

PERFORMANCE OF FEMALE WEST AFRICAN DWARF (*Fouta djallon*) GOATS FED *SPONDIAS MOMBIN* Plus CONCENTRATE.

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ABSTRACT

The effects of supplementing *Spondias mombin* with concentrate diet were investigated with respect to dry matter and crude protein intakes and retention, feed efficiency and growth rate in 50 young female West African dwarf (*Fouta djallon*) goats in a 90 - day feeding trial. The mean dry matter intake was significantly ($P < 0.05$) different from one another with regard to different supplementation levels while the highest dry matter intake was exhibited by the does fed with 25% browse plus 75% concentrate diet. The does on 75% browse plus 25% concentrate diet indicated the best performance in terms of growth rate (106g/day) and feed efficiency (0.391). The highest crude protein intake (86.21g/day) and protein retention (57.18g/w^{0.75}kg) were induced by 50% browse and 50% concentrate supplement. The protein requirement for maintenance in the does was 24.459/Wkg^{0.75}.

Key words: *Spondias*, Dwarf goats, concentrate.

INTRODUCTION

The importance of browse plants as source of protein and energy to ruminants, particularly during the dry season of the year has been extensively reviewed (Wilson, 1969). However, browse plant cannot constitute a complete feed when fed alone (Carew, 1981). They should be given adequate attention in the feeding management of goats.

Spondias mombin (Yoruba: Iyeye (English: hog plum) is a browse plant common in many parts of West Africa. Being a browse, it is practically available throughout the year. It is a perennial dicotyledonous plant which has the ability to regenerate when cut or planted. This confers easy mode of establishment on the plant. It is used as staking stick for yam cultivation by the peasant farmers. It is a popular animal feedstuff at the traditional

farming level especially during the dry season and can be fed as fresh forage, hay or silage. The plant grows effectively on tropical humid and rich loamy soil. It is water loving with ability, after fully grown, to withstand drought and harsh conditions.

This study estimated the DM intake, growth rate, feed efficiency, protein retention and protein requirement for maintenance in young female WAD goats fed *Spondias mombin* leaves supplemented with concentrate diet.

MATERIALS AND METHODS

Animals and their management

Fifty young female WAD goats, aged 5 to 9 months and weighing 6 to 9 kg were used. They were dewormed with Banminth II wormer at 12.5g/kg body weight and dipped into solution of Asuntol powder at 3g/litre of water to get rid of possible ectoparasite. The goats were housed in disinfected and well ventilated pens where they were given University of Ibadan Farms standard diet for 30 days with free access to water and mineral salt lick before the experiment. This was to ensure uniform pre-experimental management so that their responses to experimentation will be attributed, within reasonable limit, to different dietary treatments.

Experimental diet

The experimental diet used was made up of basal feed of *Spondias mombin* plus concentrate supplement. The concentrate supplement consisted of sundried cassava peels (23.5%), ground maize grains (25%), maize bran (30%), palm kernel cake (20%), mineral-vitamin premix (0.5%) and table salt (1%). The calculated crude protein of the concentrate supplement was 10.73% while that of *Spondias mombin* as determined (AOAC, 1980) was 13.91%

Dietary treatment

The 50 young does were divided into 5 groups of 10 each such that group weights were similar. The 100% concentrate diet was diet 1 (D1). The total daily DM intake was replaced (W/W in percentage) with 25 (D2), 50 (D3), 75 (D4) and 100 (D5) of the browse. The browse leaves and branchlets were cut, sundried for 2 to 3 hours to reduce moisture content and chopped daily before supplied to the experimental goats. Each of the groups was randomly assigned and fed one of the diets for 90 days. Total feed offered daily was 0.60kg per head. Any residues of the browse and concentrate diets were weighed before morning feeding to estimate intake. Water was supplied *ad libitum*.

Data Collection

The goats were weighed every fortnight between 08.00 and 09.00 h before feeding. Five does from each group were randomly picked, fixed with harnessing and collection bags lined with cellophane paper and transferred into individual, metabolic cages modified for collection of urine. Faeces and urine from each doe were collected daily and weighed for 7 days. About 25% of daily faeces collected was oven-dried at 80°C and bulked for each animal. The urine sample bottles were rinsed with dilute sulphuric acid as preservative before storing at -5°C until required for chemical analysis.

Chemical Analysis

2 gms of the ground fry *Spondias mombin* leaves and faeces were further dried at 105°C to constant weights. The ground samples were analysed for their proximate components (AOAC, 1980) and statistical analysis.

Dry matter intake, growth rate, protein retention and feed efficiency were computed and subjected to analysis for variance while the protein requirement for maintenance was determined from the regression analysis (Little and Hills, 1978).

