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Effect of row spacing and cutting management in guinea grass (*Panicum maximum*) for fodder-cum-seed purpose

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ABSTRACT

An experiment was conducted during the rainy season of 1999 and 2000 at Zonal Agricultural Research Station, Konehally, Tiptur, to study the influence of 3 row spacings (30, 45 and 60 cm) and 4 cutting managements on guinea grass (*Panicum maximum* Jacq.) under irrigation. Among the growth parameters, the number of tillers/m row alone was significantly higher at wider spacings. The tillering was significantly profuse when the crop was cut for fodder-cum-seed purpose at later cuts than at first cut. The green fodder yield was significantly influenced by cutting management. However, the seed yield was not influenced significantly by row spacings and cutting management. The closer row spacing of 30 or 45 cm and managing the crop with fourth cut for fodder-cum-seed purpose giving a green fodder yield of 55–58.5 tonnes/ha and a seed yield of 105–115 kg/ha appeared optimum for 'PGG 518' guinea grass under irrigation.

Key words : Row spacing, Cutting management, Guinea grass, Fodder-cum-seed purpose

Guinea grass is an important forage crop, as it provides green fodder at frequent intervals and is valued for milch animals in view of its lactogenic effect. Singh and Srivastava (1990) suggested 'PGG 1' and 'PGG 9' varieties of guinea grass to Southern, North–West and Central India. The forage seed productivity could be augmented through appropriate cutting, fertilization, irrigation management techniques besides varietal selection (Rai and Shankarnarayan, 1981; Hazra, 1989; Purushotham *et al.*, 1995, 1998). Therefore an attempt was made to optimize row spacing and cutting management in 'PGG 518' guinea grass which was identified for release (AICRPFC, 1999) for the entire country for fodder-cum-seed purpose as the information is lacking from Karnataka.

MATERIALS AND METHODS

A field experiment was conducted on guinea grass (cv. 'PGG 518') during the rainy season (*kharif*) 1999 and 2000 with 3 row spacings in main plot (30, 45 and 60 cm) and 4 cutting management in subplot (out of 4 cuts, 1 cut for fodder-cum-seed purpose and the remaining 3 cuts for green fodder) in split-plot design, with 3 replications under protective irrigation at Zonal Agricultural Research Station, Konehally, Tiptur. The soil was red, sandy, acidic, medium in available N and P, while rich in available K status. Uniform application of 10 tonnes farmyard manure/ ha at 1 month prior to sowing and a basal application of 30, 60 and 40 kg N, P and K/ha at the sowing time was provided. A seed rate of 5 kg/ha at all the row spacings was followed and it was sown on 5 July 1999 and 10 July 2000 during 1999 and 2000 respectively. A top-dressing of 30 kg N/ha was provided 30 days after sowing and after each cut. The crop was cut for green fodder at boot-leaf stage which took 65 days for first cut and in rest of the cuts it took 35–40 days. The crop for fodder-cum-seed purpose took 100 days in first cut, whereas it varied from 55 to 65 days in rest of the cuts. A rainfall of 694.6 mm in 36 rainy days and 774.0 mm in 37 rainy days was received in the year 1999 and 2000, respectively, in the *kharif* season during the cropping period of July–January. Bulk of rainfall (93.2% in 1999 and 94.1% in 2000) was received during August–October. However, a rainfall of 482.8 mm in October 1999 and 263.2, 213.7 and 251.3 mm in August, September and October 2000, respectively, was received. Therefore weeds offered moderate competition with the crop during *kharif* 2000. Intercultivations and hand-weeding were slightly hampered in the second year due to high moisture status in the field on account of heavy rains in August, September and October. Growth parameters and green fodder yield based on 4 cuts and seed yield of 2 years were analysed by pooling the data.

