PROXIMATE COMPOSITION OF IRRIGATED *Brachiaria ruziziensis* AS AFFECTED BY HERVESTING AGE

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ABSTRACT
The experiment was conducted to evaluate the proximate composition of irrigated Brachiaria ruziziensis at different stages of harvest. Three treatments of B. ruziziensis planted in $4m^2$ plots were harvested at 8, 10 and 12 weeks after seed emergence at the teaching and research farm of Federal Polytechnic Bali. Samples from three plots per treatment were cut, rinsed and shade-dried and subjected to proximate analysis. There were significant difference ($P<0.05$) in all parameters depending on age. The crude protein (CP) is significantly higher at 8 weeks (8.83±0.18); organic matter (OM), Ether extract (EE) and ash contents of 35.74±4.8, 2.20±0.52 and 35.99±.5.5 respectively were higher in samples cut at 10 weeks post emergence. While the crude fibre but also moisture content (MC) of 70.45±0.37, 12.1±0.00 respectively were significantly higher at 12 weeks. The study showed variation in the proximate composition of irrigated Brachiaria ruziziensis at different stage of maturity with the CP content depreciating and the CF increasing as the plant mature. Further studies are need to determine appropriate irrigation schedule for optimum yields of B. ruziziensis
Key words: Proximate composition, *Brachiaria ruziziensis*, irrigated, emergence, harvest.

INTRODUCTION
Ruminant production is one of the major livestock industries in most of the developing countries in the tropics Okoruwa and Agbonlahor (2016). Ruminant livestock play an important role in the economic development of Nigeria in terms of feeding the steadily growing population and providing the investible resources for national development. Inadequate nutrition is one of the major factors that generally affect livestock productivity. Despite the naturally endowed vegetation's, there are still inadequate feeds and feedstuff for livestock in Nigeria. Period of dry season is always stressful for livestock, as the environment is characterized by insufficient feeds, occasioned by scarce forage and fibrous standing hays and the negative effect of the period is obvious in the loss of weight, reduced milk production and high mortality of the animals. Incidence of disease outbreak is rampant as a result of low immunity arising from malnutrition. Grass is the major source of nutrients for domesticated ruminants during large part of the year (Taweel *et al.*, 2005). Herrera (2004) argued that pasture turn out to be an appropriate source of food for ruminants, mainly in countries of tropical climate. This is due to the high number of species that can be used, possibility of cultivating them throughout the year, capacity of ruminant using fibrous foods, does not compete as food for humans and tends to be a cheap economical source. Grasses are more easily accessible, better in taste and quicker in digestion than shrubs and trees (Quraishi, 1999). Nutritive quality of forage has been defined as the product of the voluntary intake, digestibility and efficiency of nutrients that are used by the animal (Reid, 1994). The digestibility of the different grass species could be distinctly different, and is also influenced by area of origin, including temperature, light intensity, total rainfall, soil type, fertilization level, and by stage of maturity and preservation method (Janèík *et al.*, 2009). Grasses are the most dominant plants in most forage based enterprises throughout the world. They provide energy and nutrients for animal growth and maintenance. Their leaves are more palatable than stems and re-growths are more nutritious than old tissues (Briske, 1991). Cattle and sheep feed on grass which form their major diet and are able to convert the vegetative matter into products such as milk and meat (Okukenu *et al.*, 2021). The objective of the study is to evaluate the proximate composition of *Brachiaria ruziziensis* that grows under irrigation condition harvested at different stage of growth (weeks 8, 10 and 12).

MATERIAL AND METHODS
Study Area
The study was conducted at the Federal Polytechnic Bali teaching and research farm, Bali, Taraba State, Nigeria. Bali is located in the tropical savannah zone of the north- eastern Nigeria on latitude 7^0 51' 37.01" N,

longitude 10^0 58'11.82"E and altitude 193m (633ft) above sea level with average annual temperature 31^0c and 1,700mm (67 inches) of rainfall.

Planting Material

The seeds planted were Brachiaria ruziziensis. The seeds were obtained from National Animal Production Research Institute Zaria, Kaduna State. The seeds were sown on a 2m × 2m plot in February, 2022 in layout.

Treatments and Experimental Design

The study was laid out in a Randomized complete block design (RCBD) consisting of three (3) treatments and each treatment is replicated three (3) times. While the three (3) stages of harvest (8, 10 and 12 weeks) of which treatment one sample was collected at eight week, treatment two at ten week and treatment three at twelve week 3×3 factorial respectively.

Experimental Material

Congo grass (*Brachiaria Ruziziensis*) was used for the study. Seed bed was prepared by turning the top soil and breaking the lumps. Each block/replicate and treatment were demarcated by a walking allay to facilitated free movement in between blocks and treatments. The seed was planted using sawing method of 2cm depth and slightly covered with soil and water supply was twice in a day morning and evening hours of which all the treatment received equal amount of water. Cutlass, hoe, watering Can and bucket was the tools used. Poultry dung was applied three weeks and two days after emergence and side placement method was used.

Planting & Irrigation

The seed was sown at 2cm depth and slightly covered with soil. Water was supplied twice a day, i.e. morning and evening with all the treatments receiving equal quantity. Cutlass, hoe, watering cans and bucket was the tools used. Poultry manure was applied three weeks and two days after emergence and side placement method was used.