RESULTS AND DISCUSSION

The does treated on 25 and 75% *Spondias mombin* exhibited significantly ($P < 0.05$)

higher DM consumption (295 and 281g/day, respectively) than the does on other diets. However, the DM intake (g/day/W^{0.75}kg, Table 1) depicted lower values (29.31 to 43.32) than the figure (51.06kg/day/W^{0.75}kg) reported by Robinson and Forbes (1970) for 7-months weaned lambs but close to the values (39.43±1.980 to 46.67±1.80g/day/W^{0.75}kg) obtained by Awah (1981) for 24 - week old WAD goats. The pooled mean value of DM consumption (3.60±0.070% body weight) was equal to the value observed by Mba *et al* (1982) who fed kids (4 to 6 months old) on *Gliricidia sepium* plus concentrate supplement.

The does on D4 indicated faster ($P < 0.05$) growth rate (106g/day) than the does on other diets. Diet 4 also induced the best feed efficiency (0.391). It appears that D4 induced the best responses in the does in terms of growth rate and feed efficiency. These observations agreed with the reports of Robinson and Forbes (1970), Carew, (1981) and Opka (1985) who worked on *Gliricidia sepium* and *Leucaena leucocephala* with WAD goats. Thomas (1986) also obtained optimal growth rate with treated WAD goats on 70% basal and 30% concentrate supplement.

The does were in positive protein balance with the values varying from 13.69±1.633 to 50.22±0.994. The protein intake and retention in the does fed sole *Spondias mombin* was quantitatively higher than the protein retention in the does fed sole concentrate diet (Table 1) although the difference was not significant ($P > 0.05$). It thus appears that there is a lower protein utilization in the does fed sole *Spondias mombin*. This was expected since *Spondias mombin* contained higher crude protein content (13.91%) than the concentrate supplement (10.73%). However, the does on sole *Spondias mombin* (D5) exhibited the least responses in terms of DM intake (251g/day), growth rate (52g/day) and feed efficiency (0.207) when compared with the responses of the does on other treatments.

The highest protein intake and protein retention were induced by D3 (50% browse plus 50% supplement) while the protein requirement for maintenance was

UTILIZATION OF SPONDIAS BY WAD GOATS

TABLE 1: PERFORMANCE OF FEMALE WEST AFRICAN DWARF GOATS FED SPONDIAS MOMBIN PLUS CONCENTRARE SUPPLEMENT

Parameters	Diet 1	Diet 2	Diet 3	Diet 4	Diet 5	±SE
Initial body weight (kg)	6.20	8.15	8.70	6.50	7.73	1.072
Final body weight (Kg)	12.32	14.54	15.27	16.40	12.41	1.797
Body weight gain (kg)	6.12	6.39	6.57	9.90	4.68	1.921
Growth rate (g/day)	58.00 ^a	71.00 ^a	67.00 ^a	106.00 ^b	52.00 ^b	21.040
Dry matter intake (g/day)	264.00 ^a	295.00 ^b	255.00 ^a	281.00 ^b	251.00 ^a	18.472
Dry matter consumption (g/day/Wkg ^{0.75})	42.58	36.20	29.31	43.32	32.47	5.147
Dry matter intake per body weight (%)	4.26	3.62	2.93	4.32	3.25	0.612
Feed efficiency	0.258 ^a	0.241 ^a	0.286 ^b	0.391 ^b	0.207 ^a	0.070
Protein intake (g/day)	43.61 ^a	55.10 ^a	86.21 ^b	53.43 ^a	47.53 ^a	16.870
Protein retention (g/Wkg ^{0.75})	13.69 ^a	29.49 ^a	57.18 ^b	31.84 ^b	22.88 ^a	16.232

a,b,c. means along the same row with any identical superscript are not significant (P > 0.05)

24.45g/W^{0.75}kg. The value of 24.45g/W^{0.75}kg reported here deviated significantly from those of Mackenzie (1970) : 0.79g/W^{0.75}kg) ARC (1980) : 0.76 to 0.88g/W^{0.75}kg) and Akinsoyinu (1985 : 0.63 to 0.68g/W^{0.75}kg). Onwuka and Akinsoyinu (1985) also obtained 0.51g/day/W^{0.75}kg for goats fed browse (cassava leaves supplemented with cassava peels). The higher value obtained in this study could be attributed to the very young age (5 to 9 months) of the experimental goats. They were still in the actively growing stage which would require higher protein level for maintenance than the fairly older goats.

In conclusion, results showed that the utilization of *Spondias mombin* by the young female WAD goats was best in terms of growth rate and feed efficiency when fed at 75% browse plus 25% concentrate supplement.

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