GROWTH PERFORMANCE OF RED SOKOTO AND WEST AFRICAN DWARF GOATS FED ON NATIVE PASTURES SUPPLEMENTED WITH CONCENTRATE RATION

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ABSTRACT

Six Red Sokoto (RS) and six West African Dwarf goats (WAD) aged 12 months and housed individually were reared for five months at the Small Ruminants Improvement and Multiplication Research Unit of ESUT, Abakaliki Campus. The animals were allowed to graze in the University Paddocks containing both native and introduced pastures, browse plants and leguminous herbage. The grazing period lasted from 0800 - 1200 hours in the morning and 1500 - 1700 in afternoon daily and between these two periods they were fed supplemental diets. The results showed that there were highly significant difference amongst the members of the genotypes whose mean body weights were ranged from 24.71 ± 0.083 - 40.75± 0.55 (RS) and from 14.98± 0.47 - 27.52 0.73kg (WAD). The heights at the withers and body length measurements also showed highly significant increase (P< 0.01) in the genotype during the period. The two genotypes differed remarkably (P< 0.01) from each other with RS being superior in body weight and height at the withers, and body length. However, the measurements taken of the thigh size and hearth girth circumference revealed no real difference between the RS and WAD ((P > 0.05). The findings indicate anthropometric areas requiring genetic improvement among the WAD, and at the same time serve as a pointer to the amount of response shown by the Maradi goats to management in the wet humid tropical environment to which it was being exposed.

Key words: Growth Performance, Genotypes, Native Pastures, Supplements, Concentrate Rations.

INTRODUCTION

Shortage of feed often poses a constraint to livestock production in almost every production system in Nigeria. And where feed resources abound, they may be of low nutritive value which manifests in nutritional deficiencies among the stock types especially during the dry season (Williamson and Payne, 1987). Webster and Wilson (1980) noticed that fodder conservation in tropical ranging areas consist mainly of one or more ranges for a season, within which they are fibrous standing hay, deficient in protein. It therefore, becomes advisable to supplement with concentration in order to neutralize the effect of compensatory growth or green grass effect (Payne, 1965; Wilson and Osbourn, 1960; Smiths and Hodnett 1960; Graham, 1986).

It has been estimated that there are about 24.5 million goats in Nigeia and 145 million in Africa and that goat population is on the increase at a faster rate than those of other ruminants Aliyu,(1990). Of all those Nigerian goats, Aliyu (1990) and Devendra and Burn (1970) have classified them into two major breeds (genotypes), namely, the Red Sokoto (Maradi) RS and West African Dwarf Goat with many intermediate transitional breeds occurring as one moves from the North east, Eastward and Southward to the South east.

The rearing of goat breeds originating from distinct ecological locations and which have their remarkably varied breed characteristics together in one environment provokes interest in assessing the impact of farm animal breeds amelioration, adaptation and the much talked about genotype - environment interaction, (Barlow, 1981).

This study compared the growth performance of the Red Sokoto and West African Dwarf goats breeds reared togehter at Abakaliki, South east of Nigeria utilizing Native and introduced

pasture and concentrate feed supplementation.

MATERIALS AND METHODS

The expriment was conducted at the Small Ruminant improvement and Multiplication Research unit of the Department of Animal Science, Enugu State University of Science and Technology (ESUT), Abakaliki Campus. A total of six West African Dwarf and six Red Sokoto goats all aged twelve month were used. They were identified by neck tagging, and housed in pens at a rate of one per pen. From 8.00 a.m. - 12 20 p.m., and from 4.00 p.m - 6.00 p.m. everyday the goats were sent out to graze in the University grazing Paddocks containing both native and introduced pastures, browse plants, and legumimous herbage (Table 1). Between 1.00p.m. and 3.30 p.m. in the afternoon of each day, however, the animals were fed a concentrate ration mixture of poultry growers mash (3%), crushed maize grains 4%, bambara nut chaff (20%), crushed roasted full - fat, soybean (9%) and common salt (1%) fed at 2% body weight. Fresh clean tap water was served ad - libitum to the goats in the pens at the periods they were fed on the mixed ration every day. The body weight and other body measurements such as heart circumference, height at the withers, body length and the thigh circumference of the goats were taken forth-nightly from day one of housing till 16th months of age. All data collected were subjected to the one single factor ANOVA in a completely randomized design by Steel and Torrie (1980). The significantly different mean values were separated by means of the Duncan Multiple Range Test, (Duncan, 1985).

