

Response of pearl millet (*Pennisetum glaucum*) varieties to different levels of nitrogen under late-sown rainfed conditions

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ABSTRACT

A field study was undertaken during *kharif* (rainy) season of 1992 and 1994 at Durgapura, to optimize the dose of nitrogen and evaluate suitable variety for late-sown, rainfed situations of semi-arid conditions of eastern Rajasthan. The crop was sown on 1 and 2 August during 1992 and 1994 respectively. Because of the good and well-distributed rainfall (456.5 mm and 378.2 mm) during the crop season up to mid-September, all the varieties of pearl millet matured successfully during 1992 and 1994. Pearl millet 'HHB 60' outyielded other varieties and significantly increased the grain yield by 3.42, 5.19 and 7.96 q/ha respectively over 'HHB 67', 'RHB 30' and 'Raj 171'. Increasing levels of nitrogen from 30 to 90 kg/ha increased the grain yield of pearl millet significantly. Application of 90 kg N/ha increased the grain yield by 18.39 and 48.79% over 60 kg and 30 kg N/ha respectively.

Key words : Pearl millet varieties, Nitrogen levels

Pearl millet is the most important rainy (*kharif*)-season cereal crop in Rajasthan. It is mostly grown on marginal soils under rainfed conditions. In the event of late break and early cessation of rainfall, pearl millet is found suitable and remunerative crop for sowing in August (Sharma *et al.*, 1993). With the development of high-yielding, short-duration hybrids, this crop could produce good yield with adequate nitrogen fertilization even under late-sown rainfed conditions. Hence it was felt necessary to

find out suitable variety and nitrogen dose for pearl millet under late-sown rainfed conditions in Rajasthan.

MATERIALS AND METHODS

The study was undertaken during *kharif* 1992 and 1994 at Agricultural Research Station, Durgapura, Jaipur, under late-sown rainfed situation. The treatments, comprising 3 hybrids ('HHB 60', 'HHB 67' and 'RHB 30') and 1 variety ('RAJ 171') and 3 nitrogen levels (30, 60 and 90 kg N/ha) were replicated 4 times in randomized

block design. The soil was loamy sand, low in nitrogen (140 kg/ha), medium in P_2O_5 (50 kg/ha) and K_2O (210 kg/ha), with pH 7.9 (1 : 2 soil : water suspension).

The crop was sown in rows 45 cm apart using 4 kg seed/ha on 1 and 2 August during 1992 and 1994 respectively. A basal dose of 30 kg P_2O_5 /ha was applied and N was applied as per treatment, half at sowing as basal and half 30 days after sowing as top-dressing. There was good and well-distributed rainfall during the crop season from August to mid-September.

RESULTS AND DISCUSSION

Variety

Variety 'HHB 60' outyielded all the varieties and showed significant increase in grain yield by 3.70, 5.87 and 6.54 q/ha over 'HHB-60', 'RHB 30' and 'Raj 171' respectively during 1992; but in 1994, this varie-

ty was statistically at par with 'HHB 67' and found superior to 'RHB 30' and 'Raj 171'. This was because of the higher number of effective tillers obtained with variety 'HHB 60' during both the years (Table 1). Verma (1993) also reported similar results. In stover production, 'Raj 171' gave significantly higher stover yield during 1992 and 1994 over rest of the varieties tested. Pooled results indicated that variety 'HHB 60' registered significantly higher grain yield of 19.16 q/ha over rest of the varieties, whereas variety 'Raj 171' outyielded in case of stover production, as it gave 12-21 q/ha higher stover yield over other varieties.

