

GROWTH PERFORMANCE OF YANKASA RAMS FED DIGIT GRASS (*Digitaria smutsii*) HAY AS BASAL DIET SUPPLEMENTED WITH DIFFERENT PROTEIN SOURCES

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ABSTRACT

The study was conducted to evaluate the performance of Yankasa rams fed basal *Digitaria smutsii* hay supplemented with different protein sources. Sixteen (16) growing Yankasa rams with average live weight of 24.40 ± 0.01 kg were allotted to four (4) dietary treatments as diet without supplementation, diet supplemented with cotton seed cake, groundnut haulms, cowpea husk designated as T1 (control), T2, T3, and T4, respectively. The parameters monitored includes feed intake (FI), live weight gain/kg/ (LWG), weight gain (WG), average daily gain (ADG), Feed efficiency (FE) and feed cost. The trial was designated in a completely randomized design (CRD), replicated (4) times. The results of growth performance showed that there were significant ($P < 0.05$) differences in the total weight gain (TWG) and average daily gain (ADG), basal feed intake (BFI) and total feed intake (TFI) across treatments.

Keywords: Yankasa, Rams, *Digitaria smutsii*, Protein, Supplement.

INTRODUCTION

Small ruminant animals are raised all over the world, because of their adaptability to varying environmental conditions and the different nutritional regimes under which they evolved (Aziz, 2010). Ruminants largely depend on forages which are essential to maintain their health and production at various stages of their growth and development (Oderinwale et al., 2021). More attention has been paid to small ruminant production in the tropics as their advantages are becoming more understood than ever before, particularly for their ability to produce meat, milk and skin, even in hostile environments (Okoruwa et al., 2012). *Digitaria smutsii*, commonly known as Digit grass or Pongola grass, is a grass grown in tropical and subtropical climate (Aliyu et al., 2021). It grows relatively well in various soils but prefers moist soils. It is tolerant to droughts, water lodging, and suppressed weeds and regrows quickly after grazing. It demonstrates great potential for farmers in Africa, in tropical and subtropical climates, mostly for livestock feeds.

Study area

The experiment was conducted at the Aliko Dangote University of Science and Technology Teaching and Research Farm, Gaya (11°05'11" N; 9°02'01" E; altitude 430m above sea level) in the semi-arid Kano, Nigeria. The area is characterized by a defined wet season which normally begins in May and ends in October. The mean annual rainfall is about 800mm, while temperature ranges between 20°C in December to 43°C in May (Olofin et al., 2008).

Acquisition of Experimental Materials

Digitaria smutsii hay was obtained from the National Animal Production Research Institute (NAPRI) Shika, Zaria. Other feed ingredients in the diets includes ground nut haulms (GNH), cotton seed cake (CSC), cowpea husk (CH), rice milling residues (RMR), wheat bran (WB), sorghum chaff (SC) and salt were purchased from Wudil market. The experimental animals (Yankasa rams) were also purchased from the International Livestock market in Wudil, Kano State.

Experimental animals and their Management

The experimental animals were offered with *Digitaria smutsii* hay *ad libitum* in the morning. They were later supplemented with the experimental supplements at 1.5% BW in the evening daily. The experimental study lasted for ten (10) weeks. Sixteen (16) growing Yankasa rams with an average live weight of 24.40 ± 0.1 kg were quarantined for two weeks and ear tagged for easily identification. Prior to commencement of the study, the animals were given prophylactic treatments. They were dewormed with albendazole (2.5%) against endo-parasite, then. Injection Ivermectin was given at 0.1/10 kg body weight subcutaneously for ecto-parasites. Oxytetracycline 20% (LA) was given at 1ml/10kg body weight as broad spectrum antibiotic against bacterial infection (Rasko, 2013). Experimental animals was fed with basal diet in the morning and supplemented with three protein sources in the afternoon around 2-4:00 pm. Fresh water was provided to experimental animals *ad libitum*.

Experimental Design and Treatments

The experimental animals were balanced by weight and allotted to four (4) treatments in a completely randomized design (CRD), replicated four (4) times. The treatments were T1 (*D. smutsii* with RMR + WB and SC) as control, T1 (*D. smutsii* supplemented with WB + RMR + SC + CSC), T2 (*D. smutsii* + WB + RMR + SC + GNH and T3 (*D. smutsii* + WB + RMR + CPH) T4.

Performance Parameters measured

Feed Intake (g/day): determined by subtracting the leftover from the total feed offered, live Weight changes (Kg): obtained and monitored the changes on a weekly basis, in the morning before feeds were offered. Weight gain (Kg): Measured by the difference between initial and final weights at the end of the experiment (WG FBW-IBW). Average daily gain (g/day): was obtained by dividing total weight gain by the number of the experimental period (ADG= WG ÷ experimental period). Feed efficiency (%): was calculated as a ratio of average daily feed intake to average daily gain.

