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EVALUATION OF SPACING AND CUTTING AGE ON GROWTH COMPONENTS OF B*rachiaria brizantha*

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ABSTRACT
The study was conducted to evaluate the effect of spacing on the forage yield and quality of Brachiaria briznatha. The treatment was laid down in a Completely Randomize Block Design with spacing (50 x 50, 60 x 60, 70 x 70 and 80 x 80 cm) as the main factor and cutting age (4, 8 and 12 weeks after transplanting (WAT)) as the sub factor which was replicated three times. The growth components showed that plant height (74.9 cm) and leaf length (33.3 cm) were significantly ($P<0.05$) higher at 80 x 80cm and 70 x 70cm, respectively. Number of tillers (23) was ($P<0.05$) at 8 weeks after transplanting (WAT). Varying spacing significantly ($P<0.05$) affected fresh forage yield with the highest value (15.8t/ha) recorded at 80 x 80cm. Age of cutting was significantly ($P<0.05$) effected on both fresh forage and dry herbage yields. The highest fresh weight yield (16.3t/ha) was recorded at 8 weeks after transplanting (WAT). Whereas, higher dry weight (4.3t/ha) was recorded at 12 weeks after transplanting (WAT).

INTRODUCTION
Under natural condition, reliable pasture production is limited to the period of rain in the semi-arid region of Nigeria. Pasture production is mainly based on natural bush Savannah, Savannah-grass land and micro-nutrient are critical. *Brachiaria brizantha* is indigenous to Africa where it grew in the wild but went through remarkable improvement in South America before the repatriation of the continent Abachi, (2020). Brachiaria grass is remarkably resilient; it quickly regenerates after grazing and acts as an erosion retardant due to the secretion of exudates by the roots that bind soil particles. Research has proven that it has the capacity to survive pest and disease attacks than any other grass owing to the self-produced chemicals that enables it survives pest attack. It is tolerant of the vagaries of the climate due to its developed root system which enables it draw water and nutrient for the soil and hence adapting well to environmental changes. Abachi,(2020). Therefore, the optimum row spacing plays an important role in contributing to the high yield because thick plant population will not get proper light for photosynthesis and can easily be attacked by disease. On the other hand, very small population will also reduce yield Pookpkdi and Pataradilok, (1993). Due to this reason normal population is necessary for high yield.

MATERIALS AND METHOD

Study Area
The study was carried out at the Pasture Experimental Field of the Teaching and Research Farm, Department of Animal Science, University of Maiduguri, Maiduguri, Borno State. The farm is located on latitude 11.80470 N, longitude 13.19660 E, along Bama-Maiduguri Road in the North East of Nigeria.

Instrumentation
The instrument used include Lines, Tag (wooden), Measuring tape, Pegs, Spade, Rake, Hoe and Watering can

Sources of seedlings

Seedlings of Brachiaria were bought from National animal production research institute (NAPRI), Zaria, Kaduna state.

Farm operations

This experiments land with the area of $10m^2$ was used for this study. The land was cleared off from thorns, dry weeds, debris etc. with hoe, cutlass and rake, and was further divided into plots of 16m with a path way of 1m between plots with the spacing of 50cm x 50cm, 60cm x60cm, 70cm x 70cm and 80cm x 80cm each inter and intra rows.

Transplanting of Brachiara seedlings was done after ensuring the beds were wet and ready for transplanting. Transplanting was done in the evening to avoid complete dryness of the soil. Young tillers were transplanted at the depth of 5cm under the ground. 400g grams of urea fertilizer was applied at the time of planting (i.e. 42kg/ha) for proper germination. After 3weeks of transplanting dead tillers were replaced to ensure 100% fodder population. Irrigation was done every day at the first 2 weeks and trice a week in the subsequent weeks from the day of transplanting. Re-growth and chemical composition assessment was done by selecting middle plants stands, data was collected at 4, 8 and 12 weeks for chemical analysis and plant re-growth measurement.

Data collection

Plant attributes (plant height, leaves per stand, leaf length) was recorded at 4, 6, 8, 10and 12week after transplanting with the aid of tape rule. Plant was randomly sampled and tagged for measurement of various agronomic parameters using the standard procedure as reported by Tarawali *et el* (1995).

Statistical Analysis

Using Completely Randomize Block Design (CRBD), all data obtained was subjected to analysis of variance (ANOVA) using a computer package. SAS (2002), and least significance difference test was used to separate the treatment means.

