Potential Value of Sesban (*Sesbania Sesban*) Fodder and Napier Grass Hay Mixture Diets on the Growth Performance of West African Dwarf Growing Bucks

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Abstract
Growth performance of West African Dwarf (WAD) bucks fed *Sesbania sesban* forage with Napier grass hay mixture diet for 90days feeding trial was conducted at the Teaching and Research Farm of Oyo State College of Agriculture and Technology Igbo-ora, Nigeria. Sixteen (16) growing WAD bucks between 6 - 9 months of weighing 6.00-10.00kg were randomly allocated to four (4) treatments with 4 bucks per treatment and 2 bucks per replicate in a completely randomized design, and were fed daily with varied experimental diets (T_1 = 100%NG hay (100NG); T_2 = 25%NG + 75%SS hay (25NG75SS); T_3 = 50%NG+50%SS hay (50NG50SS); T_4 = 100%SS hay (100SS)) with a 500g concentrate diet for individual animals. There were significant ($P<0.05$) differences in all parameters determined on growth performance across the dietary treatments. Buck maintained on T_4 diet had the highest daily feed intake (283.19g/d), while the lowest value (235.98g/d) for DFI was recorded on bucks fed diet T_1. The results revealed that bucks fed diet T_1 recorded the least daily weight gain (20.56g/d) while the highest daily weight gain (25.33g/d) was recorded in bucks fed diet T_4. Hence, bucks fed diet T_3 that contained 50%NG + 50%SS hay mixture recorded the best feed utilization value of 11.10. The study revealed that 50%NG + 50%SS hay mixture diet has a good nutrient profile and enhanced feed utilization in terms of feed conversion ratio (FCR) by the bucks.

Keywords: *Tropical browse fodders, Napier grass, WAD bucks, Growth performance*

Description of Problem

Feed scarcity in terms of quality and quantity as well as seasonal fluctuation was identified as the most important constraint to livestock development and productivity (1). As a result of this the productivity of ruminant livestock in the tropics and sub-tropics is limited by inadequacy of good quality and nutritive feed (2). Browse fodders are useful sources of cheap feed for ruminant animals in developing countries, especially during dry seasons when herbaceous pasture grasses and legumes are scarce (3). The ability of their foliage to remain green and maintain their protein content makes them potential sources of protein and energy (4). Therefore, the current study was conducted to determine the growth performance of growing WAD bucks fed Napier grass and *Sesbania sesban* hay mixture with concentrate diet.

Materials and Methods

Experimental site and animals

The experiment was conducted at the Sheep and Goat Unit, Teaching and Research Farm, Oyo State College of Agriculture and Technology, Igboora. Sixteen (16) growing West African dwarf bucks weighing between 6.00 – 10.00 kg and of 6 – 9 months of age were used. The animals were allowed to acclimatize for two weeks and treated prior to the commencement of the experiment

Harvesting and processing of experimental diets

Napier grass and *Sesbania sesban* forage were harvested around the College farm, chopped at 3 cm long, wilted for 2 – 3 hours in the sun, and air-

dried under shade for 4 - 5 days to prevent bleaching and loss of nutrients before bailed and stored for the experiment.

Experimental layout, design and feeding method.

The animals were allocated by weight into four treatments of four bucks per treatment and two bucks as a replicate in a completely randomized design (CRD). The air-dried *Sesbania sesban* forage and Napier grass were mixed in varying proportions as the experimental diets, and thoroughly mixed to minimize selection by the animal before being fed at 3% body weight to the bucks per day. The animals in each treatment group were offered their respective experimental diet (forage hay) at 8.00 am, a formulated low-cost concentrate (Table 1) of 500g per buck per day at 2.00 pm, and 3 litres of fresh and clean water daily. The compared experimental diets were: T_1 (100%NG hay only), T_2 (25%NG+75%SShay), T_3 (50%NG+50%SShay) and T_4 (100%SS hay only), and their proximate composition shown in Table 2.

Data Collection and Analysis

Adjustment period of one week was allowed before data collection commenced. At the beginning of the experiment, the bucks were weighed and subsequently on a weekly basis prior to feeding in the morning. The initial live weight was subtracted from the final live weight to determine the weight gained. The forage hay and concentrate diets were weighed before feeding to the animals and left-overs weighed the next morning before feeding to determine the feed intake daily. Feed offered and reminant were weighed daily to determine the feed intake of the animals. Both values were used to determine dry matter intake (DMI), the mean initial body weight, feed intake and feed conversion ratio were calculated.

Table 1: Composition of formulated low-cost concentrate for experimental West African Dwarf growing bucks

Ingredients	Level (%)
Palm kernel cake	60.00
Wheat offal	20.00
Corn bran	9.75
Groundnut cake	8.00
Bone meal	2.00
Salt	0.25
Total	100.00

Data analysis

Data were subjected to one-way Analysis of Variance (ANOVA) procedure of SAS version 9.4 (5). Differences among treatment means were assessed using Duncan's Multiple Range Test (6).

