

EVALUATION OF GUINEA GRASS GENOTYPES UNDER NORTH GUJARAT AGRO-CLIMATIC CONDITIONS

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ABSTRACT

Four genotypes of guinea grass (*Panicum maximum*, Jacq.) viz., PGG 664, JHGG 04, Riversdale (C) and Makuni (C) were evaluated for fodder production on loamy sand soil of the Centre for Agroforestry, Forage Crops and Green belt, S. D. Agricultural University, Sardarkrushinagar during the year of 2008-09 to 2011-12. The results revealed significant difference among the genotypes for green as well as dry fodder yield over the years. These genotypes also noted significant difference among genotypes for green fodder yield in 2010-11 and for dry fodder yield in 2009-10 and 2010-11. Makuni genotype recorded significantly higher green fodder yield over the years (363.82 qha^{-1}) as compared to the rest of the genotypes and it was to the magnitude of 25.2 per cent higher than that of Riversdale, the lowest yielded genotypes with respect to green fodder yield (290.68 qha^{-1}). Similarly, the dry matter yield of Makuni genotype (97.06 q ha^{-1}) was 30.54 per cent higher than that of Riversdale (74.35 q ha^{-1}). It indicated that Makuni genotype of guinea grass out yielded the other genotypes in green as well as dry fodder yield was the best suited genotypes under North Gujarat agro-climatic conditions, while Riversdale least ideal genotype. The plant height and tillers per plant of different genotypes of guinea grasses were at par with each other.

KEY WORDS: Genotypes, green fodder yield, guinea grass

INTRODUCTION

Quality and quantity of forage production plays an important role in the dairy industries, as animal husbandry is one of the main occupation of the people living in the North Gujarat agro-climatic region. Moreover, feeding green forage to productive animal is much cheaper than feeding concentrate with crop residue (Kumar and Sood, 1997). Guinea grass a perennial forage has quick regeneration capacity, high yielding ability, palatability, nutritive value and acceptable to the animal/cattle at any stage of growth. A wide range of guinea grasses have been identified and developed, but systematic evaluation under arid and semi-arid climatic conditions were lacking so that an experiment was conducted for evaluating the genotypes of guinea grass under North Gujarat agro-climatic conditions.

MATERIALS AND METHODS

The rooted slips of four guinea grasses genotypes viz., PGG 664, JHGG 04, Riversdale (C) and Makuni (C) provided by the Main Forage Research Station, Anand Agricultural University, Anand, were grown in Randomized Block Design with five replications under North Gujarat agro-climatic conditions at the Centre for Agroforestry, Forage Crops and Green Belt, S. D. Agricultural University, Sardarkrushinagar from 2008-09 to 2011-12. The light textured soil of the centre was neutral in nature having low organic carbon, medium in available phosphorus and high in available potash. The field capacity of the soil was 7.5 at -1/3 atmosphere and wilting coefficient 2.75 at -15 atmosphere to a depth of 0-30 cm. The rooted slips of all the genotypes were sown at 50 X 50 cm distance in the month of September, 2008. The first irrigation was given immediately after planting the rooted slips and second irrigation was given 3 - 4 days after the first irrigation for proper establishment of the rooted slips. The grasses were fertilized with 40-50-0 kg NPKha⁻¹ as basal dose and 30 kg N ha⁻¹ after each cut as top dressing. All the parameters were measured just before harvesting of each cut to assess the response of different genotypes. The genotypes were harvested about 15-20 cm height above the ground level and weighed immediately for recording the green fodder yield. A fresh sample of one kg from each plot were taken randomly, labeled and allowed for sun drying. After sun drying, the dry weight of fodder was recorded. Total fifteen cut was obtained in four years duration. In the first year (2008-09), five cuts were taken, while during the second year (2009-10) and third year (2010-11), four cuts were harvested in each year and in fourth year (2011-12), only two cuts were obtained. All the cultural operations were carried out as per the requirements.

