

Response of Pearl Millet Hybrids to Nitrogen Fertilization

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Investigations were carried out at the Regional Station, Indian Agricultural Research Institute, Coimbatore during *rabi* seasons of 1973-74 and 1974-75 on nitrogen nutrition of different hybrids of pearl millet. Among the hybrids HB-3 and HB-5 were found to be most promising. Grain yield of all the hybrids was increased considerably by N application. The optimum level of N for different hybrids ranged from 70 to 129 kg/ha. Stover yield also increased with increasing levels of N.

Effect of N application on increasing the grain yield of hybrids of pearl millet (*Pennisetum typhoides* (Burm) Stapf & Hubb.) has been observed for many years (Murty, 1967). But response of the hybrids to N differs from one agro-climatic zone to another (Anon, 1973 and Mahendra Pal *et al.* 1973). An experiment was, therefore, conducted during *rabi* season (September-January) of 1973-74 and 1974-75 under the auspices of the All India Coordinated Millet Improvement Project of finding out the optimum levels of N for different promising hybrids of pearl millet.

MATERIAL AND METHODS

The experiment comprised six levels of N (0, 40, 80, 120, 160 and 200 kg/ha) and five entries (J-1270, HB-3, HB-4, HB-5 and J-934) of pearl millet in 1973-74 and same levels of N but only two entries (HB-3 and J-934) in 1974-75. Randomised block design with four replications was adopted in both the seasons. A common basal dose of 40 kg

P_2O_5 /ha and half of the N was applied at the time of planting and the remaining N was top dressed four weeks after planting. The crop was raised under rainfed conditions with the onset of northeast monsoon, in the first and last weeks of September in 1973-74 and 1974-75 respectively. The minimum temperature did not fall below 16°C during both the crop seasons. Soil was sandy loam with pH 8.4, containing 0.35 and 0.40 per cent organic carbon, 36.6 kg and 40.2 kg available P_2O_5 /ha and 655.5 kg and 658.0 kg available K_2O /ha in 1973-74 and 1974-75 respectively.

RESULTS AND DISCUSSION

The data on yield and yield attributes are presented in Table. In general, the grain yields were low in the second year than in the first year. This was due to mild lodging (about 10 per cent) of the crop at the time of flowering because of high wind and heavy rains. A linear response to N levels was observed upto 160 kg and 80 kg N/ha in 1973-74

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TABLE. Grain and stover yields and yield attributes of pearl millet hybrids

Treatment	Crain yield (q/ha)		Stover yield (q/ha)		1000 grain weight (g)		Effective tillers per plant	
	1973-74	1974-75	1973-74	1974-75	1973-74	1974-75	1973-74	1974-75
(i) N levels (kg/ha)								
0	11.7	11.0	21.7	20.6	6.91	4.0	3.1	7.48
40	15.9	16.0	34.0	29.4	7.27	4.9	4.1	8.29
80	21.4	20.2	51.5	38.4	7.43	6.2	4.5	8.32
120	25.5	19.2	64.8	43.1	7.55	6.4	5.5	8.70
160	27.2	17.4	58.5	45.0	7.67	6.8	5.5	8.29
200	26.9	15.9	69.6	43.9	7.72	6.6	5.2	7.51
S.E.m \pm	2.4	1.5	3.7	1.6	0.22	1.3	0.51	0.41
C.D. 5%	6.8	4.6	11.2	4.6	0.63	N.S.	1.62	N.S.
(ii) Entries								
J. 1270	20.5	—	46.3	—	7.16	—	4.5	—
HB 3	24.5	17.1	65.6	39.7	7.60	6.0	5.0	8.00
HB 4	17.1	—	46.5	—	7.50	—	4.3	—
HB 5	26.0	—	57.2	—	7.39	—	5.0	—
J 934	19.1	16.2	33.6	33.4	7.48	5.6	4.4	8.22
S.E.m \pm	1.8	0.90	3.0	0.8	0.28	1.1	0.46	0.30
C.D.5%	5.2	N.S.	8.6	2.6	N.S.	N.S.	N.S.	N.S.

N.S. = Not significant

and 1974-75 respectively. Application of 160 kg N/ha gave maximum yield, an increase of 15.5 q/ha in the first year over no N (control) but in the second year the increase was only 9.2 q/ha with 80 kg N/ha.

Out of five hybrids tested during 1973-74, HB-3 and HB-5 were superior in grain yield to HB-4. HB-4 recorded 52 and 43 per cent less yield than HB-3 respectively. Hybrid J-1270 and J-934 had similar yield potential as that of HB-4. In 1974-75 both HB-8 and J-934 were on par. Low yield potential of

HB-4 was due to its susceptibility to ergot and downy mildew (Anon, 1973).

Differences in yield attributing characters, such as number of effective tillers and 1000 grain weight among different hybrids were found to be marginal and non-significant. Application of even 40 kg N/ha brought substantial improvement in these yield attributes over control.

Interaction effects between N levels and entries were not significant in both the years. The mean response of the

hybrids to N levels was of quadratic nature in both the years and the response equations are given below :

1973-74

$$\hat{Y} = 11.04 + 0.1656x - 0.00042x^2$$

1974-75

$$\hat{Y} = 11.27 + 0.1459x - 0.000631x^2$$

(\hat{Y} = Expected yield; x = quantity of N applied; both in kg/ha)

The economic optimum level of N for two years was also worked out with Rs. 4.30 as unit cost of N and at Rs. 76.00/q of grain. The economic optimum level was 129.4 kg N/ha in 1973-74 but in 1974-75 it was only 70.8 kg N/ha. This differential behaviour in respect of economic optimum level was mainly due to the difference in the soil fertility and premature lodging of the crop during 1974-75. The crop received sufficient rainfall (625 mm and 738 mm per crop season) which helped in the efficient utilization of applied N. Murty (1967) observed a linear response upto 170 kg N/ha whereas Mahendra Pal *et al.* (1973) and Mahendra Pal and Kaushik

(1973) reported response upto 150 kg N/ha.

Stover yield also increased significantly due to N application. The maximum stover yield was recorded at 200 kg N/ha level in 1973-74 and at 160 kg N/ha in 1974-75 but these levels did not differ significantly with the lower level of 120 kg N/ha in both the years. Among the entries HB-3 showed the maximum stover yield potential in both the years whereas J-934 produced the minimum stover yield

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