Nitrogen

Application of 90 kg N/ha resulted in significantly higher grain yield of 17.13 q/ha over 30 kg N/ha (14.4 q/ha) and 60 kg

Table 1. Effect of pearl millet varieties and nitrogen levels on yield attributes under late-sown rainfed conditions

Treatment	Effective tillers/m row length		Grain weight/ear (g)		Ear length (cm)	
	1992	1994	1992	1994	1992	1994
<i>Variety/hybrid</i>						
'RHB 30'	11.14	10.75	13.58	16.75	20.38	21.58
'HHB 60'	14.57	13.46	14.17	19.33	19.47	21.96
'HHB 67'	13.44	12.83	14.72	15.98	16.03	16.75
'Raj 171'	9.53	7.92	17.23	18.18	25.18	25.54
CD (P = 0.05)	1.37	1.20	2.70	1.52	0.99	0.94
<i>Nitrogen (kg/ha)</i>						
30	11.52	8.59	13.86	15.26	20.35	20.13
60	12.14	11.38	14.41	17.88	20.33	21.56
90	12.77	13.75	16.50	19.55	20.13	22.69
CD (P = 0.05)	NS	1.04	1.97	1.32	NS	0.81
CV (%)	13.60	12.86	18.29	10.40	5.90	5.25

Table 2. Effect of pearl millet variety or hybrids and nitrogen levels on grain and stover yields under late-sown rainfed situations

Treatment	Grain yield (q/ha)			Stover yield (q/ha)		
	1992	1994	Pooled	1992	1994	Pooled
<i>Variety/hybrid</i>						
'RHB 30'	13.73	14.20	13.97	25.62	36.27	30.94
'HHB 60'	19.60	18.71	19.16	33.64	42.44	38.04
'HHB 67'	15.90	15.59	15.74	25.93	31.64	28.78
'Raj 171'	13.06	9.34	11.20	49.85	49.77	49.81
CD (P = 0.05)	1.41	1.91	3.17	4.43	3.17	4.87
<i>Nitrogen (kg/ha)</i>						
30	14.40	9.66	12.03	31.02	33.56	32.29
60	15.19	15.05	15.12	34.37	40.80	37.59
90	17.13	18.66	17.90	35.88	45.72	40.80
CD (P = 0.05)	1.22	1.66	2.75	2.84	2.75	4.21
CV (%)	10.89	15.91		15.79	9.52	

N/ha (15.19 q/ha) during 1992; whereas in 1994 an increasing levels of N increased the grain yield of pearl millet significantly. In case of stover yield, application of 60 kg N/ha increased the yield significantly over 30 kg N/ha and found at par with 90 kg N/ha during 1992, but in 1994 increasing levels of N from 30 to 90 kg/ha increased the stover yield significantly. Pooled results showed that application of 90 kg N/ha increased the grain yield by 48.79 and 18.39% over 30 kg and 60 kg N/ha respectively. Similar results were reported by Subbian (1991) and Jat *et al.* (1994). The increase in grain yield was because of the higher grain weight/ear during both the years and ear-bearing tillers/m row length and ear length during 1994 (Table 2). Jat *et al.* (1994) reported significantly higher ear-bearing tillers/m and ear length with application of N up to 60 kg N/ha. Stover yield was significantly higher with

application of 60 kg N/ha over 30 kg N/ha and found at par with 90 kg N/ha.

REFERENCES

- Jat, Rameshwar, Mali, A.L. and Chaudhary, G.R. 1994. Studies on integrated nutrient management in pearl millet (*Pennisetum americanum*). (In) *Proceedings of XIII National Symposium on Integrated Input Management for Efficient Crop Production*, held at Coimbatore, 22-25 February 1994, pp. 145.
- Sharma, B.L., Sharma, P.K. and Fageria, V.D. 1993. Suitability of rainy season crops for late sown rainfed conditions. *Indian Journal of Agronomy* 38 (1) : 22-24.
- Subbian, P. 1991. Effect of nitrogen, phosphorus and potassium nutrition on performance of pearl millet (*Pennisetum glaucum*). *Indian Journal of Agronomy* 36 (4) : 594-596.
- Verma, O.P.S. 1993. Response of pearl millet (*Pennisetum glaucum*) hybrid to irrigation applied at different physiological stages of crop growth. *Indian Journal of Agronomy* 38 (2) : 214-217.