TABLE 1: RESUT PADDOCK AND NATIVE PASTURES, BROWSE PLANTS AND CONCENTRATE FEED ON WHICH THE EXPERIMENTAL ANIMALS WERE FED

PREDOMINANT PASTURE GRASSES	REMARK/DESCRIPTION
A PREDOMINANT PASTURE GRASSES	
(1)*Andropogon gayanus*(Gamba grass)	Perennial, late flowering grass
(2)*Panicum maximum* (Guinea grass)	Perennial, early flowering grass
(3)*Hyperrhenia rufa*(Red thatching grass)	Annual, late flowering grass
(4)*Setaria barbata* (water grass)	Annual, late flowering
(5)*Cynodon nlemfluenesis*(African Star grass)	Creeping perenniais
B NATIVE GRASSES COMMON IN ESUT GRAZING FIELD	
(1)*Digital gayana*(Woolly Finger grass)	Annual, early flowering
(2)*Sporobolus pyranchalis*(Pyramid drop grass)	Perennial, all year round flowering
(3)*Pennisetum polystrachium* (mission grass)	Annual, late flowering
(4)*Pennisetum purpureum* (Elephant grass)	Perennial, late flowring
C LEGUMS AND OTHER BROWSE PLANTS/CROPS	
(1)*Calopogonium muconoides* (Calapo)	Annual, late flowering
(2)*Centrosema pubescens* (centro)	Perennial, late flowering
(3)*Ipomea bartatas* (sweet potato)	Leaves/stems
(4)*Manihot sp* (Cassava leaves)	Leaves browsed
(5)*Carica papaya*(paw paw leaves)	Leaves browsed
(6)*Leucaena Leucocephala*(Lucaena)	Leaves and bark
(7)*Gmelina arborea* (Leaves, bark soft stems)	
D CONCENTRATE FEEDS	
(1) Poultry Growers mash (CP content: 15.8%; ME 2,650 (kg)	
(2) Bambara nut chaff (Dusa) CP content 17%	
(3) Crushed maize (CP 8.8%)	
(4) Salt (Common slat)	
(5) Crushed and roasted full - fat soyabeans (CP).	*(Manufacturer's specification)*

RESULTS AND DISCUSSION

Table 1, show the different varieties of pasture grasses, browse and concentrate supplement from which the experiemtnal animals feeds on. The experimental location of Abakaliki, lies on a leptuso soil in the derived savanna zone of the South eastern part of Nigeria. (Omeje *et al* 1997). In this location, the dry season period is characterised by the presence of the dried fibrous native pastures usually burnt by hunters at different times leading to variation in the ages of

re-growths, while some will die due to short drought. There are some perennials which more or less provide green pasture and browse materials for the animals.

Table 2, shows the response to the feeds by the two genotypes within the five months period. After four weeks of housing (the 13th month) mean body weights of RS and WAD were 29.20± 1.92 and 18.81± 0.76 (kg) respectively indicating a remarkable rise (P< 0.01) from the values of the 12th month of age. This increase in body weight continued up to the 16th month when the highest body weight was attained by the two genotypes (P< 0.01) RSG 40.75± 0.55 and WADG

TABLE 2: DESCRIPTIVE STATISTICS OF RED SOKOTO (RS) AND WEST AFRICAN DWARF GOATS (WAD) DOES

PARAMETER	AGE (MONTH)	GENOTYPES Red Sokoto Goat	GENOTYPES W. African Goat	DIFFERENCE
Body weight (kg)				
	12	24.71 ±0.83	14.98 ± 0.47	9.73 ± 0.36*
	13	29.20 ± 0.92	18.81 ± 0.76	10.39 ± 0.16**
	14	35.24± 0.97	20.37 ± 0.59	14.87 ± 0.38**
	15	28.51 ± 0.37	23.10 ± 0.62	15.41 ± 0.08**
	16	40.75 ± 0.55	27.52± 0.73	13.23 ± 0.18**
Number of Does at Housing		6.0	6.0	-
Mean mortality during 5 months		0.0	0.0	-
Coat colour (no. of does)		Darkbrown (All)	Black (4) Ash/black Stripe (2)	

NS Not significant (P> 0.05)
* Significant (P < 0.05)
** Highly significant (P < 0.01)

TABLE 3: ANTHROPOMETRIC PARAMETERS OF RSG AND WADG DOES (CM)

PARAMETERS	AGE (MONTH)	GENOTYPES RS	GENOTYPES WAD	DIFFERENCE
Hearth Circumference (cm)	12	66.68± 0.96	64.81± 0.86	1.88± 0.1^{NS}
	13	66.17± 0.92	65.33± 0.83	0.84± 0.09^{NS}
	14	67.32± 0.16	65.93± 0.73	1.39± 0.57^{NS}
	15	68.20± 0.93	67.97± 0.77	0.23± 0.16^{NS}
	16	71.87± 1.37	67.97± 0.77	3.9 ± 0.6*
Height at the Withers	12	58.0± 0.96	43.8± 0.28	14.2± 0.68**
	13	60.42± 0.84	44.55± 0.61	15.87± 0.23**
	14	60.72± 0.79	44.72± 0.37	16.0± 0.42**
	15	61.23± 0.78	44.88± 0.41	16.35± 0.37**
	16	61.23± 0.78	44.88± 0.41	16.35± 0.37**
Body lenth	12	80.38± 1.78	72.47± 1.08	7.91± 0.7*
	13	81.93± 3.16	72.45± 1.17	12.48± 1.99**
	14	91.1± 1.07	73.83± 1.11	17.27± 0.04**
	15	91.22± 1.01	74.43± 0.99	16.79± 0.2**
	16	92.43± 1.09	74.62± 1.18	17.81± 0.09**
Thigh Circumference	12	21.3± 0.57	20.55± 0.61	0.75± 0.05NS
	13	21.6± 0.58	20.27± 0.41	1.33± 0.64NS
	14	23.97± 0.74	22.27± 0.41	0.75± 0.64NS
	15	23.47± 0.74	23.07± 0.45	0.4 ± 0.24NS
	16	24.62± 0.61	24.05± 0.74	0.15± 0.13NS