Proximate Analysis of the experimental diets

Basal *Digitaria smutsii* hay samples and other ingredients diets were taken to laboratory for chemical analysis. For {dry matter (DM), crude protein (CP), crude fibre (CF), ether extracts (EE), ash and nitrogen free extract (NFE)} were determined by procedures of Vansoet (1991).

Statistical Analysis

The data obtained were analyzed using the General Linear Model (GLM) of SAS (2008) and significant differences in the treatment means were separated using Duncan Test (Duncan 1995) at 5% level of probability.

RESULTS AND DISCUSSIONS

Proximate Composition (%) of the experimental diets.

The dry matter (DM%) values used in this experiment, ranges from 90.56-87.41%, crude protein (CP) values 6.68-7.51%. 80.03-9.23% Crude fiber (CF), 5.50-6.09% Ether extract (EE), 6.36-7.22% Ash and 58.80-61.96% nitrogen free extract (NFE). The proximate composition of the experimental diets provided a clear picture of the nutrient available in each type of diet. (6.45, 14.31 and 5.42). This variation could be attributed to the varieties used in the environment, soil characteristics, environmental factors and management practices (Savadogo *et al.*, 2000). Also, it is lower than range of 9-14% reported by Aduku (2005) needed for maintenance and growth of sheep. The variation may be attributed to the varietal differences.

Proximate composition of the experimental diets

	Parameters (%)			
	T ₁ (0%)	T ₂ (30%CSC)	T ₃ (30%GNH)	T ₄ (30%CPH)
Dry matter	88.68 ^b	87.41 ^c	88.99 ^b	90.56 ^a
Crude protein	7.07	6.68	7.21	7.51
Crude fiber	9.08	8.03	8.95	9.23
Ether extract	6.09	5.39	5.86	5.50
Ash	7.22 ^a	6.39 ^c	6.78 ^b	6.36 ^c
Nitrogen free extract	58.80	60.93	60.19	61.96

The result of growth performance of Yankasa rams fed basal *Digitaria smutsii* hay supplemented with different protein sources

The result showed that the total weight gain (TWG) value was significantly ($P < 0.05$) higher in T3 (3.33g). Average daily gain follows the same pattern with total weight gain. Basal feed intake was significantly higher in T4 (442.12) and lower in T2 (417.39). Feeding basal *Digitaria smutsii* hay with concentrates diet and supplemented with diet containing 30% groundnut haulm (GNH) resulted in appreciable increase in final body weight. The live weight gain was higher in animals supplemented with cowpea and groundnut haulms than control group fed only with straw. Reports by Ashiru, *et al.* (2010) stated that, supplementation of these legumes to a basal diet of rice straw boosted nutrients intake and growth performance of Yankasa rams. Feed conversion ratio values were lower in T3 and T4 indicating that animals in these treatments were more efficient in utilization of feeds. The findings were agreed with that of Maigandi and Nasiru (2006). The average daily gain (ADG) values obtained in the current study were lower than 94.60g/day reported by Nyako (2015) for Yankasa rams fed

groundnut hay and maize brans. This might be due to differences in the composition of the experimental diet and location. The differences may be due to the age of the experimental animals or feed ingredients. However, the total weight gains reported in this study were higher to values 1.91-2.95kg reported by Enan and Nyako (2017) when different protein supplements were fed to Red Sokoto goats. The variation could be due to differences in the experimental diet or breeds and procedure of feed processing.

Growth performance of Yankasa rams fed basal *Digitaria smutsii* hay supplemented with different protein sources

Parameters (%)	Treatment				SEM
	T ₁ (0%)	T ₂ (30%CSC)	T ₃ (30%GNH)	T ₄ (30%CPH)	
IBW (kg)	24.33	24.33	24.33	24.67	2.489
FBW (kg)	26.67	27.67	27.80	26.67	2.517
TWG (kg)	2.31 ^b	2.67 ^{ab}	3.33 ^a	2.33 ^b	0.333
ADG (g/day)	32.29 ^b	38.14 ^{ab}	45.57 ^a	32.29 ^b	4.763
Basal FI (kg)	424.82 ^c	417.39 ^d	433.24 ^b	442.12 ^a	0.15
Conc. Intake (kg)	32.83	31.78	35.60	37.37	3.753
TFI (kg)	457.65 ^c	449.82 ^d	468.24 ^b	479.49 ^a	0.02
ADFI (g/day)	650.07	642.6	668.91	684.99	49.71
FE (%)	0.08	0.08	0.09	0.06	0.012

^{abc} means within the same row with different superscripts differs significantly (P<0.05). SEM= Standard error means. IBW- Initial body weight, FBW- Final body weight, TWG- Total weight gain, ADG- Average daily gain, FE- Feed efficiency.

CONCLUSION

Based on the findings of this study, it could be recommended that feeding basal *D. smutsii* hay to Yankasa Rams supplemented with 30% CSC, 30% GNH and 30% CH level, but inclusion of 30% GNH was better and increased weight gained.

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