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Response of Pearl-Millet *(Pennisetum typhoides)* (Burmf) Stapb and Hubb., Hybrids to Nitrogen and Phosphorus*

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AN EXPERIMENT involving treatment combinations of four pearl-millet hybrids ('HB-3', 'J-41'. 'J-934' and 'J-1270'); four levels of nitrogen (0, 60, 120 and 180 kg/ha) and three levels of phosphorus (0, 60 and 120 kg/ha) was conducted on the farm of Gujarat Agricultural University, Junagadh campus, during *kharif* season of the year 1973-74. The experiment was laid out in $4 \times 4 \times 3$ factorial confounded design with two replications. The soil of the experimental plot was clayey in texture, fairly rich in total nitrogen and rich in available and total phosphorus and potash with a pH 8·2. The experimental site received a common dose of 60 kg/ha potash through muriate of potash irrespective of treatments which was broad casted and incorporated with the soil at the time of sowing. Diammonium phosphate and urea were the sources that supplied nitrogen and phosphorus. The gross and net plot sizes were 6·3 m $\times$ 4·2 m and 5·3 m $\times$ 3·0 m, respectively.

Varieties:

Data presented (Table 1) show significant variation in the inherent response of varieties under trial. 'J-41'(V_2) which gave the highest yield of 1984 kg/ha out-yielded 'HB-3', 'J-934' and 'J-1270' by 8·41, 21·49 and 24·15 per cent; the difference between varieties in all cases were being significant.

The variation in response of varieties can be attributed to higher number of productive shoots and larger number of grains per earhead, in high yielding varieties over others. The variety, 'J-41' out-numbered the other varieties both in panicle number and grains per panicle.

The variety 'J-1270' which recorded the lowest grain yield gave significantly the highest yield of straw over others with the lowest harvest index manifesting its failure to transform the dry matters produced to economic yield under the agro-climatic conditions of Junagadh.

Nitrogen:

Nitrogen had significant influence on grain yield. The highest level of 180 kg N/ha recorded the highest yield which was significantly superior to other nitrogen levels. However, the levels of 60 and 120 kg were statistically on par though they produced higher

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TABLE 1

Effect of different treatments on yield and yield attributes.

Treatments	*Yield kg/ha*		*Productive shoots per 1·8m²*	*Earhead thickness (cm)*	*Grain yield per plant (g)*	*1000 grain weight (g)*
	Grain	*Straw*				
V_1 (HB-3)	1830	6116	50·59	1·931	30·45	6·177
V_2 (J-41)	1984	6292	52·25	1·938	32·27	6·369
V_3 (J-934)	1633	4588	50·70	1·711	29·14	5·448
V_4 (J-1270)	1593	6428	33·12	1·822	28·39	6·443
S. Em. ±	52·201	107·043	0·387	0·014	0·839	0·068
'F' Test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
C. D. at 5%	149·100	305·744	1·105	0·039	2·396	0·194
N_0 (0 kg N/ha)	1517	5332	45·12	1·782	25·52	5·816
N_1 (60 kg N/ha)	1761	5876	44·50	1·845	28·50	6·090
N_2 (120 kg N/ha)	1805	6133	47·37	1·878	31·83	6·186
N_3 (180 kg N/ha)	1964	6083	50·04	1·885	34·41	6·344
S. Em. ±	52·201	107·043	0·387	0·014	0·839	0·068
'F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
C. D. At 5%	149·100	305·744	1·105	0·039	2·396	0·194
P_0 (0 kg P_2O_5/ha)	1776	6069	46·90	1·853	30·06	6·142
P_1 (60 kg P_2O_5/ha)	1808	5842	48·28	1·854	30·10	6·102
P_2 (120 kg P_2O_5/ha)	1701	5657	45·09	1·843	30·03	6·084
S. Em. ±	44·654	92·830	0·335	0·01	0·727	0·059
'F' test	N.S.	Sig.	Sig.	N.S.	N.S.	N.S.
C. D. at 5%	N.S.	265·148	0·957	N.S.	N.S.	N.S.

Sig. = Significant.
N.S. = Not significant.

yield of grain over 0 N/ha. The treatments, of 60, 120 and 180 kg N had recorded 16·08, 18·98 and 29·46 per cent increase in grain yield over the control.

Positive influence of nitrogen on straw yield was most marked at 120 kg N which produced 6133 kg/ha straw followed by N_3 and N_1. The difference between N_2 and N_3 was not significant.

The data also showed that over and above the level of poverty adjustment in N level, the immediate tendency in these varieties seemed to be for straw production. This probably is a genetic lacuna at the cryptic stages of differentiation when potential grain number is decided. Higher levels of N increased yield mostly by increasing seed index rather than grain number which is an added evidence to the genetic lacuna.

Phosphorus:

Applied phosphorus failed to influence significantly yield or yield attributes mainly because of higher status of total and available phosphorus in the soil which could adequately meet the crop requirement. The intensity and capacity factors of phosphorus in the soil were in perfect harmony.

Phosphorus is known to counteract the effect of nitrogen on excessive vegetative growth. As is seen from data, the

application of phospate at 60 kg increased the earbearing shoots. Effect of phosphorus was more on reducing vegetative growth and increasing productive shoots and the peculiar performance of applied phosphate may be attributed to this.

Varieties × *Nitrogen:*

The interaction V × N in respect of grain yield and other yield attributes were not significant.

In view of the results obtained in this study it can be stated that potential production and profit from pearl-millet can be secured by using 'J-41' variety and fertilizing the same with 60 kg N/ha alone under the agro-climatic conditions of Junagadh.

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