

HERBAGE YIELD AND CHEMICAL COMPOSITIONS OF FOUR FORAGES FOR RUMINANT ANIMALS

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ABSTRACT

In the tropics, natural grasslands which contribute the bulk of ruminant feeds are still characterized by low yield and poor quality forages during the dry season. Sown grasses intercropped with legumes produce better fodder compared to forages harvested from the wild. However, there is limited information on the management practices influencing yield and quality of certain species of grasses. Therefore, *Brachiaria Mulato II*, *Chloris gayana*, *Brachiaria ruziziensis* and *Panicum maximum* intercropped with *Lablab purpureus* were investigated. Biomass yield (BY, t/ha) of the grasses at 12 weeks after planting were recorded. Also, the Dry matter (DM, %), Crude protein (CP, %) and Neutral Detergent Fibre (NDF, %) of these grasses were determined using standard procedures. Data were analysed using descriptive statistics. Biomass yield of grasses ranged from 8.98±0.04t/ha in *C. gayana* to 19.49±0.14t/ha in *P. maximum*. The CP of *C. gayana* (10.30±0.79%) and *B. ruziziensis* (10.22±0.41%) were significantly ($p>0.05$) similar and higher ($p<0.05$) than others. The DM ranged from 33.66±4.04% (*P. maximum*) to 40.34±4.04% (*B. ruziziensis*) while the NDF of grasses were significantly ($p>0.05$) similar. It is concluded that the four types of grasses have the potential for good quality biomass production for feeding ruminants.

Keywords: *Brachiaria Mulato II*, *Chloris gayana*, *Brachiaria ruziziensis*, *Panicum maximum*, *Lablab purpureus*

INTRODUCTION

Shortage of good quality forages is one of the problems facing ruminant production. Natural pasture which is a good source of fodder cannot produce all year round forages for the animals. Also these forages get lignified easily leading to a reduction in their nutritive values and digestibility. Livestock are not able to get enough protein and energy they need from such pasture. However, the use of residues from crops and agro-industrial by-products had provided more feed for animals to consume (Ososanya *et al.*, 2014), especially in areas where most of the rural dwellers are into both crops and animal production. Moreso, with the problems of herder – farmer's clashes, unfavourable climatic condition, deforestation, erosion and other factors, there has been a great reduction in the rate at which farmers cultivate crops and process residues.

One of the management interventions which can provide solution to this problem of severe feed shortage is the cultivation of grasses with legumes under a good management system and conservation practice. This study was therefore designed to assess the dry matter yield and chemical compositions of *Brachiaria* hybrid cv Mulato II, *Panicum maximum*, *Chloris gayana* and *Brachiaria ruziziensis* for ruminant production

MATERIALS AND METHODS

Description of the Site of Experiment: The Field study was carried out at Osode farms, Iseyin, Oyo State, Nigeria. Iseyin is a local government in the Oyo North zone of Oyo state of Nigeria. Crown splits of *Brachiaria* hybrid cv Mulato II, *Panicum maximum*, *Chloris gayana* and *Brachiaria ruziziensis* were used while lablab seeds were sourced from NAPRI. These grasses were randomly planted on 12 subplots at the spacing 0.5m x 1m. Harvesting was done when grasses were 12 weeks old. Grasses were cut at stubble height of 5cm and were weighed for fresh weight determination. Completely randomized design with four treatments (grasses) and three replicates was used.

Dry matter determination and chemical analysis of forages: In triplicates at 65°C, 100 grams of grasses were dried in the oven until a consistent weight was achieved and this was used to calculate the dry matter. These were later milled in the laboratory and prepared for chemical analysis. The dry matter, ash, crude protein and ether extract were determined as described by AOAC (2000). The methods of Van Soest *et al.* (1991) were used for fibre fractions determination. Data collected were analysed using analysis of variance with the procedure of SAS (2008). The significant means were compared with the Duncan Multiple Range Test at 5% level of probability.

