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Short Communications

Nutrient and Spacing Management in Mustard

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An experiment was conducted to study the effect of various levels of nitrogen, phosphorous and spacing on yield and quality of mustard variety 'Varuna' at seed technology centre Department of Gujarat Agricultural University, Sardar Krushinagar during rabi, 1982-83. The soils was loamy sand in texture, low in organic matter, available nitrogen and phosphorous and moderate in available potash. The experiment was laid out in split-plot design with spacing in main plot treatments and nitrogen and phosphorous levels as sub plot treatments. In all, thirty six combinations comprising three levels of spacing (30, 45 and 60 cm), four levels of nitrogen (25, 50, 75 and 100 kg/ha) and three levels of phosphorous (0, 25 and 50 kg/ha) with four replications under irrigated conditions. The entire dose of phosphorous and half of nitrogen were applied as per treatments 6 to 8 cm deep in furrow just before sowing. The remaining dose of nitrogen was applied at flowering stage. The results are presented in Table-1.

Effect of row spacing

It is evident from Table-1 that there was significant effect of row spacing on seed yield. The highest yield of 2036 kg/ha was secured with 60 cm row spacing which was 7.0 and 10.9 per cent higher than those of 45 and 30 cm row spacing, respectively. Row spacing of 60 cm resulted in higher plant height, number of primary and secondary branches per plant, number of pods per plant, seed yield per plant and test weight of seeds indicating better growth and development of individual plant. Thus mustard variety varuna on account of its branching characteristics appeared to require 60 cm row spacing to provide maximum yield. These results are in conformity with those of Patel *et al.*, (1980) and anonymous (1980). The row spacing of 45 cm gave a marginal but significant higher oil content in mustard seeds than those of 60 and 30 cm spacings.

Effect of nitrogen

Application of graded doses of nitrogen was found to be advantageous in boostingup the seed yield of mustard. It is evident from Table-1 that application of nitrogen at 100 kg/ha gave significantly higher yield than the rest of the lower levels recording 2205 kg/ha. The increase in seed yield over those of 25, 50 and 75 kg/ha was to the tune of 38.1, 18.4 and 8.4 per cent, respectively. The highest seed yield obtained under the treatment, 100 kg N/ha can be attributed to higher number of primary and secondary branches per plant and number of pods per plant which were found to positively correlate with seed yield. The contribution of pods per plant was as high as 96.0 per cent in increasing the seed yield of mustard. The results are in agreement with studies conducted by Ghosh and Gupta (1975), Suraj Bhan (1979) and Bishnai and Kumar (1979). Application of nitrogen at 50 kg/ha gave the highest oil content of 41.04 per cent which was 0.88, 1.91 and 3.66 per cent higher than that obtained with 25, 75 and 100 kg N/ha, respectively.

Effect of phosphorous

The maximum seed yield of 2075 kg/ha was recorded under the treatment involving 50 kg P_2O_5/ha. The increase in seed yield at 50 kg P_2O_5/ha, was by 6.01 and 19.18 per cent over those of 25 and 0 kg P_2O_5/ha, respectively. The beneficial effect was also exhibited in primary and secondary branches per plant, number of pods per plant, number of seeds per pod and test weight with application of 50 kg P_2O_5/ha. The findings are in concurrence with those reported by Suraj Bhan *et. al.*, (1975) and Sinha and Sinha (1979). The oil content in the mustard seed increased significantly with increase in levels of phosphorous. The highest oil content of 40.82 per cent was recorded under the

TABLE 1

Influence of different row-spacings, nitrogen and phosphorous levels on mustard.

Treatment	*Plant height (cm) at harvest*	*Primary branches per plant*	*Secondary branches per plant*	*No.of pods per plant*	*No.of seeds per pod*	*Weight of 1000 seeds (g)*	*Seed yield per plant (g)*	*Seed yield kg/ha*	*Stover yield kg/ha*	*Oil content of seeds (%)*	*Net realization (Rs/ha)*
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Row spacing (cm)											
30	182.8	5.17	9.20	147	11.9	5.46	9.04	1836	2572	40.1	5895.24
45	188.0	5.39	11.06	209	12.1	5.59	13.55	1903	2689	40.9	6208.29
60	191.4	5.60	11.68	287	12.2	5.66	18.32	2036	2890	40.1	6813.66
C. D. at 5%	2.5	0.15	0.61	13	NS	0.11	0.78	121	157	0.2	—
N levels (kg/ha)											
25	184.7	4.71	8.30	182	11.8	5.47	11.16	1597	2399	40.7	5028.83
50	188.9	5.42	10.83	211	11.9	5.51	13.19	1863	2689	41.0	6093.20
75	187.9	5.57	11.33	229	12.3	5.54	14.47	2034	2864	40.3	6730.33
100	188.2	5.84	12.13	234	12.4	5.76	15.72	2206	2917	39.6	7370.52
C. D. at 5%	2.5	0.18	0.47	11	NS	0.13	0.64	99	30	0.4	—
P_2O_5 levels (kg/ha)											
0	189.0	5.12	8.82	202	11.9	5.44	12.30	1741	2683	40.0	5630.72
25	186.0	5.45	10.74	214	12.1	5.53	13.90	1957	2708	40.3	6451.81
50	187.3	5.60	12.38	226	12.2	5.74	14.70	2075	2760	40.8	6828.52
C. D. at 5%	2.2	0.15	0.41	9	NS	0.11	0.55	86	NS	0.3	—
Sig. interactions	—	NXP	SXN SXP	SXNXP	—	—	—	—	—	SXN	—

treatment involving 50 kg P_2O_5/ha which was 2.02 and 1.16 per cent higher than that obtained with 0 and 25 kg P_2O_5/ha respectively. These results are in accordance with those reported by Vanjaria (1977) and Patel *et al.*, (1980).

Interactions N × P for primary branches per plant, S × N and S × P for secondary branches and S × N × P for number of pods per plant were significant.

The correlation coefficients of primary branches/plant, secondary branches/plant, pods/plant and plant height with seed yield/plant was positive and significant. Pods/plant were found to have highest positive correlation with seed yield/plant. The number of branches and subsequently pods/plant would be influenced by spacing as well as nutrient status and thereby effect the seed yield/plant. Row spacing of 60 cm, N rate of 100 kg/ha and P rate of 50 kg/ha were found to be advantageous not only in their individual capacity but they interacted synergestically too.

Economics of treatments in terms of net realization (Rs/ha) is presented in Table-1. The perusal of the table revealed that highest returns were obtained with 100 kg N/ha followed by 50 kg P_2O_5/ha and 60 cm spacing as main treatments. In combination also 100 kg N and 50 kg P_2O_5/ha at 60 cm spacing recorded the highest return of Rs.8786/ha.

Thus the experimental results indicated that inter-row spacing of 60 cm with application of 100 kg N/ha and 50 kg P_2O_5/ha may be considered for growing mustard variety varuna in light soils of North Gujarat for obtaining higher seed yield and monetary gains.

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