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Full Length Research Paper

# Influence of Feeding *Panicum Maximum* Supplemented With Wheat Offal on the Carcass Characteristics of West African Dwarf Goat

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Data from 16 West African Dwarf (WAD) bucks aged 6 – 9 months and weighing 6 – 6.5 kg were used to evaluate the effect of feeding *Panicum maximum* supplemented with wheat offal on their carcass yield. Four goats were randomly assigned to each of four diets: T<sub>1</sub> – *Panicum maximum ad libitum* (sole diet), T<sub>2</sub> – *Panicum maximum ad libitum* + 200 g wheat offal, T<sub>3</sub> - *Panicum maximum ad libitum* + 225 g wheat offal and T<sub>4</sub> - *Panicum maximum ad libitum* + 250 g wheat offal. The experiment lasted 90 days. Data were collected on linear measurements, carcass weights and carcass quality, offal yields and wholesale cuts. Animals on diet T<sub>1</sub> recorded the highest linear parameters of 38.00cm, 16.00cm and 20.67cm for body length (BL), heart girth (HG) and neck circumference (NC) respectively. This was significantly (P<0.05) different from the supplemented groups for BL and HG, while neck length (NL) and NC were not significant (P>0.05). The carcass weights of animals on T<sub>1</sub> were significantly different (P<0.05) from those on T<sub>3</sub> with 8.33 kg, 3.07 kg and 36.85 % for slaughter weight, dressed weight and dressing percentage respectively. While there was no significant difference (P>0.05) in the dressing percentage between animals on T<sub>1</sub> and T<sub>3</sub>, those on T<sub>3</sub> recorded a numerically higher dressing percentage of 40.00 % compared to 36.85 % for those on T<sub>1</sub>. There was no significant difference (P>0.05) in carcass quality. Goats on T<sub>1</sub> had the highest significant (P<0.05) whole cut and offal sale values except in loin, towel and liver. Supplementation of *Panicum maximum* with wheat offal at 225 g is recommended for optimum growth of WAD bucks.

**Keywords:** WAD goat, *Panicum maximum*, wheat offal, carcass, offal.

## INTRODUCTION

In rural Africa, ruminants are faced with poor nutrition (Ravhuhali *et al.*, 2011) and this occurs because during the dry season, animals suffer periods of starvation as a result of scarcity and reduction in the nutrient content of forages (Nwaigwe *et al.*, 2007). At such periods most available ruminant forages become fibrous and have low digestibility, leading to poor livestock performance (Mubi *et al.*, 2008; Asaolu *et al.*, 2011). Goat production in Nigeria

as observed by Tolera *et al.*, (2000) is characterized by low productivity levels due principally to nutritional constraints leading to low production, reproductive performance, slow growth rate and increased susceptibility to diseases and pests.

According to Ifut *et al.*, (2011), the dwarf goats feed on almost any feed stuff but there seems to be some level of inter-relationship between the different diets and feed

**Table 1.** Ingredient composition of the experimental diets

TREATMENT	INGREDIENTS
1	<i>Panicum maximum</i> only
2	<i>Panicum maximum</i> + 200g wheat offal
3	<i>Panicum maximum</i> + 225g wheat offal
4	<i>Panicum maximum</i> + 250g wheat offal

**Table 2.** Linear body measurements of WAD goat fed *Panicum maximum* supplemented with wheat offal

Parameters (cm)	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	SEM
Body length	38.00 <sup>ab</sup>	35.33 <sup>c</sup>	38.33 <sup>a</sup>	36.00 <sup>bc</sup>	0.62
Heart girth	16.00 <sup>a</sup>	13.13 <sup>b</sup>	13.00 <sup>b</sup>	12.33 <sup>b</sup>	0.74
Neck length	11.33 <sup>a</sup>	13.13 <sup>a</sup>	12.67 <sup>a</sup>	12.67 <sup>a</sup>	0.93
Neck circumference	20.67 <sup>a</sup>	19.33 <sup>a</sup>	20.33 <sup>a</sup>	19.33 <sup>a</sup>	0.93

Means along the same row with different superscripts differ significantly (P<0.05)

T1- *P. maximum* ad lib; T2- *P. maximum* + 200 g Wheat offal; T3- *P. maximum* + 225 g Wheat offal; T4- *P. maximum* + 250 g Wheat offal

**Table 3.** Carcass weights and rumen pH of WAD goat fed *Panicum maximum* supplemented with wheat offal

Parameters	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	SEM
Slaughter weight (kg)	8.33 <sup>a</sup>	6.67 <sup>ab</sup>	6.00 <sup>b</sup>	6.33 <sup>ab</sup>	0.65
Dressed weight (kg)	3.07 <sup>a</sup>	2.18 <sup>a</sup>	2.40 <sup>b</sup>	2.03 <sup>b</sup>	0.20
Dressing percentage (%)	36.85 <sup>a</sup>	32.94 <sup>a</sup>	40.00 <sup>a</sup>	33.27 <sup>a</sup>	2.93
Rumen pH	8.01 <sup>a</sup>	6.78 <sup>ab</sup>	6.46 <sup>ab</sup>	5.79 <sup>b</sup>	0.47

