

EFFECT OF MANAGEMENT SYSTEMS ON HAEMATOLOGY, PARASITE STATUS AND BODY MASS INDEX OF WEST AFRICAN DWARF GOATS IN UNIVERSITY OF UYO FARM

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ABSTRACT

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The effect of intensive and semi-intensive systems of management on haematology, parasite status and body mass index of West African Dwarf (WAD) goats was investigated in sixteen WAD goats. Eight animals were randomly allocated to each of the two treatments: intensive and semi-intensive systems of management, in a completely randomized design. There were no significant ($P > 0.01$) differences between treatments for the haematological parameters and body mass index of WAD goats. The mean values for packed cell volume (PCV), total white blood cell count (WBC), Neutrophils (N), Lymphocytes (L) and Eosinophils (E) for the intensively managed WAD goats were $20.63 \pm 2.03\%$, $16.25 \pm 2.05 \times 10^9 L^{-1}$, $44.69 \pm 6.85\%$, $48.62 \pm 4.98\%$ and $8.00 \pm 6.00\%$ respectively, while those for the semi-intensively managed WAD goats were $21.75 \pm 1.81\%$, $17.00 \pm 2.18 (10^9 L^{-1})$, $40.05 \pm 6.25\%$, $48.19 \pm 5.58\%$ and $3.00 \pm 1.00\%$ respectively. The study also revealed that 33.00%, 18.75% and 6.25% of the animals under intensive system of management had strongyle worm eggs, coccidial oocysts and tapeworm segments respectively found in their faecal samples, whereas 25%, 31.25% of the semi-intensively managed WAD goats had strongyle worm eggs and coccidial oocysts in their faeces, with no tapeworm segment found. The mean values of body mass index was $293.67 \pm 310.65 (g m^{-2})$ for intensively managed WAD goats and $383.82 \pm 405.19 (g m^{-2})$ for the semi-intensive WAD goats. Results revealed that the system of management did not significantly affect the synthesis (erythrogenesis) and concentration of the red blood cells since the animals were neither anemic nor suffered from temporal polycythemia.

INTRODUCTION

The West African Dwarf (WAD) goat is one of the three main breeds of goats in Nigeria and is the most numerous species in the humid rainforest zone (Bourn *et al.* 1994) in addition to their greater ability to survive in tsetsefly infested rainforest areas compared to cattle (Otesile, 1993). It has been noted that the major constraint in goat production has been the high mortality rate due to disease (Aikhuomobhogbe and Orheruata, 2006) and parasite infestation. The prevalence of gastrointestinal parasite and diseases continues to be a major hindrance to ruminant production in Nigeria and this is further aggravated by poor nutrition, management system and inclement weather (Kadlim, 1972). It is often difficult to assess the correct health status of an animal without recourse to an examination of its blood, as it is a fast and readily available technique employed in assessing clinical, nutritional and health status of animals, as well as giving some insight into their production performance potential (Aderemi *et al.* 2000). Various reports (Tambuwal *et al.* 2002 and Daramola *et al.* 2005) have documented haematological and biological parameters of domestic species in Nigeria, with few on goats, and hardly any on the effect of management system on hematology of WAD goats. This study, therefore, aimed at assessing the effects of two management systems on haematology, parasite status as well as growth response in terms of body mass index of WAD goats.

MATERIALS AND METHODS

The study took place at the goat unit of the Teaching and Research farm, Annex campus, University of Uyo, Uyo, Akwa Ibom state, Nigeria. Uyo is located on the longitude and latitude bases between latitudes $4^{\circ} 59'$ and $5^{\circ} 04'$ N and longitudes $7^{\circ} 53'$ and $8^{\circ} 00'$ E. It is at an elevation of about 60.96 m above sea level. It has a bi-modal rainfall pattern with a mean annual rainfall of 2,190 mm and mean relative humidity of 81%. Sixteen WAD bucks aged between 6 – 12 months and a mean live weight of 6.67 kg were used. Eight animals (bucks) were randomly assigned each to intensive and semi-intensive systems of management. The experiment lasted for four months (October 2006 – January 2007).