Table 2: Proximate composition of air dried *Sesbania sesban* and Napier grass hay mixture and concentrate diets fed to bucks

Parameters (%)	T_1 100NG	T_2 NG25SS75	T_3 NG50SS50	T_4 100SS	Concentrate
DM	87.63	73.52	71.59	81.12	94.48
CP	8.12	15.28	15.61	18.67	17.57
CF	29.57	20.34	20.12	19.01	8.75
EE	1.15	2.28	2.33	2.37	10.39
Ash	11.95	7.06	9.67	10.69	5.85
NFE	36.84	28.64	23.86	30.38	50.21
NDF	51.50	45.18	48.16	41.65	30.34
ADF	40.09	30.17	31.78	32.07	16.05
ADL	14.03	10.60	11.03	10.27	5.65
*ME(Kcal/Kg)	1702.33	1676.15	1615.19	1963.15	3282.45

*DM= Dry Matter, CP= Crude Protein, CF= Crude Fibre, EE= Ether Extract, NFE=Nitrogen Free Extract, NDF= Neutral detergent fibre, ADF= Acid detergent fibre, ADL= Acid detergent lignin, *ME= Calculated Metabolizable energy,*). SS=*Sesbania*

Results and Discussion

Table 3 represents the growth performance of West African Dwarf growing bucks fed air dried *Sesbania*

sesban and Napier grass hay mixture with concentrate diets. There were significant differences (P<0.05) in feed intake (g/d) among treatment means. Bucks fed solely 100%SS diets recorded significantly (P<0.05) higher feed intake T_4 (283.19) while the lower value (235.98g/d) was observed in bucks maintained on solely 100%NG air dried forages in diet T_1. This observation is in agreement with the inverse relationship between dry matter intake and fibre content of the feed reported by (7), but did not agree with the reports of (8) who reported a higher DMI for diets with high fibre content than those with low fibre content. However, the nature of fibre and its interaction with other nutrients like protein might also influence intake. Lower DMI in the diet T_1 group might be as a result of lower crude protein content of the diet as earlier reported by (8) that low nitrogen content of feed significantly reduces dry matter intake of feeds. The improved feed intake (283.19g/d) for T_4 diet that contained air dried solely 100%SS forages with 500g concentrate supplemented diet could be due to faster rumen outflow and the provision of more degradable organic matter (9). The growth rates obtained in this study which ranged between 20.56 –25.33g/d were higher than the range of 14.88 to 21.43 g/d reported by (10) for WAD goats that were offered dried leaves of moringa, gliricidia and leucaena as supplements to a basal diet of cassava peels. The difference observed in the daily weight gain (DWG) of bucks in this study can be attributed to variation in the nutrient supplied by the diets. The low feed intake in bucks on diet T_1 could be attributed to the higher lignification of the diet. The observed feed conversion ratio values ranged from 11.10 to 13.32 were higher than the values (3.48 – 7.35) reported by (11) in a study with WAD growing rams fed guinea grass supplemented with differently processed pigeon pea leaves on growth performance. The result showed that T_3 had the best feed utilization with value of 11.10. These results could be an indication that air dried 50%NG+50%SS hay mixture fodder supplemented with 500g concentrate is probably suitable alternatives as dry season supplements to poor quality fibrous feeds.

Table 3: Growth performance of West African Dwarf growing bucks fed air dried *Sesbania sesban* and Napier grass hay mixture with concentrate diets

Parameters	T_1 100NG	T_2 NG25SS75	T_3 NG50SS50	T_4 100SS	SEM (±)
Daily feed intake (g/d)	235.98^{d}	281.26^{b}	248.05^{c}	283.19^{a}	4.21
Average initial weight (kg)	8.56^{c}	8.55^{b}	8.57^{ab}	8.58^{a}	0.40
Average final weight (kg)	10.41^{d}	10.45^{c}	10.58^{b}	10.86^{a}	0.32
Average weight gain (kg)	1.85^{d}	1.90^{c}	2.01^{b}	2.28^{a}	0.45
Daily weight gain (g/d)	20.56^{d}	21.11^{c}	22.33^{b}	25.33^{a}	2.05
Feed conversion ratio (FCR)	11.48^{b}	13.32^{a}	11.10^{cd}	11.18^{c}	1.30

^{abcd} means on the same row with different superscript are significantly different (P< 0.05). SSH=*Sesbania sesban Hay, NGH=Napier grass Hay, FCR= Feed conversion ratio.*

Conclusion and Application

The results of this study indicated that combination of grass based diet Napier grass (*Pennisetum purpureum*) hay with browse fodder promoted dry matter intake, nutrient intake and also enhance growth performance in WAD growing bucks fed 50%Napier grass hay + 50% *Sesbania sesban* fodder hay mixture with 500g concentrate diet.

It is therefore, recommended that the tropical grass (Napier grass) hay be supplemented with browse in diets of buck to enhance the growth performance. The combination ratio might however, depend on the production status of the animal and the quality of both the basal grass diet and the browse plant species. Supplementation of basal grass diet with browse, particularly 50% Napier grass hay + 50% *Sesbania sesban* fodder hay is therefore recommended in the humid tropics of Nigeria for bucks, especially during the dry season when there is decline in quality and quantity of the basal grass diet.

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