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Table 1. Growth parameters, green fodder and seed yields of guinea grass as influenced by row spacing and cutting management under irrigation during rainy season (pooled data of 1999 and 2000)

Treatment	Growth parameter				
	Plant height (cm)	Tillers/m row	Green leaves/ tiller	Green fodder (tonnes/ha)	Seed yield (kg/ha)
Row spacing					
30 cm	63.4	68.4	3.5	49.3	105
45 cm	62.3	84.0	3.3	48.1	115
60 cm	62.9	89.1	3.3	46.1	125
CD (P=0.05)	NS	5.3	NS	NS	NS
Cutting management					
C_1, First cut for fodder-cum-seed and rest for fodder	65.8	69.8	3.6	43.8	114
C_2, Second cut for fodder-cum-seed and rest for fodder	60.3	80.3	3.3	44.8	121
C_3, Third cut for fodder-cum seed and rest for fodder	61.3	82.2	3.2	48.8	123
C_4, Fourth cut for fodder-cum-seed and rest for fodder	64.2	89.6	3.4	53.9	103
CD (P=0.05)	NS	6.5	0.1	3.2	NS

Table 2. Green fodder yield of guinea grass (tonnes/ha) as influenced by row spacing and cutting management under irrigation during rainy season (pooled data of 1999 and 2000)

Cutting management	Row spacing			
	30	40	60	Mean
C_1, First cut for fodder-cum-seed and rest for fodder	43.7	42.3	45.5	43.8
C_2, Second cut for fodder-cum-seed and rest for fodder	43.4	45.3	45.7	44.8
C_3, Third cut for fodder-cum seed and rest for fodder	51.2	50.2	45.2	48.9
C_4, Fourth cut for fodder-cum-seed and rest for fodder	58.8	54.6	48.1	53.8
Mean	49.2	48.1	46.1	
CD (P=0.05)				
Row spacings		NS		
Cutting management		3.2		
Interaction		5.5		

RESULTS AND DISCUSSION

Among the growth parameters, tillers/m row alone were significantly higher at wider spacing (45 and 60 cm) compared to narrow spacing of 30 cm apart (Table 1). There was numerical decrease in fodder yield, while seed yield increased with the increase in row spacing (Table 1). The cutting management significantly influenced tillers/m row, green leaves/tiller and green fodder yield. The tillers/m were significantly higher when the crop was cut for fodder-cum-seed purpose at later cuts than at first cut, whereas leafiness was significantly more with the first cut but not at later cuts. Green fodder yield was significantly higher when the crop was cut for both the purposes in third and fourth cuts as compared to first or second cuts and it might be due to better tillering when later cuts were opted for fodder-cum-seed purposes compared to earlier cuts. The increase in green fodder yield was 22.8, 20.2 and 10.3% with fourth cut for fodder-cum-seed purpose than first, second and third cuts, respectively. The increase in yield was owing to number of tillers at this cutting management as compared to other management. The green fodder yield was highest (58.8 tonnes/ha) at 30 cm row spacing with fourth cut for fodder-cum-seed purpose and it was significantly higher than rest of management practice except at 45 cm spacing with fourth cut for fodder-cum-seed purpose (54.6 tonnes/ha) Table 2. The crop offers competition to weeds at closer spacings of 30 and 45 cm compared to wider spacing of 60 cm.

Therefore the study infers that closer row spacing of 30 or 45 cm and fourth cut for fodder-cum-seed purposes, giving a green fodder yield of 55–58.5 tonnes/ha and a seed yield of 105-115 kg/ha appeared optimum for guinea grass under irrigation.

REFERENCES

AICRP FC. 1999. *Annual Report of 1999–2000.* Part 1 : *Kharif 99,*

All-India Co-ordinated Research Project on Forage Crops, Indian Grassland and Fodder Research Institute, Jhansi, Uttar Pradesh.

Hazra, C.R. 1989. *Technology for Increasing Forage Production in India*. Indian Grassland and Fodder Research Institute, Jhansi, Uttar Pradesh.

Purushotham, S., Umesha, K. and Manjunatha, M., 1995. Agronomic practices for fodder cum seed purposes in Anjan Grass. *Indian Journal of Agronomy* **40**(4) : 689–692.

Purushotham, S., Umesha, K. and Siddaraju, R. 1998. Performance of guinea grass genotypes under irrigation. *Karnataka Journal of Agricultural Sciences* **11**(1) : 12–16.

Rai, P. and Shankaranarayana, K.A. 1981. Effect of nitrogen and phosphorus on the seed yield of Pusa Giant Anjan. *Forage Research* **7** : 181–185.

Singh, Panjab and Srivastava, K. 1990. *Forage Production Technology*, Indian Grassland and Fodder Research Institute, Jhansi, Uttar Pradesh.