RESULTS AND DISCUSSION

The results for the biomass and dry matter yield are presented in Table 1. Biomass yield ranged from 8.98 t/ha in *Chloris gayana* to 19.49 t/ha in *Panicum maximum*. Biomass and Dry matter yields of *Panicum maximum* and Mulato II were higher than the yields of *Chloris gayana* and *Brachiaria ruziziensis*. This result was in agreement

with Bauer *et al.* (2011) who reported higher production of Mulato II (4,200kg/ha) than Xaraes (3,500kg/ha) when comparing 5 cultivars of *Brachiaria* genus in Mato Grosso. The greater weight of *Panicum maximum* and Mulato II observed in this study could be attributed to their longer and wider leaves including their longer and larger stems when compare with *Brachiaria ruziziensis* and *Chloris gayana*. This observation was in line with the report of Rodrigues *et al.* (2014) who observed Mulato II having higher dry matter yield than *Brachiaria humidicola*, *Brachiaria brizantha*, *Brachiaria ruziziensis*, *Brachiaria decumbens*, *Panicum* cv. Massai and *Andropogon gayanus*.

Table 1: Biomass yield (t/ha) and dry matter yield (t/ha) of grasses intercropped with Lablab

Grass	Biomass yield (t/ha)	Dry matter yield (t/ha)
Chloris	8.98±0.02 ^d	3.31±0.12 ^d
Panicum	19.49± 0.14 ^a	7.02±0.03 ^a
B.ruzi	12.12±1.11 ^c	4.24±0.04 ^c
Mulato	16.66±1.41 ^b	5.22±1.01 ^b

^{abcd}Means of treatments along a column with different superscripts differed significantly (P<0.05).

The results for the percentage Crude protein (CP), Dry matter (DM) and Neutral detergent fibre (NDF) are presented in Table 2. All the grasses had crude protein above 75g/Kg DM which is necessary for optimum rumen functioning; however, this crude protein is not enough for the lactating cows which require a high crude protein of about 100 - 180g/Kg DM. (NRC, 2001). Low crude protein obtained in this study could be as a result of the age at which the grasses were harvested even though they were planted with Lablab which is a leguminous plant from which they could have access to atmospheric nitrogen. Asmare, (2016) explained that as forages mature, the crude protein, minerals, vitamins and non structural carbohydrate contents of the forage will be decreasing while the structural carbohydrate, indigestible compounds, fibre fractions of the forage will be increasing. Although, at this age, *Brachiaria ruziziensis* recorded higher CP content and Dry matter than others. The higher CP might be because the grass has many leaves and it was not of many strong stems as *Chloris gayana*. The mean values of NDF for the grasses in this study were within the average of 660g/kg DM reported for tropical forages (Mc Donald *et al.*, 2002). And there was no significant difference in NDF of the grasses. The relatively low NDF of grasses at this age might be due to the increased uptake of essential nutrients made available by lablab interplanting which might have reduced the rate of fibre build up.

Table 2: Crude protein (%), dry matter (%) and Neutral detergent fibre (%) of grasses intercropped with Lablab

Grass	Crude Protein (%)	Dry matter (%)	NDF (%)
Chloris	8.07±0.79 ^b	37.34±4.47 ^b	65.60±2.53
Panicum	7.13±0.38 ^c	35.35±0.05 ^c	64.93±2.71
B.ruzi	10.10±0.41 ^a	46.33±2.76 ^a	63.85±2.76
Mulato	8.03±0.28 ^b	40.47±0.95 ^b	63.92±2.83

^{abcd}Means of treatments along a column with different superscripts differed significantly (P<0.05).

CONCLUSION

Grasses like *Panicum maximum*, *Brachiaria* Mulato II, *Chloris gayana* and *Brachiaria ruziziensis* interplanted with Lablab has the potentials to provide feed for ruminant nutrition.

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