The animals were administered anthelmintic medications and PPR vaccine upon assembling and also dipped against ectoparasites. Each pen was numbered and the animals identified by neck tags. The feeding materials were *Gliricidia sepium* and *Panicum maximum* supplemented with cassava and maize sieviates respectively. Feeding was done in the morning (900 hours) after which the semi-intensively managed goats were allowed freedom of outside grazing, and at 1700 hours brought back and fed while the intensively managed goats were not allowed to graze. Water was provided for the animals *ad libitum*. Proximate composition of diets was determined using A.O.A.C. (1980) guidelines. About three millilitres of blood was collected through the jugular vein of each goat.

prior to feeding each morning, into plastic containers with ethylene diamine tetracetic acid (EDTA). Packed Cell Volume (PCV) was determined by microhaematocrit method (Schalm *et al.* 1975) and White Blood cell (WBC) count was done using Neubauer haemocytometer chamber while leukocytes were determined according to the method described by Schalm *et al.* (1975). Height at withers was measured using tailors tape and weekly weights taken to determine body mass index. Faecal samples were collected directly from the rectum of the animals in the morning, biweekly until end of experiment. Both smear and floatation methods, with saturated sodium chloride solution were employed in the quantitative examination of faecal samples for the presence or absence of strongyle worm eggs, tapeworm segments and coccidial oocysts.

Statistical analysis

Mean values and standard error of means were calculated and significantly different means were separated using Student's t-test (P<0.01) (Snedecor and Cochran, 1982).

RESULTS AND DISCUSSIONS

Table 1 shows the haematological values of WAD goats in the two systems of management at the start and end of the experiment. There were no significant differences (P>0.01) between the treatments in respect of the haematological parameters measured. These values however, were within the normal physiological range reported for normal WAD goats (Daramola *et al.* 2005; Lasisi *et al.* 2006). The high value for PCV (21.75±1.81%) under intensive management could be attributed to the likely higher plane of diet given to the animals. The animals in the semi-intensive system, though with a lower strongyle worm egg count (25 % vs. 33 %) than those on intensive system recorded a PCV not numerically very different from those on intensive system (21.75 ± 1.81 vs. 20.63 ± 2.03). This value was lower than that reported by Anurudu *et al.* (2004) of 23 – 33 % probably because the plane of diet, though higher in the intensively managed goats, was not optimal due to the season. Reduced value of PCV and haemoglobin according to Aderemi *et al.* (2000) may be attributed to season, management and nutritional stress. This was unlike what Saddiqi *et al.* (2010) reported for sheep in which there was reduced PCV the longer the animals remained on the infected pasture due to sucking of blood from abomasa by adult *Haemonchus contortus*.

The mean values of WBC (16.25 ± 2.05 x 10⁹ L⁻¹ and 17.00±2.18 x 10⁹ L⁻¹) obtained in this study was within the range of 6.8 – 20.1 reported by Daramola *et al.* (2005). The leukocyte differential counts in the present study were not significantly different (P>0.01) in both systems of management, but the values fell within the normal physiological values for WAD goats (LYM – 47-82 %; NEU – 17-52 %; EOS – 1-7 %; and MON – 0-1 %) (Daramola *et al.* 2005). This suggests that management systems may have little or no effect on the leukocyte differential values of this species of animals, though this is contrary to observations made in White Fulani cattle, in which intensively managed animals recorded lower leukocyte counts than those on extensive (Saror and Coles, 1975). The percent lymphocytes for animals in both systems showed no significance (P>0.01) contrary to Schalm *et al.* (1975) who stated that percent lymphocytes and monocytes tended to be high under stress condition of the environment, especially of nutritional origin.

Table 1: Hematological parameters of WAD goats under intensive and semi-intensive systems of management

System of Management	Pre-commencement					
	PCV (%)	WBC (x10 ⁹ /L)	NEU (%)	LYM (%)	EOS (%)	MON (%)
Intensive	20.13±1.02	18.24±1.34	31.16±3.06	54.75±5.58	1.00±1.00	0.00±0.00
Semi-intensive	20.50±1.30	20.96±2.03	40.11±6.53	54.75±5.58	6.00±2.00	0.00±0.00
Post-commencement						
Intensive	20.63±2.03	16.25±2.05	44.69±6.85	48.62±4.98	8.00±6.00	0.00±0.00
Semi-intensive	21.75±1.81	17.00±2.18	40.05±6.25	48.19±5.58	3.00±1.00	0.00±0.00