Means along the same row with different superscripts differ significantly (P<0.05)

T1- *P. maximum* ad lib; T2- *P. maximum* + 200 g Wheat offal; T3- *P. maximum* + 225 g Wheat offal; T4- *P. maximum* + 250 g Wheat offal

stuffs, their effects on body condition, carcass yield and quality (Anous and Mourad, 1993). Pinkerton (2003) observed that goat meat evaluations have received little attention and as a result, knowledge of yield and quality of goat meat is given little consideration as compared to meat from cattle and sheep. Therefore, there is need for evaluations and formulations of rations that will supply enough nutrients for resultant desirable carcass yield. It is with this in mind that farmers now make routine nutrient supplementation by feeding concentrates alongside forages with the hope of achieving desirable goats performance. Forage like *Panicum maximum* cannot solely provide all the nutritional needs of a goat raised for meat, hence the need to supplement with concentrates for enhanced production.

Wheat offal is used as a preferred concentrate because of its reported abundance in Nigeria and the fact that the value of wheat offal in feeding of livestock had long been recognized by earlier scientists in the United States of America (U.S.A.) (Morrison, 2006). The objectives of this work were to determine the effect of feeding *Panicum maximum* as a sole diet on the carcass yield, wholesale cuts and offal yields of the WAD goat. It also aimed at

assessing the carcass characteristics of WAD bucks fed *Panicum maximum* and varying levels of wheat offal supplementation.

## MATERIALS AND METHODS

A 90-day experiment was conducted at the Goatry unit of the Department of Animal Science, University of Uyo, Uyo, Nigeria. 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 longitudinal and latitudinal 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 %.

A total of 16 WAD bucks aged 6 - 8 months with average weight of 6.38 kg were used. The animals were quarantined for 2 weeks and treated against ecto- and endo-parasites. The animals were put into four treatment groups replicated 4 times in a completely randomized design. The animals were fed a basal diet of *Panicum*

**Table 4.** Wholesale cuts of WAD goats fed *Panicum maximum* supplemented with wheat offal

Parameters (g)	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	SEM
Hindquarters	750.00 <sup>a</sup>	466.67 <sup>c</sup>	600.00 <sup>b</sup>	466.67 <sup>c</sup>	34.84
Fore shank	716.67 <sup>a</sup>	500.00 <sup>bc</sup>	600.00 <sup>ab</sup>	466.67 <sup>bc</sup>	37.27
Chuck	316.67 <sup>a</sup>	250.00 <sup>ab</sup>	250.00 <sup>ab</sup>	233.33 <sup>b</sup>	19.98
Brisket	300.00 <sup>a</sup>	200.00 <sup>b</sup>	100.00 <sup>c</sup>	150.00 <sup>bc</sup>	25.66
Loin	250.00 <sup>a</sup>	250.00 <sup>a</sup>	266.67 <sup>a</sup>	250.00 <sup>a</sup>	26.51
Rib	366.67 <sup>a</sup>	233.33 <sup>b</sup>	300.00 <sup>ab</sup>	216.67 <sup>b</sup>	38.18

Means along the same row with different superscripts differ significantly (P<0.05)

T1- *Panicum maximum* ad lib; T2- *Panicum maximum* + 200 g Wheat offal; T3- *Panicum maximum* + 225 g Wheat offal; T4- *Panicum maximum* + 250 g Wheat offal

**Table 5.** Offal yields (g) of WAD goats fed *Panicum maximum* supplemented with wheat offal

Parameters (g)	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	SEM
Gut fill	2700 <sup>a</sup>	1716.70 <sup>b</sup>	1900 <sup>b</sup>	1600 <sup>b</sup>	191.66
Empty gut:					
Stomach	350.00 <sup>ab</sup>	416.67 <sup>a</sup>	300.00 <sup>bc</sup>	233.33 <sup>c</sup>	27.64
Intestine	416.67 <sup>a</sup>	316.67 <sup>ab</sup>	300.00 <sup>b</sup>	300.00 <sup>b</sup>	31.18
Testes	66.59 <sup>a</sup>	46.41 <sup>b</sup>	27.43 <sup>c</sup>	25.35 <sup>c</sup>	5.12
Heart	40.72 <sup>a</sup>	28.92 <sup>b</sup>	38.78 <sup>a</sup>	25.02 <sup>b</sup>	2.99
Kidney	28.21 <sup>a</sup>	27.56 <sup>a</sup>	27.92 <sup>a</sup>	23.47 <sup>b</sup>	0.96
Lungs	91.32 <sup>a</sup>	68.69 <sup>b</sup>	80.55 <sup>ab</sup>	75.17 <sup>b</sup>	4.16
Liver	120.30 <sup>a</sup>	118.77 <sup>a</sup>	148.48 <sup>a</sup>	129.19 <sup>a</sup>	6.39

Means along the same row with different superscripts differ significantly (P<0.05)

T1- *Panicum maximum* ad lib; T2- *Panicum maximum* + 200 g Wheat offal; T3- *Panicum maximum* + 225 g Wheat offal; T4- *Panicum maximum* + 250 g Wheat offal

*maximum* supplemented with varying levels of wheat offal as shown in Table 1. Data on linear body measurements were obtained with the aid of a tailor's cloth measuring tape.

