



## RESEARCH ARTICLE

### Performance of Growing Grasscutters Fed on Different Fibre Sources

RE Uwalaka<sup>1</sup> and EO Ahaotu<sup>2</sup>

<sup>1</sup>Department of Forestry Technology, Imo State Polytechnic Umuagwo, Ohaji, Nigeria

<sup>2</sup>Department of Animal Production Technology, Imo State Polytechnic, Umuagwo, Nigeria

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#### ABSTRACT

Grasscutter (*Thryonomys swinderianus*) is an animal species that belongs to the rodent order. Its meat constitutes a vital source of much-needed animal protein for humans. The grasscutter is a wild herbivorous rodent found predominantly in the grasslands of Sub-Saharan Africa. It feeds mainly on grass and is capable of digesting majority of edible plants similar to rabbits. An intensive grasscutter production aims at achieving higher levels of DM intake through addition of various vegetative and concentrates supplements to the basal diet. Our 18 week experiment evaluated the performance of twenty four 15-week old growing grasscutters, allotted to four treatment groups of six animals each, which were fed on diets containing four different fibre sources namely; wheat offal, palm kernel cake, maize sievates and a combination of equal amounts of all the three fibre feedstuffs. The experiment involved two replicates per treatment and three growing grasscutters per replicate in a Completely Randomized Design and the data were subjected to the analysis of variance. The performance of grasscutters, as assessed by forage intake, concentrate intake, total feed intake and cost of feeding, was significantly ( $P < 0.05$ ) higher on the maize sievates than on other diets, while the rate of attainment of puberty was significantly higher on the palm kernel cake than on other diets. These findings suggest that the performance of growing grasscutters was best on the palm kernel cake diet. We thus recommend palm kernel cake as the preferred source of fibre for feeding growing grasscutters.

#### \*Corresponding Author

RE Uwalaka  
vieng663@hotmail.com  
emmaocy@yahoo.com

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#### INTRODUCTION

Grasscutters (*Thryonomis swinderianus*) inhabit the grasslands and woody savannahs of the humid and sub-humid areas south of the Sahara (Adu *et al.*, 1999). They belong to a group of wildlife animal species, which constitute a vital source of much-needed animal protein for humans in West Africa (Singleton *et al.*, 2003, Abioye *et al.*, 2008). Grasscutters can adapt to harsh environments, utilize natural resources and can digest almost any form of edible plants (Ajayi, 1983). The digestive tract of the grasscutter with its large caecum is adapted predominantly for microbial digestion of feeds (Baptist and Mensah, 1986, Alaoginouwa *et al.*, 1996). The aim of intensive grasscutter production is to achieve higher levels of DM intake through incorporation of various vegetative and concentrate supplements to the basal diet. Efficient and cost-effective production systems involve the intensive feeding of the grasscutter on

roughages, including agricultural by-products and concentrates such as maize sievates, wheat offal and palm kernel cake, which provide energy and protein supplements.

#### MATERIALS AND METHODS

The experiment was carried out at the Grasscutter and Rabbitry Research Farm at Imo State Polytechnic Umuagwo, Imo State, Nigeria. The study area is situated in the South Eastern Zone of Nigeria with an annual rainfall of 2000mm - 2484mm and with an average temperature of 26°C (IMLS, 2010).

Four different treatment diets that differed only in their fibre sources were formulated to contain Wheat Offal (WO), Palm Kernel Cake (PKC), Maize Sievates (MS), or a combination of equal amounts of all the high fibre feedstuffs (MWP) as shown in Table 1. All the ingredients were purchased from the local market in

Calabar. The composition of the test diets is shown in Table 1, while the proximate composition of the diets is shown in Table 2. The Apparent Digestibility Coefficients (ADC) of the various fractions (Dry Matter (DM), Crude Protein (CP), Crude Fibre (CF), Ether Extract (EE), Ash and Nitrogen Free Extract (NFE)) for the various diets was determined (Table 3). Twenty four 13-week old growing grasscutters of equal weight were randomly allotted, in groups of six, to the four test diets. There were two replicates per treatment and three growing grasscutters per replicate in a completely randomized design. The experiment lasted for 15 weeks. Water and feed were supplied *ad libitum*. The animals were weighed every two weeks during the experiment.

Daily feed (forage and concentrate) intake and daily weight gain were recorded. All the data collected was subjected to the analysis of variance using the procedures described for the GENSTAT (2007) software. A P-value less than 0.05 were considered to be statistically significant.

**Table 1:** Composition of the experimental diets used for growing Grasscutters

Ingredients (%)	Experimental diets (source of fibre)			
	MWP	PKC	WO	MS
Cassava	37.00	37.00	37.00	37.00
Maize sievates	3.00	0.00	0.00	9.00
Wheat offal	3.00	0.00	9.00	0.00
Palm kernel cake	3.00	9.00	0.00	0.00
Groundnut cake	21.00	21.00	21.00	21.00
Soybean meal	29.00	29.00	29.00	29.00
Salt	0.25	0.25	0.25	0.25
Bone meal	3.50	3.50	3.50	3.50
Vitamin premix	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00

MS = maize sievates, WO = wheat offal, PKC = palm kernel cake, MWP =

**Table 2:** Proximate Composition of the Experimental Diets for Growing Grasscutters

Nutrients (% of DM)	Treatments (Source of fibre)			
	MWP	PKC	WO	MS
Dry matter	91.04	90.96	91.25	90.92
Crude protein	21.63	20.44	22.18	20.01
Crude fibre	6.26	6.18	6.01	6.26
Ether extract	4.82	4.75	5.00	4.66
Ash	4.00	4.89	3.89	5.02
Nitrogen free extract	63.29	63.74	62.92	64.05
Calculated ME (kcal/kg)	2912.11	2919.04	2921.14	2909.12