Table 2 shows that the endoparasites of WAD goats under intensive and semi-intensive managements include strongyle worm eggs, *Eimeria* (coccidian) oocysts, and tapeworm segments. Also, 33 % of the intensively managed WAD goats had strongyle worm eggs present in their faecal samples, while 18.75 % had coccidian oocysts, with about 6.25 % having tapeworm segments. The semi-intensively managed WAD goats (25 %) were infested with strongyle worm eggs and 31.25 % with coccidian oocysts, with no tapeworm segment. Vecruiyse (1983) postulated that the dangers of worm burden were likely to increase with more intensive management. Obochi and Nwakalor (2000) also observed that restricted-unsupplemented animals had significantly the highest egg count. The reason for the high incidence of worms may be to favourable build up of worms due to favourable micro-environmental conditions, such as wetting of bedding materials, through urination and defecation, which enhances the subsequent development and survival of the pre-parasitic stages of strongyle worms. Moreover, the

beddings were changed periodically after every two weeks till the end of the experiment. Consequently, animals under this system could have ingested infective larvae as they feed from the floor and thus the reason for the high incidence of worms. The high level of coccidian oocysts present in the faecal samples of the semi-intensively managed animals may be due to infested pasture the goats were exposed to, as well as the pre-dry season (October – December) that the experiment was conducted.

Table 2: Percentage identification of endoparasites and Body Mass Index of WAD goats under intensive and semi-intensive systems of management

System of management	Parasites			Body mass index(g m ⁻²)
	Strongyle worm eggs	Coccidia oocysts	Tapeworm segments	
Intensive	6/16 (33%)	3/16 (18.75%)	1/16 (6.25%)	293.67±310.65
Semi-intensive	4/16 (25%)	5/16 (31.25%)	-	383.82±405.19

This submission is in agreement with Otesile's (1993) observation, that parasites are most predominant in tropical countries due to the climate and prevailing environmental conditions, which favour helminthes' growth. According to Akerejola *et al.* (1979) coccidiosis was a major cause of diarrhea in housed sheep. The prevalence and severity of infection are usually influenced by management system adopted and the nutritional state of the animals which, when poor, depresses the immune system as well as deny the animal materials for growth and repairs. However, the ectoparasites identified mostly on the intensively managed WAD goats were lice, sarcoptic mange and ticks, which did not pose serious problem. Though there was no significant ($P>0.01$) difference in body mass index of WAD goats between treatments measured, the mean value of 293.67±310.65 (g/m²) and 383.82±405.19 (g/m²) for both the intensively and semi-intensively managed WAD goats was obtained.

CONCLUSION

The results obtained from this study revealed that the system of management did not significantly affect the synthesis (erythrogenesis) and concentrations of red blood cells of the experimental animals, since the animals were neither anemic nor suffered from temporal or progressive polycythemia. In addition, the strongyle nematodes encountered appeared to be non-invasive parasites since there was no significant change in WBC in both systems of management.

REFERENCES

- Aderemi, F. A., Tewe, O. O. and Adesehinwa, O. K. 2000. Utilization of cassava root and leaves in diets for layers. *Tropical veterinarian*. 18:213-219.
- Aikhuomobogbe, P. U. and Orheruata, A. M. 2006. Haematological and blood biochemical indices of West African dwarf goats vaccinated against Pestes des petit ruminants (PPR). *African Journal of Biotech.* 5(9): 743-748.
- Akerejola, O. O., Vanveen, J. W. S. and Njoku, C. O. 1979. Ovine and caprine diseases in Nigeria: A review of economic losses. *Bull. Animal Health and Production in Africa.* 27: 65 – 70.
- Anurudu, N. F., Babayemi, O. J. and Osoanya, T. O. 2004. Haematology of pregnant West African Dwarf ewes fed siam weed-based rations. *Trop. J. Anim. Sci.* 7(1): 105 – 112.
- A.O.A.C. 1980. Official methods of analysis 15th ed. *Association of Analytical Chemist.* Washington DC. Pp. 69 – 88.
- Bourn, D. W., Blench, W. R. and Wooley, E. 1994. Nigerian livestock resources survey. *World Animal Review* 78(1): 49-58.
- Daramola, J. O., Adeloye, A. A., Fatoba, T. A. and Soladoye, A. O. 2005. Haematological and biochemical parameters of West African dwarf goats. *Livestock Research for rural-development.* 17(8): 1 – 8.
- Kadlim, J. H. 1972. A summary of gastrointestinal nematodes of sheep in Iraq. *Tropical Animal Health and Production.* 4:109-112
- Lasisi, O. T., Oyeyemi, M. O., Otesile, E. B. and Akusu, M. O. 2006. The efficacy of thiophanate on strongyle worm in West African Dwarf goats. *Vom Journal of Veterinary Science.* Vol. 1(2): 32 – 37.
- Obochi, O. C. and Nwakalor, L. N. 2000. Effect of management system and feeding regime on gastrointestinal parasite infestation in WAD sheep. *Journal of Sustainable Agriculture and Environment.* 1:7-13
- Otesile, E. B. 1993. Studies on West African Dwarf sheep: The influence of age of ewe and parturition interval on neonatal lamb mortality rate. *Bull. Animal Health and Production in Africa.* 41:251-255.

