



Comparative Fattening Potential of West African Dwarf Bucks and Rams under Two Feeding Systems

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ABSTRACT

We studied the performance of bucks and rams of the West African Dwarf breed (WAD) under intensive and semi-intensive systems. Thirty-two animals comprising 16 bucks and 16 rams aged 9 months to one year were used for the experiment. The 16 WAD bucks were divided into four groups of four bucks each and each group randomly assigned to one of the following four feeding regimes: (T1) intensive system + forages, (T2) intensive system + forages + supplements, (T3) semi-intensive system + forages and (T4) semi-intensive system + forages + supplements. Similarly, the 16 rams were treated in the same way as the WAD bucks and designated T5, T6, T7 and T8 respectively. The feeding trial lasted for 90 days while digestibility study lasted 7 days. Feed intake, weight gain, feed conversion ratio and digestibility were determined. Rams under semi-intensive (T7) management had the highest mean daily gain (48 g/d) while rams under intensive system (T5) had the best feed conversion ratio (2.14) and those under the intensive (T6) the highest feed intake (742.8 g/d). Bucks raised under semi-intensive system (T3 and T4) had better weight gain than those under intensive system (T1 and T2) 40.0 g/d and 28.8 g/d versus 25.8 and 27.0 g/d respectively. The bucks suffered higher mortality rates than rams. Digestibility of nutrients differed little between bucks and rams. The results thus showed that raising rams under semi-intensive system would give a better performance than under intensive system and rams would perform better than bucks in both systems.

Keywords: Performance, digestibility, bucks, rams.

INTRODUCTION

The systems of small ruminant production in Nigeria are usually characterized by limitation posed by non-availability of year-round feed

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resources due to prolonged dry season (Aina et al., 2002; Aye, 2002). Agishi, (1998) reported that forage and feed resources available to small ruminants come from fallow rangeland and rarely from browse or pasture except under semi-intensive and intensive management systems. The intensive system requires complete confinement of animals, which is zero grazing, and provision of feeds and water. The provision of medications, balanced feed, salt licks as well as concentrates (energy or protein based) is important (Odeyinka, 2001). The semi-intensive system was described as being partially intensive and extensive (Gefu and Adu, 1984). Infrastructure and equipment are also provided. Apart from concentrate supplementation, the animals are allowed to graze for six to eight hours each day before returning to their pens in the evenings. Where grazing land is available, it is less labour-intensive and less costly than the intensive system (Gefu and Adu, 1984). The objective of our study was to compare the growth performance of WAD bucks and rams raised under similar conditions.

MATERIALS AND METHODS

The experiment was conducted at the Goatry unit of the Department of Animal Science, University of Uyo, Uyo, Akwa Ibom state, Nigeria.

Geo-Physical Description of Study Area

The study area, Uyo, is located between 112,000 m S – 118,000 m N and 604,000 m – 610,000 m W in the UTM Zone 32. On the longitude and latitude bases, Uyo is between latitudes 4° 59' and 5° 04' N and longitudes 7° 53' and 8° 00' E. It is on an elevation of about 60.96 m above sea level. It has a bi-modal rainfall pattern in July and September/October with a mean annual rainfall of 2,190 mm and mean relative humidity of 81 %.

Animals and Feeds

Thirty-two animals aged between six months and one year, comprising 16 bucks and 16 rams of the West African Dwarf breed were randomly allotted to eight groups of four animals each. The groups were randomly divided into intensive and semi-intensive systems of four subgroups. The experimental design was a 2 x 2 factorial in completely randomised design. *Panicum maximum* and *Gliricidia sepium* were obtained from the rangeland of the Department while concentrates (maize and cassava sievates in 50/50 mixture) were obtained from processing -facilities around the campus. These were offered to animals under intensive and semi-intensive systems before those under semi-intensive were led out for grazing. Water and salt lick were also given *ad libitum*. Prior to the arrival of the animals, pens were thoroughly

washed and disinfected. Animals were routinely dewormed and treated for parasites. The animals were weighed weekly while the last 7 days were used for total faecal collection for digestibility.

Data Collection/ Chemical Analysis

Data were taken for weight gain, feed intake, digestibility, feed conversion ratio and mortality. Dried and ground samples of the feedstuffs and faeces were used for chemical analysis according to A.O.A.C. (1990).

Statistical Analysis

Data were subjected to analysis of variance (ANOVA) using SAS (1999). Treatment means that differed significantly were compared using Duncan's New Multiple Range Test (Duncan, 1955) at the 5% level of probability.

RESULTS AND DISCUSSION

The proximate composition of experimental diets offered to the animals (bucks and rams) is presented in Table 1. The dry matter (DM) of *Panicum maximum* and *Gliricidia sepium* did not differ significantly. Cassava sievate had the highest DM content (77.75 %) while *Gliricidia sepium* had the lowest (24.31 %). Our DM and crude protein (CP) values for *Gliricidia sepium* were consistent with those reported in Ifut (1987) though higher in terms of crude fat (CF). For *Panicum maximum* the DM and CP values compared favourably with those reported in Adebowale, (1989). The high crude fibre content (27.40 %) could be attributed to the season (October – January) the research was carried during which time the plant had matured.

Table 1: Proximate composition (% DM) of *G. sepium*, *P. maximum*, Maize sievates and cassava sievates fed to West African Dwarf goats and sheep.