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RESULTS AND DISCUSSION

Effect of spacing and cutting age on growth components of *Brachiaria brizantha.*

The result of forage yield component is presented in Table 1. Plant height increases significantly ($P<0.05$) with an increase in the level of spacing, 80 x 80cm and 70 x 70cm had significantly ($P<0.05$) higher but similar plant height of 74.90cm and 73.40cm, respectively. Leaf length was significantly ($P<0.05$) affected by spacing in the same manner. However, leaf width, number of leaves and number of tillers were not affected significantly by spacing. Age of plant had an effect on the growth parameters. Plant height at 12 weeks (105.56cm) differed significantly ($P<0.05$) from the other weeks being at 4 weeks (75.13cm) and 8 weeks (91.37cm), respectively. Leaf length at 12weeks, 8weeks and 4weeks after transplanting (WAT) were not significantly different from each other ($P>0.05$). Leaf width at 4 weeks (2.0cm), 8 weeks (2.2cm) and 12weeks (1.9cm) were similar ($P<0.05$) to each other. Numbers of Leaf at different age differed significantly ($P<0.05$) at 8weeks (20) and 12weeks (21) compared to 4weeks (17) after transplanting, Number of tillers statistically similar with age, at 4 weeks, 8 week and 12 weeks after transplanting (21, 23 and 22,), respectively. Leaf area index (LAI) showed a significant ($P<0.05$) difference at 50 x 50cm and 70 x 70cm (0.56 and 0.44, respectively) while the least LAI was recorded at 60 x 60cm spacing (0.35). Age also had a significant ($P<0.05$) effect on the LAI. It was highest at 8 weeks of age (0.60) and lowest at 12 weeks (0.04) (WAT). The interaction between spacing and age of cutting was not significant ($P>0.05$) for any measured variables.

Table 1; Effect of spacing and age of cutting on growth component of *Brachiaria brizantha.*

Spacing (cm) Inter & intra row	Plant height	Leaf length	Leaf width	No. of leaves	No. of tillers	Leaf area index
50x50	65.7[b]	27.2[b]	2.04	17	18	0.56[a]
60x60	70.6[b]	28.7[b]	2.1	20	19	0.35[c]
70x70	73.4[a]	33.3[a]	1.9	21	19	0.44[ab]
80x80	74.9[a]	31.7[a]	1.8	28	20	0.42[b]
SEM	2.28	0.90	0.20	0.63	1.69	0.06
LOS	*	*	NS	*	NS	*
Age of cutting: (week)						
4	75.13[c]	30.6[ab]	2.0[a]	8[b]	21[ab]	0.46[a]
8	91.4[b]	33.5[a]	2.2[a]	11[a]	23[a]	0.60[a]
12	105.6[a]	31.4[ab]	1.9[a]	10[ab]	22[a]	0.45[b]
SEM	1.83	0.720	0.16	0.50	1.35	0.04
LOS	*	*	*	*	*	*
Interactions						
S x C	0.920	0.770	0.460	0.580	0.780	0.990

PH= plant height, LAI=leaf area index. LL= leaf length, LW = leaf width, S= spacing, C = age of cutting. a, b, c: Means with different superscript within column differ significantly ($P<0.05$). SEM=Standard error of the mean, LOS= level of significance**.**

DISCUSSION

Plant height in this study observed an increase with increase with in the level of spacing (74.90cm). at 80 x 80 cm, this might be due to the fact that the grass had enough to thrive well without competition for space and this which led to more vegetative growth that resulted in higher plant height. This is in line with the findings of Olanite *et el*; (2010) who reported higher plant height values for Columbus grass in wider spacing, similarly. Nadaf *et el*. (2009) found a higher plant height for *Chenchrus ciliaris* at wider spacing compared to narrow row spacing. Leaf length obtained for this study was significantly ($p<0.05$) with highest 31.7 at 80 x 80cm which is the widest spacing for this study this disagrees with Wondimagen (2021) who reported a longest leaf length of Brichairia brizantha in a narrow spacing of 20 x 20cm with a value of 27.84cm. This might be due to management and cultural practice, weather condition as well as soil fertilizer and adaptation to environment conditions. A similar result was obtained for leaf length of rennegtum purprium grass at wider spacing by Berihun (2005). Highest number of leaves per plant (28) was recorded for this study. This is in line with the work of Lulie and Chala (2016) who obtained a higher number of leaves at wider spacing of lemon grass in both Inter and intra row spacing. The result of this study might be due to higher tillering and less competition between plant having enough space for growth. High tiller number of (20) at the widest spacing of 80 x 80cm inter and intra row was obtained for from this study., this higher number might be attributed to the fact that plant where able to thrive well with enough nutrient and less competition for both space and nutrient. This is in line with Lulie and Chala (2016) who reported similar observation on lemon grass. Highest plant height (105.6cm) was recorded

(105.6cm) at 12 weeks after transplanting, while leaf length (33.3cm), life width (2.2cm) number of leafs (11) and number of tillers (22) respectively were obtained at 8 weeks after transplanting. From the result obtained for this study, it is indicated that B. brizantha had peaked in growth at 8 weeks of age. this findings is in line with a B.brizantha description that the grass has a deep root and short rhizomes (down to 2cm). it has short erect or slightly decumbent clumps and bright green leafs. That enables it to grow faster at week 8

CONCLUSION

For *B. brizantha*, 8 weeks after transplanting is recommended as the best cutting age for fresh and dry herbage yield as well as quality

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