

**Full Length Research Paper****The utilization of some tropical browse plants by pregnant West African Dwarf goats in southern Nigeria****Ogunbosoye D.O\* and Babayemi O.J<sup>1</sup>**

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<sup>1</sup>Department of Animal Science University of Ibadan.**\*Corresponding author: Ogunbosoye D.O****ABSTRACT**

A study on utilization of five tropical browses was carried out to investigate on the significant effect of these forages on the performance of pregnant goats in relation to weight gain, birth weight, litter size and weight of the kids with their sex. Result revealed that daily dry matter consumption of animals fed guinea grass was highest (1.17kg/day) while the least consumption was *Gliricidia sepium* (0.48kg/day). The daily weight change of goat fed *Albizia odoratissima* was highest (85.3g/day) and lowest in animals fed guinea grass. The weight of doe during pregnancy had effect on the litter size and birth weight of the kids. The weight of does fed albizia diet was highest and this resulted into multiple birth and moderate birth weight. The study also showed that single birth kids were heavier than multiple births. The result then revealed that where multiple births occurred, the males were heavier than females. It is therefore concluded that animals fed *Albizia odoratissima* performed better than the rest, although all the forages used for this study sustained the pregnant does except guinea grass which needs to be supplemented with either browse plants or concentrate.

**Keywords:** Browse specie, WAD goats, Litter size, Multiple birth, Kids**INTRODUCTION**

Feed accounted for about 60-80 % total cost of production in livestock industry and is the single largest cost associated with livestock management (Egbewande and Olorode, 2003). Nutrition has a very important influence on animal reproduction, milk production and growth performance. Animals that are fed with inadequate diets are more prone to some infections and diseases and may fail to reach their genetic potentials. Many factors like maintenance, growth, pregnancy, lactation, fibre production, activity and environment may affect the nutritional requirements of small ruminants.

As the population and standard of living continues to increase in the tropics and throughout the world, the demand for animal products will increase. In many developing countries, sustained and high population growth rates, combined with limited and rapidly diminishing land for food and forage production, have created a need to intensify agricultural production in order to bridge the gap between requirement and supply of food and ensure proper human nutrition. Hence, the challenge of livestock producers and nutritionists to increase the efficiency of conversion of feed resources into animal products is highly essentials.

Dry season results in a rapid decline in the quantity and quality of forages leading to low forage intake and

digestibility which results in poor animal performances. Adegbola, (2002) reported that poor quality roughages fed to ruminants without supplementation during the dry season caused considerable weight losses and general poor performances. The conventional feed resources available during this period are very expensive to feed animals because of the competition with man for livelihood (Akinmutimi, 2004) and this has necessitated the search for cheap alternative feed materials that can meet nutritional requirements of farm animals. The alternative feed materials should not be in high demands by humans and should be very cheap and readily available (Akinmutimi, 2007).

Intensification, in the context of ruminant production systems, means a broadening of the feed resource base to compensate not only for the shrinking of rangeland and natural grasslands but also for the low quality and seasonal nature of this major feed resource. Therefore, the use of alternative feed resources such as multipurpose trees and shrubs (legumes and non-legumes) should be intensified. Fodder trees and shrubs have been used for generations as multipurpose resources (food, fibre, fodder, timber, wood and live fences) across all of the agro-ecological zones of Africa. Multipurpose trees and shrubs (MPTS) have hitherto not been systematically exploited for strategic year round livestock production but they could be used to improve livestock production during dry season because of availability all year round. The local

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farmers can easily integrate production of fodder trees into the farming system and manage them without assistance from the extension agent. MTPS are considered to be high production of good quality forage in terms of protein and minerals contents, palatability and digestibility.

This study is therefore designed to evaluate the performance of these forages on pregnant WAD does.

### Materials and Methods

Forage used are *Leucaena leucocephala*, *Gliricidia sepium*, *Albizia odoratissima*, *Ficus thonningii*, *Spondias mombin*, and *Panicum maximu*. Forages were supplemented with concentrate at 2 % body weight. The study was conducted at Animal Genetic Resources Unit of National Centre for Genetic Resources and Biotechnology (NACGRAB) Moor Plantation, Ibadan.

**Table 1:** Composition % of experimental diet

Ingredients	Composition
Wheat offal	54.25
Soyabean meal	10
Corn bran	20
Palm kernel meal	10
Oyster shell	2.25
Bone meal	3
Salt	0.5

### Chemical composition of the feed samples

Each fresh sample consists of leaves and small part of stems. The samples were oven-dried to constant weight at 105°C for 2 days to determine dry matter (DM) and later ground to pass through 1mm sieve for later use. Crude protein (CP), ether extract (EE), crude fibre (CF), ash content of the fodders were determined as outlined (AOAC, 1990). Neutral detergent fibre (NDF), acid detergent fibre (ADF) and acid detergent lignin (ADL) were analyzed (Van Soest *et al.*, 1991).

parturition, birth weight of kids, litter size and sex of the kids were recorded after parturition.