- Saddiqi, H. A., Iqbal, Z., Khan, M. N. and Mohammad, G. 2010. Comparative resistance of sheep breeds to *Haemonchus contortus* in a natural pasture infection. *International Journal of Agricultural Biology*. 12:739-743
- Saror, D. I. and Coles, E. H. 1975. Hemtological parameters of Nigerian Zebu cattle under native husbandry practices. *Nigerian Veterinary Journal*. 4(2): 89-92.
- Schalm, O. W., Jain, N. C. and Carroll, E. J. 1975. Veterinary haematology. 3 rd edition. Lea and Febiger, Philadelphia, U.S.A. Pp13,123-136.
- Snedecor, G. W. and Cochran, W. G. 1982. Statistical methods, 6th edition. Iowa state University Press, 10.
- Tambuwal, F. M., Agaie, B. M. and Bangana, A. 2002. Hematological and biochemical values of apparently healthy Red Sokoto goats. Proc. of 27 th Annual Conf., Nig. Soc. of Anim. Prod. (NSAP) March 17 – 21, 2002. FUTA, Akure, Nigeria. Pp 50 – 53.
- Vercruyse, J. 1983. A survey of seasonal changes in nematode faecal egg count levels in sheep and goats in Senegal. *Journal of Veterinary Parasitology*.13:239-244.

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REFERENCES

- Aderemi, F. A., Tewe, O. O. and Adeschinwa, O. K. 2000. Utilization of cassava root and leaves in diets for layers. *Tropical veterinarian*. 18:213-219.
- Aikhuomobhogbe, P. U. and Orheruata, A. M. 2006. Haematological and blood biochemical indices of West African dwarf goats vaccinated against Pestes des petit ruminants (PPR). *African Journal of Biotech.* 5(9): 743-748.
- Akerejola, O. O., Vanveen, J. W. S. and Njoku, C. O. 1979. Ovine and caprine diseases in Nigeria: A review of economic losses. *Bull. Animal Health and Production in Africa*. 27: 65 – 70.
- Anurudu, N. F., Babayemi, O. J. and Osoanya, T. O. 2004. Haematology of pregnant West African Dwarf ewes fed siam weed-based rations. *Trop. J. Anim. Sci.* 7(1): 105 – 112.
- A.O.A.C. 1980. Official methods of analysis 15th ed. *Association of Analytical Chemist*. Washington DC. Pp. 69 – 88.
- Bourn, D. W., Blench, W. R. and Wooley, E. 1994. Nigerian livestock resources survey. *World Animal Review* 78(1): 49-58.
- Daramola, J. O., Adeloye, A. A., Fatoba, T. A. and Soladoye, A. O. 2005. Haematological and biochemical parameters of West African dwarf goats. *Livestock Research for rural development*. 17(8): 1 – 8.
- Kadlim, J. H. 1972. A summary of gastrointestinal nematodes of sheep in Iraq. *Tropical Animal Health and Production*. 4:109-112
- Lasisi, O. T., Oyeyemi, M. O., Otesile, E. B. and Akusu, M. O. 2006. The efficacy of thiophanate on strongyle worm in West African Dwarf goats. *Vom Journal of Veterinary Science*. Vol. 1(2): 32 – 37.
- Obochi, O. C. and Nwakalor, L. N. 2000. Effect of management system and feeding regime on gastrointestinal parasite infestation in WAD sheep. *Journal of Sustainable Agriculture and Environment*. 1:7-13
- Otesile, E. B. 1993. Studies on West African Dwarf sheep: The influence of age of ewe and parturition interval on neonatal lamb mortality rate. *Bull. Animal Health and Production in Africa*. 41:251-255.