NS Not significant (P> 0.05)
* Significant (P< 0.05)
** Highly significant (P< 0.01)

27.52±0.73 kg respectively. However, the decrease in weight noticed in RSG at the 16th month as against the 14th months indicates that the RSG might be reaching maturity age.

Table 3 shows the antropometric measurements of economic importance which are usually employed in the selection of breeding and slaughter goats (Falconer, 1989, Williamson and Payne, 1978; FAO, 1977, 1976 and 1990). The hearth girth circumference within and across the two genotypes did not show significant increase from the 12th month to the 13th month (P 0.05) until the 16th month of the experiment, when the RSG and WAD responded significantly (P> 0.01). This finding agrees with Ngere (1975). These two parameters, therefore confer superiority over its opposite genotpe (WADG).

However, the thigh and chest circumference did not differ significantly from each other (P> 0.05). This result disagrees with the findings of Tripathi *et al* (1978); Vanderstock and Salibun (1940); Verga, (1939) who did not only support that height at the withers, etc but were of the opinion that body increase in weight was as a result of accelarated increase in different organs of body parts. The similarity in thigh, and chest circumstance results, between the two genotypes has restored advantage to WADG

(P< 0.05) short natured. The muscle at the WADG thigh is thick and effectively cushions the body weight as against the lanky and bony legged nature of the RSG.

The finding in the experiment showed that RSG and WADG does, managed in the same feeding condition showed significant growth in weight along with some body parameters. However, the increase in weight did not affect the growth of the thigh and heart girth circumference.

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REFERENCES

ALIYU, S.U. (1990). Sheep and goat production: Extention bulletin No. 46 L/S series No. 8 pp 1 - 22.

BARLOWO, R. (1981). Experimental evidence for interaction between heterosis Comm. COMW, Bur. Anim Breed. Genet; No. 19 COMW. Agric. Bus Farham Royal. UK.

DUNCAN, D.D.(1985). Multiple Range and Multiple F. Test Biometrics 11: 1 - 42.

FALCONER, O.S. (1989). Introduction of Quantitative Genetics ELBS, Longman, 3rd Edition pp 229 - 245.

FRENCH, M.H. (1970). Observation on the oat. No 8, 14 FAO Rome. AO, 1976 Edition, Animal.

FAO. (1977). Edition sheep and goat breed series 12 pp 41 - 47.

GRAHAM, B. (1986). Farm Livestock Farming Series pp. 102 - 107.

NGERE, L. (1975). The improvement of Livestock Production in Nigeria through Breeding Nigerian Journal Animal Production.

OMEJE, S., NWEZE, B., and ALAKU, S. (1997). Establishment of grazing paddock. For cattle and small ruminant. The performance of two grass species (Adropogon gayanus and Panicum Maximum) germinated by seeds and transplants paper, 24th Ann. Con. . NSAP, Bauchi 23 - 27th March, 1997.

PAYNE, W. (1965). Specific problem of semi arid environment. pp. 12, 268 - 294.

SMITH and DNETH (1962). Compensatory growth of cattle on the natural grasslands of Northern Rhodesia, Nature, Lond. 195. 919 - 20

SMITH C. (1967). Birgalow country. Rep. Div. Trop past. CSIRO 1966/67, pp. 25 - 34, Australia.

STEEL, R.G.D. and TORRIE, J.H. (1980). Principle and procedures of statistics. Mc Graw - Hill Co; New York.

TRIPATHI, G.S., KOUL, C.L. and KAPAL, B.G. (1976). Predicting weight from body measurements in Gir Cattle. India J. Dairy Sc. 31: 204 - 207.

VERGA, J.S. (1939). Contribution of the Study of Caracu Industrail Animal, N. S. 2(1): 53 - 61.

WANDERSTOCK J. AND SALISBURY, G. (1987). An Introduction to Animal Husbandry in the Tropics (ELBS Ed) pp. 63 - 479 London.

WILSON, P.M. and OSBOURN, D.F. (1960). Compensatory growth after undernutrition in mammals and birds. Biol Rev. 35: 324 - 63.