### Statistical Analysis:

The experimental design was completely randomized design (CRD). Data obtained were subjected to variance procedure of SAS (1987). Significant treatment means were compared by Duncan option of SAS (1987).

### Management of experimental animals

Twenty one (21) adult WAD does weighing between 12- 14 kg were allotted to seven dietary treatments in a complete randomized design with three animals per treatment. The animals were weighed and given prophylactic treatment against parasites, bacteria and viral infections such as PPR. The animals were fed tested diets for fourteen days of the adjustment period prior to the commencement of data collection. Oestrous was artificially synchronized using progesterone in two doses of 1ml per animal given 21 days interval. Bucks of proven fertility were introduced as soon as the does were on heat.

The pregnant does were weighed and allocated to individual pen until parturition.

Weighed quantities of feed were offered to the animals twice a day after feed residue from the previous day has been collected and weighed to estimate intake. The animals had free access to water and salt lick throughout the experimental period. Daily dry matter intake, weekly weight of the does till

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## RESULTS AND DISCUSSION

The chemical composition of the browse species is presented in Table 2. Dry matter (DM) of the feed resources ranged from 22% in *Ficus* to 35% in *Leucaena*. The lowest ash content (5%) was recorded for *Albizia odoratissima* and *Ficus* spp had the highest (12 %). Ether extract (EE) which signifies fat content of the diet was also lowest in *Panicum maximum* (3 %) but highest in *Leucaena leucocephala* and *Gliricidia sepium* (12 %). The crude protein contents of the browse species ranged from 7% in *Panicum maximum* to 24% in *Leucaena* spp. Variations were also observed among the tested diets in respect of fiber fractions of the fodders. Neutral detergent fibre (NDF) varied from 45 % in *Leucaena* to 73 % in *Panicum maximum*. Acid detergent fibre ranged between 32 % in *Leucaena* and 48 % in *Ficus* while Acid detergent lignin (ADL) contents varied from 6 % to 12 %. In all, *Leucaena* spp exhibited the lowest values of the fiber fractions.

The DM content obtained was similar to those reported of earlier work (Yavuz Gurbuz 2007). The amount of ash present in these plant species was also consistent with the work of Yavuz Gurbuz, (2007). It was observed that crude protein (CP) content of the browse spp are within the range required for optimum performance of WAD goats expect for *Panicum maximum* which fell below the minimum requirement for ruminants (7%, Minson, 1990). However, the level of CP of the browse spp agreed with the reports of Le Houerou (1980), and Omokanye, (2001). It was observed that in all the browse spp, ADL took the larger proportion of NDF. This is an indication that the fodders contained high level of lignin and cellulose, but low level of hemicellulose. The result was however, corroborated those reported elsewhere for some browse species in the tropics (Abdulrazak *et al.*, 2000). The fibre contents of the plant species were consistent with the

report of other workers (Larbi *et al.*, 1996). Although, Meissner *et al.*, (1991) reported that browse spp with NDF above 55-60 % will reduce the intake of such fodder by ruminants, the trend was not observed in this study. This is because those plants with higher value NDF (*Ficus* and *Panicum*) were well consumed. It then showed that many other factors could be responsible for the consumption of fodders by ruminants such as succulent, protein level, age at harvest, and season of the forages.

The summary of the performance characteristics of West African dwarf does fed different forages during pregnancy is depicted in Table 3. The performance characteristics of goats on the treatments differed significantly ( $P < 0.05$ ). Dry matter consumption ranged from 0.46 kg/ day for animals fed diet Gl+ C to 1.17 kg / day for those fed diet Gr. The higher daily dry matter intake (DDMI) for the guinea grass diet compared with other diets in this study could be due to the fact that ruminants have affinity for guinea grass and that the grass was not supplemented with concentrate like other treatments. This result is consistent with the study of Babayemi and Bamikole (2006) who discovered that *Panicum maximum* was highly preferred to other grasses and in a free grazing goat normally graze on guinea grass. Meanwhile, the lowest consumption was recorded for animal on *Gliricidia sepium* despite its higher crude protein content. This could not be unconnected with the presence of coumarin found in it and the offensive or repulsive odour that emanates from it (Arigbede *et al.*, 2003). Similarly, in a study conducted by Babayemi (2007) on in vitro fermentation and acceptability of some dry season forages, it was observed that goats showed nonchalant attitude initially to consumption of *Gliricidia*.

