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Effect of Irrigation, Phosphorus and Row Spacing on Yield and Economic Return of Soyabean*

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In northern plains, large area after the harvest of rabi crops, remain fallow, such fallow fields can easily be utilized for the cultivation of kharif soyabean. After harvest of *kharif*, soyabean, wheat can be grown easily. With this background in view, a field experiment was conducted during *kharif* seasons of 1983 and 1984 at JNKVV, Regional Agricultural Research Station, Morena. The experiment was laid out in split plot design with three replications. The combination of irrigation (no irrigation, 0.3 and 0.6 IW/CPE ratio) and phosphorus (0, 40 and 80 kg P_2O_5 ha^{-1}) levels were alloted to main plot whereas row spacing in sub plots. The intra row spacing was kept constant (5 cm) and the plant population was adjusted by varying the row spacing which were 30, 45 and 60 cm and gave a population of 660×10^3, 440×10^3 and 330×10^3 plants ha^{-1} respectively. The irrigation at 0.3 IW/CPE could not be achieved during both the seasons, hence the treatments no irrigation and 0.3 IW/CPE ratio both were included in one statistical analysis was done by dummy methods. The soil was sandy loam having organic carbon 0.16%, available N 77.2 kg ha^{-1} (low), available phosphorus 206.7 kg ha^{-1} (medium) and available potash 385.5 kg ha^{-1} (medium) and soil pH was 7.3. The crop variety Gaurav (JS 72-44) was sown on July 26 and 12 in 1983 and 1984 respectively, and it was harvested on 7 Nov. (1983) and 25 Oct. (1984).*

Effect of irrigation

Data in (Table 1) showed that one irrigation at 0.6 IW/CPE ratio significantly increased seed yield kg ha^{-1}, pods per plant, 100 seed weight, seed and straw yield per plant over no irrigation in both years. This might be that supply of water in requisite amounts has much to do to improve the yield attributing characters, which finally increased the yield over no irrigation. Similar results has been reported by Sharma *et al.* (1976).

Effect of phosphorus

Seed yield was affected significantly by phosphorus application (Table 1). Number of pods per plant, 100 seed weight, seed and straw yield per plant were significantly increased with the increasing levels of phosphorus in both years. The reason might be that phosphorus stimulated early root development thereby helped the plant in better initial establishment (Gupta, 1984).

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TABLE 1

Yield attributes, yield and economic return as affected by irrigation schedule, phosphorus levels and row spacing.

Treatments	Pods/ plant		100 seed wt (g)		Seed yield/pl.		Straw yield/pl.		Seed yield (kg ha^{-1})		Net Return (Rs ha^{-1})		Return/Rupee, investment (Rs)	
	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984
Phosphorus levels														
P_0	29.9	30.9	9.3	7.7	5.5	4.5	16.4	17.5	7.53	9.28	1347	1767	0.76	0.95
P_1	36.6	31.9	9.5	7.9	6.1	4.7	17.2	18.5	8.16	9.60	1381	2094	0.69	1.00
P_2	38.7	33.6	9.7	8.1	6.7	5.3	18.7	19.0	8.99	9.79	1492	1939	0.67	0.83
C. D. at 5%	0.24	1.15	0.13	0.19	0.47	0.09	0.41	0.02	0.11	0.13	—	—	—	—
Irrigation schedules														
I_0+I_1	33.7	30.2	9.3	7.8	5.7	4.6	16.9	17.8	7.84	9.28	1339	2054	0.70	1.03
I_2	37.8	36.1	9.8	8.2	7.0	5.2	18.5	19.3	9.00	10.10	1741	2315	0.86	1.11
C. D. at 5%	0.20	0.99	0.11	0.16	0.41	0.80	0.12	0.02	0.10	0.11	—	—	—	—
Row spacing														
S_1	29.9	25.7	9.1	7.5	5.3	3.9	15.2	15.7	8.93	10.23	1711	2368	0.85	1.13
S_2	35.8	33.7	9.3	7.9	6.3	4.8	17.3	17.8	8.23	9.47	1493	2135	0.77	1.07
S_3	39.5	37.0	9.9	8.2	6.8	5.7	19.7	21.4	7.53	8.96	1239	1960	0.66	1.01
C. D. at 5%	1.88	1.57	0.18	0.27	1.04	0.31	0.66	0.83	0.50	0.18	—	—	—	—

Effect of row spacing

During both the seasons, there was significant decrease in seed yield kg ha^{-1} of soyabean due to every increase in row spacing (Table 1). Number of pods per plant, 100 seed weight, seed and straw yield per plant were significantly increased in wider row spacing as compared to narrow row spacing in both years. Higher yield will be contributed more by the increased number of plants per unit area than by the yield per plant, resulting in higher yield in narrow spacing (30 cm). Similar results has been reported by Mookherjee (1980).

Economic return

The highest economic return were obtained with 30 cm row spacing, one irrigation at 0.6 IW/CPE ratio and 40 kg P_2O_5 ha^{-1}, which reflects on the basis of monitary net return per hectare. Similar results were obtained by Khande (1976) and Risk (1979).

REFERENCES

Gupta, U. S. (1984). Production potential of grain legumes. Crop physiology advancing frontiers, pp. 319-65.

Khande, B. K. (1976). Growth analysis of soyabean communities. M. Sc. (Ag.). Thesis submitted to JNKVV-Jabalpur (MP).

Mookherjee, S. (1980). Effect of sowing date and spacing on two varieties of soyabean. *Soyabean Abst. Vol. 3 No. 6* : 94.

Risk, M. A. (1979). Response of lentil to irrigation and phosphorus and their residual effects on maize. Ph. D. thesis, IARI, New Delhi.

Sharma, S. R.; Raghu, J. S. and Chaubey, S. D. (1976). Response of soyabean varieties to irrigation given at different growth stages under normal and late sown condition. *Indian J. Agron.* **21** (4) : 412-414.