RESULT AND DISCUSSION

The data of green fodder yield (q ha⁻¹) of different genotypes of guinea grass recorded in individual year from 2008-09 to 2011-12 and pooled over years presented in Table 1 revealed that the green fodder yield of Makuni genotype was maximum over all other genotypes in all the cuts. However, all the genotypes of guinea grass did not differ statistically among themselves, except in 10th, 11th and 12th cuts. The total green fodder yield of guinea grass was differed significantly among themselves during 2010-11 and in pooled data over all the four years (Table 1). Makuni genotype recorded significantly higher green fodder yield over the years (363.82 qha⁻¹) as compared to the rest of the genotypes and it was to the magnitude of 25.2 per cent higher than that of Riversdale, the lowest yielded genotypes with respect to green fodder yield (290.68 qha⁻¹). It is also observed that green fodder yield of guinea grass was recorded higher during the second and third year, but it was lower during the first year due to the establishment of the saplings and in fourth year due to older saplings (Table 2). It indicated that the green fodder yield of guinea grass drastically reduced after fourth year. These results are more or less similar to the findings of Kumar and Sood (1997) and Verma *et al.* (1997).

The *per se* performance of different genotypes with respect to dry fodder yield presented in Table 2 showed significant difference among genotype during 2009-10, 2010-11 and in pooled over years. The significant difference among genotypes was also noted in 2nd cut in 2008-09, 6th cut during 2009-10 and 10th, 11th and 12th cut during 2010-11. The total dry fodder yield was

recorded highest in Makuni genotype of guinea grass in all the cuts. However, it recorded the total dry fodder yield significantly higher during 2009-10 (167.06 qha⁻¹), 2010-11 (127.16 qha⁻¹) and pooled over four years (97.06 qha⁻¹). Pooled over years, the dry matter yield of Makuni genotype was 30.54 per cent higher than that of Riversdale (74.35 qha⁻¹) followed by 19.47 per cent than PGG 664 (81.24 qha⁻¹) and 16.64 per cent than JHGG 04 (83.21 qha⁻¹). Hence, It was evident that Makuni genotype recorded highest dry biomass as compared to other genotypes evaluated. This might be due to difference in their genotypic potential and adaptability to soil and climate.

The mean values of average plant height year wise as well as pooled over years of different genotypes of guinea grass are given in Table 3. The plant height was non-significant among different genotypes in individual year as well as pooled over years. However, the maximum plant height (124.16 cm) over years noted in PGG 664 and was followed by Riversdale (120.63 cm), Makuni (118.11 cm) and JHGG 04 (117.17 cm). Similarly, the number of tillers per plant (Table 4) also showed non-significant difference among genotypes in individual years as well as pooled over years. The average tillers per plant were numerically higher in Riversdale (37.30) followed by Makuni (36.46).

CONCLUSION

It can be concluded that the Makuni genotype of guinea grass out yielded the other genotypes in green as well as dry fodder yield was the best suited genotypes under North Gujarat agro-climatic conditions, while Riversdale least ideal genotype.

REFERENCES

- Kumar, P. and Sood, B. R. (1997). Corelation studies on various growth and quality parameters of Panicum Maximum Jacq. and Setaria anceps Stapf. Ex. massey introduced grassland. *Forage Res.*, 22 (4) : 243-248.
- Verma, S. S., Singh, V. and Joshi, Y. P. (1997). Effect of cutting frequency and nitrogen level on forage yield, quality and economics of Napier Bajra hybrid (NB-21). *Forage Res.*, 23 (1&2) :71-77.

Table 1: Green fodder yield (q ha⁻¹) recorded in different genotypes of guinea grass in individual year as well as pooled over years

Sr. No	Genotypes	Green Fodder Yield (q ha ⁻¹)																			Pooled
		2008-09						2009-10					2010-11					2011-12			
		1 st cut	2 nd cut	3 rd cut	4 th cut	5 th cut	Total	6 th cut	7 th cut	8 th cut	9 th cut	Total	10 th cut	11 th cut	12 th cut	13 th cut	Total	14 th cut	15 th cut	Total	
1	PGG 664	3.33	8.50	12.50	39.69	78.00	142.01	110.38	173.13	106.06	83.13	472.69	62.63	98.69	271.88	55.25	488.44	136.25	29.25	165.50	317.16
2	JHGG 04	3.39	13.19	13.44	41.50	71.25	142.77	117.00	175.63	104.25	87.50	484.38	64.00	104.84	281.88	57.50	508.21	134.50	28.38	162.88	324.56
3	Riversdale (C)	1.89	9.06	10.31	40.19	76.50	137.95	98.75	156.25	93.25	73.13	421.38	56.25	86.25	253.13	56.25	451.88	123.75	27.75	151.50	290.68
4	Makuni (C)	3.91	14.88	15.63	44.75	88.88	168.03	134.00	188.75	107.75	83.13	513.63	79.88	122.00	338.13	60.13	600.13	140.63	32.88	173.50	363.82
	SEm±	0.66	1.83	1.55	4.13	4.68	10.04	9.84	15.12	8.77	7.06	31.18	5.26	7.29	18.33	4.14	25.98	9.94	2.05	10.79	11.20
	CD at 5%	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	16.20	22.45	56.49	NS	80.04	NS	NS	NS	31.69
	C.V. %	47.25	35.79	26.76	22.25	13.30	15.20	19.13	19.49	19.06	19.32	14.74	17.90	15.80	14.30	16.20	11.3	16.61	15.53	14.77	14.90