**Table 2: Chemical composition of the browse plants**

Parameters	<i>Leucaena leucocephala</i>	<i>Gliricidia sepium</i>	<i>Albizia odoratissima</i>	<i>Spondias monbim</i>	<i>Ficus thoningii</i>	<i>Panicum maximum</i>
DM	32	25	41	32	22	34
CP	24	20	16	16	14	7
Ash	9	8	5	7	12	11
EE	12	12	9	11	10	3
NDF	45	49	60	55	64	73
ADF	32	34	33	40	48	37
ADL	6	7	9	8	12	9

**Table3 Performance characteristics of WAD does fed different forages during pregnancy**

Parameters	A+C	F+C	Gl+C	L+C	Gr	Gr+C	S+C	SEM
Initial weight (kg)	11.9	12.6	11.6	11.9	13.9	11.8	12.8	1.17
Final weight (kg)	23.9a	17.9b	17.0b	20.0ab	19.1b	16.8b	19.9ab	1.33
Total Weight gain (kg)	12.0a	5.33c	5.34c	8.10b	5.20c	4.97b	7.00b	0.55
Weight gain (kg <sup>0.75</sup> )	6.45a	3.71c	3.52c	4.80b	3.44b	3.32c	4.3b	0.22
Weight gain (g/day)	85.3a	40.1c	38.3c	57.9b	37.1c	43.5c	50.b	0.22
Intake/day (kg)	1.08ab	0.66c	0.46d	0.73c	1.17a	0.73c	0.84bc	0.03
FCR	12.6c	16.6bc	12.6c	12.7c	31.7a	17.7b	17.2	1.46

abcd: Means with the same letters in the same row are not significantly different ( $p > 0.05$ )

A = Albizia spp, F = Ficus spp, Gl = Gliricidia spp, L = Leucaena spp, Gr = Panicum maximum, S = Spondias spp, C = Concentrate

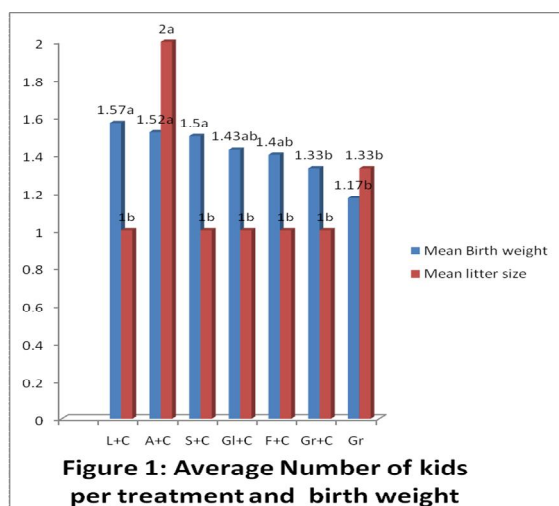
**Table 4: Effect of sex on birth weight of kids**

Sex	No of kids born	Mean birth weight (kids)
Female	13	1.41
Male	12	1.53

The weight gain (g /day) differed significantly ( $P < 0.05$ ) among the animals placed on the diets. The daily weight gain for the pregnant animals fed diet A+C was highest (85.27 g/day, however, the lowest value (37.14 g/day) was recorded for goats fed Gr only. Similar trend was observed for metabolic weight gain (kg<sup>0.75</sup>) of animals on these same diets. Among the diets, the values for feed conversion ratio (FCR) by the animals fed diet A+C and Gl+C was the least (12.60) and highest in animals fed with Gr (31.70). This result corroborated with other works where dietary CP and feed conversion efficiency (Black et al., 1987) are associated with higher BWG (Min et al., 2005)

Table 4 presents the effect of sex on birth weight. During the course of this study, the total number of kids recorded was twenty five out of which thirteen were female and twelve were recorded for male. The males were heavier (1.53 kg) than the females (1.41 kg). Figure 1 presented the average number of kids per treatment and their respective birth weight. The mean birth weight ranged between 1.17 and 1.57kg. The animals on Leucaena, Albizia and Spondias had significantly higher kid birth weights than the rest while kid birth weight of animal fed guinea grass the lowest. Incidentally, all the animals under

Albizia treatment gave birth to two; one doe from guinea grass diet also had twins while others gave birth to one. The reason for this multiple birth in Albizia could not be understood. It may be due to some other reasons that are beyond the scope of this study. A further study could be conducted to verify this observation. Litter size and composition (sex effect) are known to affect birth weight of kids. From the result obtained here, the males of the twins were heavier than the females while the birth weight of the single birth kid was also high compared to kids of multiple births. This observation is in variance with what was reported elsewhere that where multiple births occurred, the males are bigger than the females (Afzal et al., 2004; Martinez et al., 2009). Similarly, many workers who conducted studies on the reproductive performance of West African dwarf goat confirmed this findings (Akusu and Ajala 2000; Ola and Egbunike, 2007). Also, the results of this study showed that single born kids were heavier than the multiple born kids. This result was in support of report of other workers (Afzal et al., 2004) who observed that single kid will have better opportunities in the uterus of dams as compared to multiple kids.



## CONCLUSION

The result revealed that these browse plants (*L. leucocephala* and *G. sepium*, *A. odoratissima*, *F. thonningii* and *S. mombin*) could be utilized as both dry and raining season fodders for ruminants to avoid weight loss during the period of feed scarcity and could also be fed to pregnant does for better performance. It could also be concluded that ruminants cannot be maintained on guinea grass only due to its low nutrient content. It is either supplemented with concentrate or multipurpose trees. The crude protein content of these feed resources except guinea grass is above the minimum requirement and could be promising feed resources for the ruminants especially during the lean period.

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