentration was determined by the cyanomethaemoglobin method; while Red blood cell (RBC) and white blood cell (WBC) counts were determined using improved Shale haemocytometer method and percentage distribution of various white blood cells (differential counts) was also computed.

Data analysis

All data were compared using *t*-test and significant differences between groups were set to $P < 0.05$ in JMP SAS 13 to determine the effect of breed and sex on Haematological parameters.

RESULTS AND DISCUSSION

Generally, values of haematological parameters of rabbits observed (In table1) in the present study fell within the range reported previously elsewhere (Tambuwal *et al.*, 2002; Singh *et al.*, 2002; Schalm *et al.*, 1975; Chineke *et al.*, 2006)., There was significant ($p < 0.05$) difference between breeds in the PCV, HB and RBC with New Zealand White exhibiting higher values than Chinchilla. Similarly, significant genotype influence ($p < 0.05$) on PCV, WBC, MCH and ESR was observed in rabbits in previous studies by Schalm *et al.* (1975) who observed significant breed differences between haematological values of New Zealand

Table 1: Haematological values by breed

Parameters	New Zealand	Chinchilla	SEM	P-value
PCV%	37.75	33.75	0.63	0.004
HB g/dl	12.65	11.28	0.25	0.008
RBC $\times 10^6/L$	5.45	3.95	0.09	0.001
WBC $\times 10^6/L$	6.35	7.80	0.76	0.224
Neutrophils %	63.00	64.75	2.21	0.595
Lymphocytes %	35.50	31.00	1.46	0.072
Monocytes %	0.25	1.50	0.49	0.121
Eosinophils %	1.25	2.75	0.85	0.261

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Basophils %	0	0	0
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PCV=packed cell volume, RBC= red blood cell, WBC= white blood cell, HB= haemoglobin.

White and wild jack rabbits. Similarly, Chineke *et al.* (2006) reported the influence of genotype on PCV of rabbits in humid tropical conditions. There was no significant ($p>0.05$) difference between breeds in the WBC, Neutrophils, Lymphocytes, Monocytes, Eosinophils and Basophils. However, Chineke *et al.* (2006) found that genotype influenced WBC of rabbits. According to Schalm *et al.* (1975) haematological studies of various farm animals generally showed either no significant or significant breed effects.

Then, non significant ($p>0.05$) effects of sex on the haematological variables were obvious in this study (Table 2). This agreed with the study of Schalm *et al.* (1975) and Chineke *et al.* (2006) who found that sex did not affect haematological indices in rabbits. Ozkan *et al.* (2012) similarly observed non significant effect of sex on haematological parameters of New Zealand White rabbits in Kenya. Contrastingly, Isaac *et al.* (2013) observed that males had higher values of WBC, Neutrophils, Monocytes, Lymphocytes, Basophils, RBC, HB, haematocrits (HCT), MCV, MCHC and platelets than females while females had the higher values in MCH.

Table 2: Haematological values by sex

Parameters	Male	Female	SEM	P-value
PCV%	36.25	35.25	1.28	0.601
HB g/dl	12.10	11.83	0.46	0.689
RBC X10/L	4.68	4.73	0.44	0.939
WBC X10/L	7.45	6.70	0.84	0.549
Neutrophils %	62.75	65	2.17	0.491
Lymphocytes %	33.25	33.25	1.95	1.000
Monocytes %	1.50	0.25	0.49	0.121
Eosinophils %	2.5	1.50	0.91	0.468
Basophils %	0	0	0	

PCV=packed cell volume, RBC= red blood cell, WBC= white blood cell, HB= haemoglobin

CONCLUSIONS

Breeds of rabbits vary in some haematological parameters but do not in others. Sex has no effect on haematological indices in rabbits. These should be noted for diagnosis. Established normal range of haematological values of rabbits is applicable to the rabbits reared on the Jos Plateau.

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