Effect Of Different Management Environment On Hematological Perfomance In West African Dwarf (WAD) Goats.

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ABSTRACT

This study was carried out to assess the effect of management environment on heamatological performance of West African Dwarf goats reared under different management system commonly adopted by farmers in Nigeria (i.e. extensive, semi-intensive and intensive system). The experiment was laid out in a completely randomized design using fifteen (15) West African Dwarf (WAD) goats. Result from the experiment shows that PCV and Hb values were significantly (P<0.05) influenced by management system. This value ranges from 28.3±1.50 to 31.3±2.52% for PCV and 8.93±0.45 to 10.3±1.57 g/dl for Hb. whereas other parameters such as RBCs, MCHC, WBCs shows no significant (P>0.05) differences in their values. Total serum protein and Serum glucose reveals significant (P<0.05) differences in their values too, with intensively reared goats having higher serum values. This value also ranged from 7.14±0.51 to 8.51±0.30 g/dl for total serum protein and 47.75±3.35 to 61.16±3.47mg/dl for glucose respectively. It was concluded that intensively reared goats have better heamatological performance compared with extensively reared goats.

Key: *Management environment, heamatological performance, West African Dwarf goats.*

INTRODUCTION

Goat production in Nigeria contributes significantly to the agrarian economy. The West African Dwarf (WAD) breed of goats are predominant in the Southern part of Nigeria, which favour high prevalence of trypanosomiasis because this eco-zone is infected with tsetse fly, however the WAD breeds of goats thrives well and reproduce with twins and triplet births in the ecological niche (Adeloye, 1998).

In Nigeria and West Africa, goats are reared extensively at subsistence level and these animals feed for their own nourishment without any delibrate effort by man to supplement or improve their plane of nutrition, while the intensively

reared ones are housed and given medication with improved nutrition, whereas the semi intensive system of management represent a varying degree of compromise between the two system of management stated above.

It is a known fact that the performance of an animal is dictated by the environment in which it funds itself. Various factors are within the environment which dictates the performance of animals, and these factors include rainfall, temperature, relative humidity, wind movement, solar radiation. (Williamson and paynee, 1980), the effect of these environmental factors can mediate through reduction or increase in feed intake, weight gain, plane of nutrition, diseases, reproductive performance and feed efficiency (Ames and Rays, 1983, Imasuen and Otoikhian, 2004).

The significance of determining the effect of different management environment on hematological performance of WAD goats becomes imperative from the forgoing because a good knowledge of the performance will reveal a great deal of the animal health status and by extension its general productivity.

The objective of this study therefore is to determine the effect of different management system on the hematological performance in WAD goats with a view to ascertain the well-being of these goats.

MATERIALS AND METHODS

Animal And Management: Fifteen West African Dwarf (WAD) goats were reared under different management systems (i.e. intensively, semi-intensively and extensively) and were used in an experiment to evaluate the effect of the different management systems on the hematological parameters. The animals were quarantined for 30 days during which routine treatment developed by NAPRI (1984) was administered under the supervision of a veterinarian.Thereafter five animals were randomly assigned to each of the three-management systems; namely intensive, semi-intensive and extensive system. These management systems served as the treatments.

Blood samples were collected at the commencement of the experiment from the animals and thereafter at four weeks interval for two seperate occasion. The average of all these blood parameters were used to compute the hematological.

performance of the animals as shown in Table 1and 2 below.

Data collection and blood analysis: Data were obtained on the blood samples from each of the 15 healthy goats of both sexes. Ten milliliters (10ml) of blood was taken into a sample bottle containing anticoagulant ethylene diamine tetra acetic acid (EDTA) and another sample bottle without anti-coagulant from the jugular vein of each of the 15 goats. The blood samples were shared equally into the two different samples bottles. The blood samples were collected the same day from all animals for the determination of hematological indices.

The hematological indices assessed were Packed cell volume (PCV), Hemoglobin concentration (Hb), Red blood cell (RBC), White blood cell (WBC) and Mean corpuscular hemoglobin concentration (MCHC). Total serum protein, Serum albumin, Serum globulin and Serum glucose.

Statistical analysis: Mean values and Standard errors were calculated for all hematological parameters collected and the result were statistically analyzed using the student's t-test method (Snedecor and Cochran, 1978).The experiment was laid down in a simple completely randomized design and one-way analysis of variance (ANOVA) was used to assessed the statistical difference between the three treatments.

RESULT AND DISCUSSION

Results as shown in Table 1 reveal that parked cell volume (PCV) was significantly ($P<0.05$) lower in the group reared under extensive system of management whereas intensively and semi-intensively reared goat's showed no difference in their PCV values. Hemoglobin concentration values were also higher in those goats reared intensively and semi-intensively, however, significant ($P<0.05$) differences were only observed between the intensively reared goats and extensively reared goats. On the other hand no significant ($P>0.05$) differences were observed in the value of RBC's, MCHC and WBC's count in all the management systems examined during this experiment.

The lymphocytes values was significantly ($P < 0.05$) lowerer in goats reared intensively whereas neutrophils value was significantly ($P <0.05$) higher in the same group of goats reared intensively.

The group reared semi-intensively had the least value of neutrophils and was

significantly lowerer (P <0.05) than both extensively and intensively reared goats. Eosinophils value in those reared intensively was significantly higher (P <0.05) than the others.

This study is similar in some regard to observation made in WAD sheep, goat and white Fulani cattle by Oluyemi *et al.* (2000) and Daramola *et al.* (2005) in which it was reported that management system favors intensively reared animals with higher PCV, RBC;s, WBC's and MCHC values compared to extensively reared animals. However, this study did not reveal any significant difference (P>0.05) in RBC's, WBC's and MCHC as reported by these authors.

