

Agronomic practices for fodder-cum-seed purpose in anjan grass (*Cenchrus ciliaris*)

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ABSTRACT

A field experiment was conducted under rainfed conditions with few agronomic practices during 1989–1991 on anjan grass (*Cenchrus ciliaris* L.) to obtain fodder and seed from the grass. The practices studied were 2 row spacings (22.5 and 45 cm), 2 phosphorus levels (20 and 40 kg P_2O_5 /ha) and 2 cutting managements (with and without cut). In the year of establishment, the seed yield was significantly reduced with cutting treatment (14.6 kg/ha) as compared with no cut (55.5 kg/ha). Green-fodder yield was significantly influenced by different treatments during 1991. Seed yield was significantly higher with higher P level with an exception during 1989. Sowing at 45 cm row spacing with 40 : 40 kg N : P/ha gave higher yields. In the establishment year, it was grown purely for seed purpose. However, in the later years it could be cut at 6–12 weeks after monsoon for green fodder and the ratoon crop left for seed-purpose.

The productivity and availability of seeds are the important factors in forage production. In a situation of limited land in the country, it is not feasible to increase the area under forage-seed production. Sudhakar *et al.* (1994) observed higher fodder production in 'CAZRI 75' variety of anjan grass (*Cenchrus ciliaris* L.) Hazra (1989) reported the possibility of growing Dinanath grass for fodder-cum-seed purposes. Therefore an attempt was made through agronomic practices to produce green fodder as well as seeds from anjan grass, which is most popular grass in the arid and semi-arid conditions of the country.

MATERIALS AND METHODS

A field experiment was conducted on anjan grass under rainfed conditions at the Regional Research Station, Tiptur (Karnataka), during the rainy (*kharif*) season of 1989 to 1991. It was laid out in

randomized block design, with factorial concept and replicated 4 times. The agronomic practices studied were 2 row spacings (22.5 and 45 cm between rows), 2 phosphorus levels (20 and 40 kg P_2O_5 /ha over an uniform dose of 40 kg N/ha) and 2 cutting managements [cut at 60 days after sowing (DAS) and no cut during 1989, cut at 8 weeks after monsoon and no cut during 1990, and cut at 6 weeks after monsoon and cut at 12 weeks after monsoon during 1991]. The soil of experiment plot was sandy in texture (Alfisol), red in colour, acidic in reaction (pH 6.3) and medium in fertility status (392, 28.5 and 400 kg of available N, P_2O_5 and K_2O /ha respectively). The variety 'CAZRI 75' was used with a seed rate of 5 kg/ha. Seeds were sown at a shallow depth on 12 July 1989 after good showers of rain (54.0 mm) at different row spacings based on the treatment. Half the dose of N and full dose of P as per treatment was applied basal.

The rest of N dose was top-dressed after the cut as per treatment. The source of N and P was urea and single superphosphate respectively. Rainfall of 448.8, 285.2 and 598.5 mm was received during 1989, 1990 and 1991 respectively during April–November, ie crop-growing period. The plots were kept free by 2 weedings in first year and by 1 weeding in the subsequent years.

RESULTS AND DISCUSSION

Effect of row spacing

The plant height of seed crop was not influenced by the row spacings significantly (Table 1). Tillering capacity was significantly more at 45 cm row spacing than that at 22.5 cm row spacing during 1990 and 1991. In general, the fodder and seed yields were low during 1990 compared with other years due to low rainfall. The yields did not differ due to spacings with an exception of signifi-

cantly higher green-fodder yield with 45 cm than 22.5 cm row spacing during 1991. Rai (1990) also observed no difference in fodder yields due to variation in row spacings.

Effect of phosphorus

The plant height of seed crop was significantly improved at 40 kg P_2O_5 /ha compared with 20 kg P_2O_5 /ha during 1990. The tillering capacity did not differ due to P levels. The green-fodder yield was significantly higher (29.3%) with 40 kg P_2O_5 than kg P_2O_5 /ha (57.9 q/ha) during 1991. Improvement in fodder yield of anjan grass due to phosphorus application was observed by Singh (1988) and Rai (1990). The seed yield was also significantly higher (30.6 and 38.6% respectively during 1990 and 1991) at 40 kg P_2O_5 than that at 20 kg P_2O_5 /ha. Such significant improvement in straw yield due to phosphorus was observed during 1990 only, which may be attributed

Table 1. Plant height and tillers/m row length in the seed crop of anjan grass during 1989–1991

Treatment	Plant height (cm)			Tillers/m row length		
	1989	1990	1991	1989	1990	1991
<i>Row spacing</i>						
22.5 cm between rows	78.7	58.1	60.1	115.8	68.4	92.6
45.0 cm between rows	75.5	61.4	61.5	131.0	84.3	111.0
CD (P = 0.05)	NS	NS	NS	NS	8.4	11.3
<i>Cutting management*</i>						
With cut	72.7	55.9	59.1	136.8	74.4	98.1
Without cut	81.4	63.6	62.5	110.0	77.8	105.6
CD (P = 0.05)	NS	4.7	NS	16.4	NS	NS
<i>P₂O₅ (kg/ha)</i>						
20	75.3	56.5	58.9	130.3	73.6	102.8
40	78.8	63.0	62.6	116.6	79.1	100.9
CD (P = 0.05)	NS	4.7	NS	NS	NS	NS