In order to investigate the carcass, the goats were fasted for 24 hours with free access to water, weighed and slaughtered by severing the jugular veins after stunning. After bleeding, the carcasses were flayed and then cut into whole sale cuts after the entrails had been harvested. Individual carcass weight, dressing percentage, wholesale cuts and offal weights were obtained using weighing scales, while rumen pH was measured using portable pH meter (Hanna). All data obtained were subjected to analysis of variance using SAS (1999) computer software package. Means were separated using Duncan's Multiple Range Test.

## RESULTS AND DISCUSSIONS

The linear body measurements of WAD bucks fed *Panicum maximum* supplemented with varying levels of wheat offal are shown in Table 2.

There were no significant differences (P>0.05) in the neck lengths and neck circumferences. This agrees with El-shaer (2003) who reported no significant differences

between animals fed concentrates and basal diets and concluded that diet type does not affect body linear measurements. Concentrate-fed goats had a smaller heart girth than the control (P<0.05). This might be due to the fact that forages are best for optimum growth of animals (Ifut *et al.*, 2011).

Table 3 shows the carcass weights, dressing percentage and rumen pH of WAD goats fed *Panicum maximum* and wheat offal at varying levels of inclusion. There was a significant difference (P<0.05) between the means of the concentrate-fed group and the control in the slaughter and dressed weights. This agrees with the work of Snowden, (1994) who recorded a highly significant difference between concentrate-fed and forage-fed goats. Animals on T<sub>1</sub> recorded the highest values for both slaughter and dressed weights as against wheat offal supplemented groups.

However, the dressing percentage was not significantly different among the treatment means (P>0.05) which may be due to the fact that wheat offal as well as forages have the ability to influence yields (Susan, 2002). Animals on T<sub>3</sub> performed the best numerically (40 %) as compared to others with those on T<sub>2</sub> being the least (32.94 %). The dressing percentage observed in this work did not fall within the range (39.36 – 43.77 %) as stated by Ifut *et al.*, (2011) for WAD bucks except for animals on T<sub>3</sub>. Increase

in wheat offal supplementation led to a decrease in rumen pH. Animals on T<sub>1</sub> recorded the highest (8.01) significant value while those on T<sub>4</sub>, with higher supplementation, had the least (5.79). This finding agrees with Banerjee (1998) who stated that rumen pH is within the range of 5.8 – 6.8. With large amounts of readily fermentable carbohydrate, the pH of rumen may fall to 4.0. However, with poor forages the pH may rise to 7.5 or more. Animals on T<sub>2</sub> and T<sub>3</sub> diets fell within the range for normal rumen pH except those on T<sub>1</sub> and T<sub>4</sub> due to effect of forages and wheat offal respectively.

Table 4 shows the wholesale cuts of WAD goats fed *Panicum maximum* supplemented with wheat offal. There was a significant difference between the means of the treatments ( $P > 0.05$ ) which agrees with Agishi, (1995) that feeding forages solely led to higher carcass yield and further supports that forages are best for optimum growth of animals (Ifut et al., 2011). However, the loin recorded no significant difference ( $p > 0.05$ ). Animals on T<sub>1</sub> were numerically higher than others for the parameters measured except for loin, while significantly different ( $p < 0.05$ ) from those on other treatment diets on hindquarters and brisket.

Table 5 summarizes the offal yields of WAD goats fed *Panicum maximum* supplemented with wheat offal. There was no significant difference ( $p > 0.05$ ) in the offal yields of the treatments with respects to the liver. However, there were significant differences ( $p < 0.05$ ) in the treatment means of gut fill, empty gut and other organs. This supports the work of Agishi (1995) that forage fed animals often result in higher offal yields. Animals on T<sub>1</sub> were numerically higher in terms of gut fill, testes ( $p < 0.05$ ), intestine, heart, kidney and lungs. Animals on T<sub>4</sub> had a poor showing with the lowest values for gut fill, towel, testes, heart and kidney (1.60 kg, 233.33 g, 25.35 g, 25.02 g, and 23.47 g respectively).

## CONCLUSION

The study showed that 225 g wheat offal supplementation of *Panicum maximum* gave a better carcass yield or dressing out percentage (which is a measure of amount of useful product (meat)) than other treatment diets. Hence, an inclusion level of 225 g of wheat offal is recommended for supplementation in goat diets for optimum growth.

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