Sample Collections

Sample collection was done at eight, ten and twelve weeks after seed germination for treatments one, two and three respectively. Samples from three replicates per treatment were collected by cutting the plant materials with knife, rinsed with clean water before they were shade-dried placed in labelled envelopes

Sample Analysis

Proximate composition was evaluated in the chemistry laboratory of the department of Science Laboratory Technology, Federal Polytechnic Bali. The parameters evaluated were moisture content (MC); organic matter (OM); crude protein (CP), using the Kjeldahl method (AOAC, 2006); ether extract (EE), using the Gerber method described by Richardson (1985) while crude fibre (CF) and ash content were analyzed using the AOAC (2006) procedure.

Statistical Analysis

The data that were generated on the proximate analysis were subjected to Analysis of Variance using the General Linear Model procedures of SAS (SAS, 2001). Significance differences between the means were compared using the least significance differences (LSD) method of the same package.

RESULTS

The estimated moisture content (MC) of *B. ruziziensis* at (8, 10, 12 weeks) are 9.80±2.206%, 1093±2.72% and 12.1±0.00% respectively as shown in table 1. The organic matter (OM) is 4.14±2.259%, 35.74±48.29% and 32.10±41.41% for 8, 10 and 12 weeks respectively. The crude protein (CP) is 8.83±0.18%, 8.61±0.16% and 8.03±0.14% at 8, 10 and 12 weeks. Ether extract (EE) are 0.52±0.466%, 2.20±0.52% and 0.66±0.57% cut at (8, 10 and 12 weeks) respectively. Crude fibre (CF) of *B. ruziziensis* cut at (8, 10 and weeks) are 53.40±38.45%, 62.97±11.82% and 70.45±0.37% respectively. While the ash content (Ash) is 5.66±2.68% 35.99±55.59% and 33.33±50.81% respectively as shown in table 1 below.

Table 1: *Mean (±SD) proximate composition of Brachiaria ruziziensis harvested at different level of maturity*

Weeks post emergence			
Variables	8	10	12
MC (%)	9.80 ± 2.21^{c}	10.93 ± 2.72^{b}	12.1 ± 00^{a}
OM (%)	4.14 ± 2.26^{d}	35.74 ± 4.8^{a}	32.10 ± 4.10^{b}

CP (%)	8.83±0.18[a]	8.61± 0.16[b]	8.03±0.14[c]
EE (%)	0.52±0.47	2.20±0.52[a]	0.66±0.57
CF (%)	53.40±38.45[c]	62.97±11.82[b]	70.45±0.37[a]
Ash (%)	5.66±2.68[c]	35.95±5.6[a]	33.33±50.81[b]

a, b, c, d = means in the same row with different superscripts are significantly different ($p<0.05$) T_1 = 8 weeks, T_2 = 10 week, T_3 = 12 weeks, MC = moisture content, OM = organic matter, CP = crude protein, EE = ether extract, CF = crude fibre, Ash and supper scrip = level of significant ($P< 0.05$).

DISCUSSION

The result of this study shows that there are wide variations in the proximate composition of the B. *ruziziensis* harvested at different stages of growth as revealed in the study. There are many other factors affecting chemical composition of forages apart from stage of growth or maturity such as species and variety (Okukenu *et al.*, 2021) these was also reported by Promkot and Wanapat (2004). The moisture contents of *B. ruziziensis* at 12 weeks (12.1%) and 10 weeks (10.93%) was higher than (9.80%) obtained at 8 weeks is in relation with the dry matter obtained by Heuze *et al.*, (2017) in his study on *B. ruziziensis*. The mean value for organic matter (OM) obtained were significantly different ($P<0.05$) in all the treatments. Organic matter (OM) content of grass species at harvesting stage had a very high significant ($P<0.05$) effect on OM content of *B. ruziziensis* harvested at different harvesting period (8, 10 and 12 weeks) respectively. The result showed that an increased in the organic matter is because of the advance maturity stage of the grass. The OM of this study was similar with the findings of Zeneme *et al.*, (2020) who noted that the rate of organic matter content of *B. ruzuziensis* increased from 85.35 – 89.5% with increase in the stage of maturity. The crude protein (CP) content of B. ruziziensis tend to decline as the grass advances in maturity. This study agrees with the reports of Bilal *et al.* (2001); Olanite *et al.* (2006) and Okukenu *et al.* (2021). This might be due to increase in the cell wall structure and a decrease in the leaf-stem ratio of the grasses with the advancement in the age at maturity of the grass. The structural constituent increased as harvesting age delayed while the increasing CF content with harvesting age agreed with the report of Asmare (2016) for grass species. CF content of forages varies widely, depending on species, maturity and growing environment (Mahyuddin, 2007). Ash content of *Brachiaria ruziziensis* at harvesting age had a significant ($P<0.05$) effect on the ash content of different harvesting stage. The lowest ash content were found at the third harvesting stage (12 weeks) the result is in agreement with that of (Zenema *et al.*, 2020) who reported that the ash content of B. grass decreased with an increased stage of maturity.

CONCLUSION

The study showed variation in the proximate composition of *Brachiaria ruziziensis* cut at different stage of maturity of which the crude protein (CP) content depreciated as the plant advances in maturity while the crude fibre (CF) increased as the plant increases in age.

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