**Table 3:** Apparent Digestibility Coefficients (%) of Nutrients of the Experimental diets fed to growing grasscutters

Diets	DM	CP	CF	EE	Ash	NFE
MWP	73.40	82.21	77.68	76.33	73.60	68.06
PKC	73.58	85.74	78.22	77.40	80.04	68.55
WO	73.47	86.20	76.96	84.43	74.41	68.26
MS	74.04	86.02	78.12	74.31	80.77	68.95
SEM	0.14	0.95	0.29	2.20	1.86	0.19

MS = maize sievates, WO = wheat offal, PKC = palm kernel cake, MWP =

## RESULTS

The proximate composition of the experimental diets is presented in Table 2. The results show that the

proximate composition of the various fractions (DM, CP, CF, EE and Ash) did not differ significantly among the test diets. The Apparent Digestibility Coefficients (ADC) of various nutrients is shown in Table 3. DM, CP, CF, EE, ash and NFE, for the various diets were similar regardless of the source of fibre in the diets. Grasscutters fed with the MS diet had the highest (256.93 g) forage intake ( $P < 0.05$ ), while the lowest (179.04 g) intake was observed with grasscutters fed with the PKC diet. Average daily diet intake was highest (95.34 g) for grasscutters fed with the PKC diet and lowest (78.22 g) for grasscutters fed with the MWP diet. Grasscutters fed on the PKC diet had the highest (116.31 g) daily total feed intake, while the lowest (102.74 g) total feed intake was observed with grasscutters fed on the MWP diet. 100% of the six female grasscutters fed on the PKC diet attained puberty before or by 22 weeks of age. This performance was significantly higher than the 83.30, 50.00 and 33.30% observed among grasscutters fed with the MWP, MS and WO diets, respectively. The average daily cost of feeding grasscutters was highest (N7.63) for grasscutters fed on the PKC diet, while the lowest (N6.30/day) was observed with grasscutters fed on the MWP diet.

## DISCUSSION

Total feed intake and diet intake were significantly different among grasscutters, being highest on the palm kernel cake (PKC) diet, though daily weight gain was not significantly different among growing grasscutters fed on different diets. The significantly lower intake of forage and forage dry matter on the PKC diet was compensated for by the significantly higher intake of the compounded diet which, because of its higher energy and less crude fibre content, partly explains the comparable weight gain on the PKC diet. The average daily total feed intake (102.74- 116.31 g) obtained in this experiment is lower than the 150-250 g reported by Yeboah and Adamu (1995), while the average daily weight gain (11.12-11.83 g) agrees with the 8-13 g reported by Jori and Cherdonnet (2001) and the 7-12 g reported by Yeboah and Adamu, (1995). Fast growth rate and early attainment of puberty are economically beneficial to the farmer. The results of this study show that the rate of attainment of puberty (before or by 22 weeks of age) was higher for grasscutters on the PKC diet (100%) than on the maize sievates (50%) or wheat offals (33.3%) diet (Table 4). The higher rate of attainment of puberty was the result of the significantly higher intake of total feed and diet on the PKC diet than on the wheat offals and maize sievates diets. The higher intake of diet and total feed resulted in the comparably high daily weight gain, which stimulated faster physiological changes and therefore, the faster and higher rate of attainment of puberty on the PKC diet at 22 weeks of age. Though not statistically significant, grasscutters on the PKC diet had the highest final body weight (2468.34 g), which underscores the faster rate of attainment of puberty on that diet. Akinbile (2004) reported 20 weeks as the age of physiological maturity in female grasscutters. The similarity in the proximate composition of diets and their Apparent Digestibility Coefficients (ADC), as well as the comparable feed conversion ratios, which are indicative of rate of feed utilization, explain the comparable weight gains on those diets. Although the

**Table 4:** Performance of growing grasscutters fed with different fibre sources

Parameters	Treatments (Fibre sources)				SEM
	MWP	PKC	WO	MS	
Initial body weights (g)	1319.03	1323.21	1304.24	1415.22	64.21
Final body weight (g)	2292.21	2468.34	2345.23	2421.42	88.10 <sup>ns</sup>
Average daily forage intake (g)	202.91b	179.04c	195.11bc	256.93a	7.92
Average daily forage DM intake (g)	24.52b	21.33c	23.93b	31.72a	1.02
Average daily diet intake (g)	78.22b	95.34a	85.52b	83.52b	3.33
Average daily total feed intake (g)	102.74b	116.31a	106.41b	113.83a	3.43
Average daily weight gain (g)	10.62	11.63	11.83	11.12	2.14 <sup>ns</sup>
Puberty rate (%)	83.30b	100.00a	33.30c	50.00d	16.50
Feed conversion ratio	13.83	12.71	11.92	15.93	3.72 <sup>ns</sup>
Average daily cost of diet (N.k/kg)	6.30c	7.63a	6.84b	7.51a	0.28
Cost to body weight gain ratio (N/kg)	0.86	0.64	0.68	0.71	0.34 <sup>ns</sup>

ab: mean values along the same row having no common superscript differ significantly from each other at P<0.01; ns refers to non-significant differences between the mean values. MS = maize sievates, WO = wheat ofal, PKC = palm kernel cake, MWP=?

daily cost of feeding was highest for PKC fed group, the cost of feeding per unit weight gain was lowest on the PKC diet (N0.64/g) than on the wheat ofal (N0.68/g) and maize sievates (N0.71/g) diets, suggesting that a more favourable cost per unit weight gain was achieved on the PKC diet.

### Conclusion

The findings of our experiment suggest that the performance of growing grasscutters, as indicated by the significantly higher rate of attainment of puberty, was best on the PKC diet. We therefore recommend PKC be used as the preferred kernel cake for rearing grasscutters.

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