Total serum protein, albumin, globulin and glucose shows significant differences (P<0.05) between the extensively and semi-intensively reared goats on one hand and the intensively reared goats on the other hand. This finding agrees with previous research work in which kerr *et al.* (1982) reported that nutrient level in blood sample may be considered to be proximate measure of long term nutritional status of animals.

From the foregoing, it is obvious that when animals are reared intensively they have better hematological result than those reared extensively because they are adequately fed and well cared for, however, results from this study reveals that all hematological parameters assessed were within the range for PCV (21- 35%), RBCs, (9.2 -13.5 $x10^6$/ml), WBC's, (6.8 - 20.1 x 10^3/ml) and MCHC (32 - 34.6%) reported by Daramola *et al*. (2005).

CONCLUSION

This study was carried out to evaluate the hematological performance in WAD goats reared under different management environment with a view to know if intensively reared goats are more healthy and grows better than extensively reared goats or otherwise.

Result shows that much difference did not exist in terms of hematological values, serum proteins and glucose values. However, when animals are intensively reared feeds are adequately utilized as shown from serum proteins and glucose analysis in the goats.

Since all the animals used in this experiment showed averagely adequate values in all parameters accessed, it could be concluded that irrespective of the management system adopted, goats can thrive well in all the management systems, but for better productivity the semi-intensive or the intensively reared goats

had better nutrient status when viewed from the blood serum level.

Further study is recommended in the area of nutrient determination using the blood serum assessment and also to examine if any correlation exists between hematological parameters and blood serum nutrients.

Table: 1 Effect of Different Management Systems on Hematological Parameters In WAD Goats

Parameters	MANAGEMENT SYSTEMS		
	Ext. System	Semi-Int. System	Int.- System
PCV%	28.3±1.50[b]	31.3±2.52[a]	30.0±2.75[a]
Hb, g/dl	8.93±0.45[b]	10.3±1.57[a]	9.5±0.15[b]
RBCs, x 10^6µl	10.5±1.80	10.8±1.0	11.2±1.25
MCHC, %	33.2±0.40	33.9±0.50	34.1±0.40
WBC, X 10^3µl	13.1±1.5	14.5±2.85	13.5±1.95
Lymphocytes%	73.1±15.3[b]	75.5±2.00[a]	67.5±2.15[c]
Neutrophils, %	26.2±1.25[b]	24.3±2.15[c]	31.2±2.04[a]
Eosinophils, %	0.2±0.15[b]	0.1±0.10[b]	1.5±0.50[a]
Monocytes, %	0.5±1.10[a]	0.2±0.20[b]	0.2±0.10[b]

a, b, c, Value with the different superscript along the same row are significantly different at 5% level.
± S.E.M (plus and minus standard error of means)

Table: 2 Serum Proteins and Glucose Level In WAD Goats Reared Under Different Management System.

	MANAGEMENT SYSTEMS		
Parameters	**Ext. System**	**Semi-Ext. System**	**Int.- System**
Total serum protein g/dl	7.14 ± 0.51[b]	7.13 ± 0.52 [b]	8.51 ± 0.30 [a]
Albumin g/dl	3.25 ± 0.20[b]	3.28 ± 0.28 [b]	3.70 ± 0.35 [a]
Globudin g/dl	3.89 ± 0.22[b]	3.85 ± 0.40 [b]	4.81 ± 0.31[a]
Glucose mg/dl	47.75±3.35[b]	51.66 ± 4.17 [b]	61.16 ± 3.47[a]

a, b, c, Value with the different superscript along the same row are significantly different at 5% level
± S.E.M (plus and minus standard error of means)

REFERENCES

Adeloye, A. A. (1988): The Nigerian small Ruminant species. Corporate office max. Ilorin, Nigeria. Pages 7 – 8.

Ames, D. R. and D. E. Ray (1983): Environmental manipulation to improve animal productivity J. Amin. Sci. (suppl 1.2) 57:209-233

Daramola, J. O., Adeloye, A. A., Fatoba, T. A. and Soladoye, A. O. (2005): Heamatological and Biochemical parameters of West African Dwarf goats. Livestock Res. For Rural Deve. 17 (8) 89-92.

Imasuen, J. A. and Otoikhian, C.S.O. (2004) Growth and Physiological performance of WAD goats reared under two different Management environment: In: Ogunji, J. O., Osakwe, I.I., Ewa, V.U., Alaku, S.O., Otuma, M.O. and Nweze, B.O. (eds). Proceedings of the 9th Annual Conference of Animal Science Association of Nigeria. September, 13th – 19th, 2004 Held at Ebonyi State University, Abakaliki. 146 – 148.

Kerr, G.R. Lee, E.S, Lan, M.K.M., Lorimar, R.J. Randall, E. and Forthoter, R. N. (1982): Relationship between dietary and biochemical measure of Nutritional status. Am. J. Clin. Nutri. 35:294-318.

NAPRI (National Animal Production Institute, 1984) Highlights of Research Achievements on Animal Production. Science and Technology Briefing Lagos Dec. 1984. pp 3-17.

Oluyemi, F. O., Farotimi, J. O. and Fagbohun, O. A. (2000): Haematology of the West African Dwarf Sheep under the different management systems in Nigeria. Ibadan, Biomedical Communications Group Publication.

Snedecor, G.W. and Cochran, W.G. (1978): Statistical methods. 6th edn., Iowa state Univ. Press, Ames-Iowa.

Williamson, G. and Payne, W. J.A. (1980): An introduction to Animal Husbandry in Tropics second edition.