Components	<i>Gliricidia sepium</i>	<i>Panicum maximum</i>	Maize sievates	Cassava sievates
Dry matter	24.31 ±12.38	26.47 ±12.38	39.62±12.38	77.75±12.38
Crude protein	20.13 ±1.50	13.03 ±1.50	15.20 ±1.50	5.69 ±1.50
Ether extract	5.98 ±1.39	6.10 ±1.39	2.46 ±1.39	0.44 ±1.39
Crude Fibre	3.63 ±6.14	27.40 ±6.14	4.88 ±6.14	0.76 ±6.14
Ash	3.00 ±0.33	4.20 ±0.33	5.00 ±0.33	2.00 ±0.33
NFE	42.95 ±6.38	22.80 ±6.38	32.84 ±6.38	13.36 ±6.38

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The data on performance of the animals under the two systems are presented in Table 2. The highest feed intake was recorded for rams on treatment 6 (T6) (742.89 g/d) which were supplemented while the lowest was recorded for bucks (678.46 g/d) on treatment 2 (T2) also supplemented. These intake values (723.34 and 742.86 g/d) obtained in this study were lower than those reported in Anugwa (1990) for rams and higher for bucks (457.6 and 678.4 g/d) than that reported in Bamikole et al., (2004). The reason for this could be that grasses alone cannot provide nutrients required by ruminants (Aye, 2002), so there is need for supplementation which influenced intake positively (Akinusi and Adeleye, 1998).

A weight gain of 25.8 g and 27.0 g was recorded for T1 and T2 respectively for bucks. Due to supplementation, T2 had better value, contrary to the reports of Ajayi et al., (2005) who showed a lower value of 23.81 g. However, bucks under semi-intensive system, (T3) had the highest gain (40.0 g) being similar to that reported in Malau-Aduli et al., (2003) for red Sokoto goats. Rams on T6 performed better than those on T5 with 38.67 g and 21.0 g respectively. These values are consistent with those reported in Ahamefule et al., (2000). However, the value for T6 was higher than that reported in Adebowale (1989) in WAD sheep (24.9 g). The difference may be attributed to supplementation with concentrates in the diet of rams on T6. Rams on semi-intensive system (T7) had the highest value (48.0 g). On the whole rams performed better than bucks.

A mortality rate of 75 % was noted for T1 and 25 % for each of T2 and T3 respectively while the rate was the same for T2, T3, T6 and T7. It therefore appears that rams could be managed more efficiently under intensive and semi-intensive systems irrespective of diets than bucks. Data on coefficients of nutrient digestibility (%) for the animals (bucks and rams) are presented in Table 3. Digestibility values were higher for bucks in groups A and B (intensive). However, they were not significantly ($P > 0.05$) different from each other. The concentrate had little effects on digestibility of DM, CP, EE, CF, ASH and NFE. The high values obtained in this study may be attributed to the effect of concentrate and *Gliricidia sepium* combination as observed in Aye (2002). Digestibility values for rams in group B were numerically higher than those in group A with respect to DM, CP, EE, CF, and significantly so ($P < 0.05$) for ASH. This is in line with the findings of Ahamefule et al., (2000). Overall, bucks seemed to utilize the nutrients more effectively than the rams in similar treatment groups. Also, the animals were able to retain substantial amounts of nutrients considering what was consumed and what was voided which was an indication of good nature of experimental diets and management system.

Table 2: Performance of the experimental animals under intensive and semi-intensive systems.

Parameters	Rams							
	T1	T2	T3	T4	T5	T6	T7	T8
Initial body weight (kg/buck/ram)	6.46 ±0.13	7.00 ±0.13	6.75 ±0.13	6.50 ±0.13	8.05 ±0.14	7.38 ±0.14	7.56 ±0.14	7.75 ±0.14
Final body weight (kg/buck/ram)	8.67 ±0.31	9.30 ±0.31	10.11 ±0.31	8.92 ±0.31	9.78 ±0.31	10.63 ±0.31	11.60 ±0.31	11.75 ±0.31
Mean daily gain	25.80 ±0.04	27.0 ±0.04	40.0 ±0.04	28.8 ±0.04	21.0 ±0.01	38.67 ±0.01	48.0 ±0.01	35.0 ±0.01
Mean total feed intake (g)	457.6 ±0.04	678.4 ±0.04	-	-	723.34 ±0.05	742.86 ±0.05	-	-
Feed Conv. Ratio	4.18 ±0.78	3.07 ±0.78	-	-	2.14 ±0.73	2.17 ±0.73	-	-
Mortality (%)	75 ±11.96	25 ±11.96	25 ±11.96	50 ±11.96	0 ±0.00	25 ±0.00	25 ±0.00	0 ±0.00

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Table 3: Coefficients of nutrient digestibility (%) of Bucks and Rams fed *P. maximum*, *G. sepium* and concentrates.

Nutrients	Bucks		Rams	
	Group A (PM+GS)	Group B (PM+GS+C)	Group A (PM+GS)	Group B (PM+GS+C)
Dry matter	82.57±6.83	88.95±6.83	58.96±6.83	85.85±6.83
Crude protein	92.72±2.44	91.76±2.44	82.02±2.44	90.03±2.44
Ether extract	91.10±3.19	88.29±3.19	76.43±3.19	83.91±3.19
Crude fibre	97.08±3.59	95.61±3.59	93.31±3.59	95.16±3.59
Ash	74.84±10.87	75.33±10.87	30.75 ^b ±10.87	72.32 ^a ±10.87
NFE	39.00±2.55	39.66±2.55	40.75±2.55	37.67±2.55

a, b = means on the same row bearing different superscripts differ significantly ($p < 0.05$).
P. maximum – PM; *G. sepium* – GS; C – concentrate. ± SEM

CONCLUSION

It is very evident from this study that raising rams under the semi-intensive system elicited better performance than those raised under intensive system and the rams performed better than bucks.

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