* Crop was cut at 60 days after sowing, 8 and 6 weeks after monsoon in cutting-management treatment during 1989, 1990 and 1991 respectively, whereas no-cut treatment was imposed during 1989 and 1990, but 1 cut was imposed at 12 weeks after monsoon in 1991

Table 2. Green fodder, seed and straw yields of anjan grass as influenced by row spacings, cutting management and phosphorus levels during 1989–1991

Treatment	Green-fodder yield (q/ha)			Seed yield (kg/ha)			Straw yield (q/ha)		
	1989	1990	1991	1989	1990	1991	1989	1990	1991
<i>Row spacing</i>									
22.5 cm between rows	53.3	6.0	59.1	34.0	23.2	33.2	45.1	45.9	68.3
45.0 cm between rows	57.3	6.0	73.7	36.0	26.6	37.9	44.2	49.7	68.0
CD (P = 0.05)	NS	NS	10.9	NS	NS	NS	NS	NS	NS
<i>Cutting management*</i>									
With cut	55.3	6.0	58.4	14.6	22.8	34.4	33.2	42.3	68.9
Without cut			74.4	55.5	23.1	36.8	55.3	53.3	67.5
CD (P = 0.05)			10.9	14.7	NS	NS	8.1	4.5	NS
<i>P₂O₅ (kg/ha)</i>									
20	52.6	6.0	57.9	29.0	19.9	29.8	43.0	45.5	65.4
40	58.0	6.0	74.9	41.1	26.0	41.3	46.3	50.2	71.1
CD (P = 0.05)	NS	NS	10.9	NS	3.9	6.7	NS	4.5	NS

* Crop was cut at 60 days after sowing, 8 and 6 weeks after monsoon in cutting-management treatment during 1989, 1990 and 1991 respectively, whereas no-cut treatment was imposed during 1989 and 1990, but 1 cut was imposed at 12 weeks after monsoon in 1991

to higher plant height at 40 kg P₂O₅/ha.

Effect of cutting management

The plant height was significantly more with no-cut treatment compared with the treatment with cutting during 1990, which may be due to availability of more time for no-cut treatment compared with the other. Such difference in plant height was not observed in 1989 and 1991 due to receipt of relatively higher rainfall than in 1990. The number of tillers per unit row length were significantly higher with the cutting treatment compared with no cutting in the year of establishment. Cutting induced more tillering capacity in the grass under good moisture condition in 1989 compared with low-moisture condition that prevailed in 1990. The green-fodder yield was significantly higher with cutting at 12 weeks after monsoon than cutting at 6 weeks after monsoon during 1991, which might be attributed for

better growth of the crop due to delay in cutting. Seed yield was significantly higher with no-cut treatment (purely seed crop) compared with the cutting treatment (fodder-cum-seed purpose crop) in the establishment year. Such differences due to cutting were not observed in the subsequent years. The straw yield was also significantly higher with no cut compared with the treatment with cutting during 1989 and 1990. The results are in conformity with those of Purushotham and Umesha (1992) on Dinanath grass.

Effect of interaction

The seed yield of anjan grass was influenced by the interaction effect between row spacing and P levels during 1991. Seed yield did not differ significantly due to P levels with 22.5 cm row spacing. However, with 45 cm row spacing application of 40 kg P₂O₅/ha gave significantly higher seed yield

(72.3%) than at lower P level (27.8 kg seed/ha). The seed yield did not differ due to row spacings at lower P level. However, at higher P level the seed yield of anjan grass was significantly higher with 45 cm row spacing (38.4%) than 22.5 row spacing (34.6 kg seed/ha).

Thus anjan grass should be sown at 45 cm row spacing and fertilized with 40 and 40 kg N and P/ha for higher fodder and seed yields. In the year of establishment, it must be managed purely for seed purpose. However, in the subsequent years, depending on the rainfall, the grass can be cut at 6–12 weeks after monsoon for green fodder and the ratoon can be continued for seed purpose.

REFERENCES

- Hazra, C. R. 1989. *Technology for Increasing Forage Production in India*. Indian Council of Agricultural Research, New Delhi.
- Purushotham, S. and Umesha, K. 1992. Agronomic practices for fodder-cum-seed production in Dinanath grass. *Current Research* 21 : 105–106.
- Rai, P. 1990. Effect of row spacing on the productivity of Anjan grass with Caribbean stylo under different levels of phosphorous. *Annals of Arid Zone* 29 (1) : 29–33.
- Singh, Panjab 1988. Rangeland reconstruction and management for optimising forage production. (in) *Rangelands Resource and Management*, pp 20–37. Panjab Singh and P S Pathak (Eds). Range Management Society of India, Jhansi, Uttar Pradesh.
- Sudhakar, N., Swami, M. L. and Yadav, M. S. 1994. Performance of *Cenchrus ciliaris* varieties at Bhuj. *Annals of Arid Zone* 33 (4) : 335–36.