Table 2: Dry fodder yield (q ha⁻¹) recorded in different genotypes of guinea grass in individual year as well as pooled over years

Sr. No	Genotypes	Dry Fodder Yield (q ha ⁻¹)																			Pooled
		2008-09						2009-10					2010-11					2011-12			
		1 st cut	2 nd cut	3 rd cut	4 th cut	5 th cut	Total	6 th cut	7 th cut	8 th cut	9 th cut	Total	10 th cut	11 th cut	12 th cut	13 th cut	Total	14 th cut	15 th cut	Total	
1	PGG 664	0.77	1.97	2.90	9.59	23.35	38.58	47.00	43.58	25.56	22.44	138.58	11.23	23.96	50.30	15.98	101.48	38.06	8.25	46.31	81.24
2	JHGG 04	0.75	2.94	2.97	9.08	21.56	37.30	55.69	42.38	21.69	24.25	144.00	11.52	25.64	52.03	17.20	106.38	36.92	8.25	45.17	83.21
3	Riversdale (C)	0.36	1.80	1.95	9.43	23.66	37.19	43.44	32.69	22.56	24.25	122.94	11.89	22.30	45.78	17.16	97.12	32.99	7.15	40.13	74.35
4	Makuni (C)	0.89	3.78	3.67	9.62	26.83	44.80	63.56	46.50	30.50	26.50	167.06	15.83	29.86	63.53	17.94	127.16	39.85	9.35	49.20	97.06
	SEm±	0.15	0.46	0.39	0.90	1.52	2.54	4.15	3.64	2.22	2.17	9.55	0.81	1.67	3.15	1.18	5.00	2.81	0.62	3.03	5.74
	CD at 5%	NS	1.40	NS	NS	NS	NS	12.77	NS	NS	NS	29.42	2.48	5.14	9.72	NS	15.40	NS	NS	NS	NS
	C.V. %	48.91	38.81	30.58	21.33	14.23	14.39	17.68	19.72	19.83	19.91	14.91	14.28	14.66	13.33	15.49	10.35	17.00	16.92	15.00	15.29

Table 3: Plant height (cm) recorded in different genotypes of guinea grass in individual year as well as pooled over years

Sr. No.	Genotypes	Plant Height (cm)				
		2008-09	2009-10	2010-11	2011-12	Pooled
1	PGG 664	87.43	135.70	128.68	144.80	124.16
2	JHGG 04	84.20	131.40	133.03	120.04	117.17
3	Riversdale (C)	88.69	130.60	130.35	132.90	120.63
4	Makuni (C)	81.53	129.70	126.53	114.72	118.11
SEm±		3.15	3.93	2.71	12.70	3.43
CD at 5%		NS	NS	NS	NS	NS
C.V. %		8.23	6.67	4.67	22.17	13.11

Table 4: Number of tillers per plant recorded in different genotypes of guinea grass in individual year as well as pooled over years

Sr. No.	Genotypes	Tillers per plant				
		2008-09	2009-10	2010-11	2011-12	Pooled
1	PGG-664	21.06	47.52	49.20	24.60	35.61
2	JHGG-04	20.29	45.64	53.30	23.10	35.59
3	Riversdale (C)	24.22	48.04	53.70	23.20	37.30
4	Makuni (C)	20.90	49.61	53.70	21.60	36.46
S.Em±		1.01	2.29	2.16	1.27	0.89
CD at 5%		NS	NS	NS	NS	NS
C.V. %		10.47	10.72	9.19	12.26	10.92

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