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Effect of Irrigation, N and P on Safflower Yield Quality, Uptake of Nutrients and Economics

D. R. Makwana, S. G. Sadaria, V. D. Khanpara, B. B. Kaneria and R. K. Mathukia

Department of Agronomy, Gujarat Agricultural University, Junagadh-362 001

A field experiment was conducted at Agronomy Farm, Gujarat Agricultural University, Junagadh during *rabi* season of 1992-93 on clayey soil having low total N (0.07%, medium available P 34 kg/ha) and high available K (303 kg/ha) and slightly alkaline in reaction (7.9 pH) with normal E.C. (0.30 dS/m). The treatments comprising three levels each of irrigation (0.4, 0.6 and 0.8 IW/CPE ratio), nitrogen (0, 25 and 50 kg N/ha) and phosphorus (0, 10 and 20 kg P_2O_5/ha) were tried in split plot design having irrigation levels in main plots and combinations of N and P levels in sub-plots and replicated thrice. Half dose of N and full dose of P were applied in form of urea and SSP, respectively at the time of sowing and remaining half dose of N was top-dressed in form of urea at 40 days after sowing. The safflower variety "Tara" was sown on October 17, 1992 with inter row spacing of 45 cm and harvested on February 9, 1993.

Irrigation at IW/CPE ratio of 0.8 recorded significantly higher seed and stover yields than 0.4 IW/CPE. However, irrigation at IW/CPE of 0.6 was on par with IW/CPE of 0.8. Each increase in frequency of irrigation significantly improved the contents of oil and protein. Uptake of N and P by seed and stover were statistically similar under irrigation at 0.8 and 0.6 IW/CPE ratios but significantly higher over that at 0.4 IW/CPE ratio. The results confirm the findings of Singh and Singh (1980). The maximum net realization of Rs 4679/ha was secured with the application of irrigation at 0.8 IW/CPE.

Fertilizing the crop with 50 kg N/ha recorded the highest seed yield mainly on account of higher N and P uptake. Stover yield followed the similar trend except that 25 and 50 kg N/ha were on par. Similar results were also reported by Bhanvadia (1993). The oil content decreased with each increase in N level. The finding is in accordance with that of Singh *et al.*, (1992). Protein content recorded at 50 and 25 kg N/ha were materially the same but higher over control. Application of 50 kg N/ha recorded the highest net return of Rs 4626/ha.

Application of 20 kg P_2O_5/ha recorded the highest seed and stover yields on account

TABLE 1

Effect of different treatments on yield, quality, nutrient uptake and net realization of safflower.

Treatments	Yield (q/ha)		Oil content (%)	Protein content (%)	N uptake (kg/ha)		P uptake (kg/ha)		Net realization (Rs/ha)
	Seed	Stover			Seed	Stover	Seed	Stover	
Irrigation (IW/CPE)									
0.4	12.61	37.82	31.42	12.85	25.97	23.29	3.91	2.60	3733
0.6	14.05	44.50	31.95	13.17	29.39	27.88	4.46	3.06	3393
0.8	14.80	48.12	32.69	13.48	31.98	31.37	4.90	3.29	4679
C. D. at 5%	1.35	5.53	0.55	0.22	3.24	3.55	0.53	0.43	—
Nitrogen (kg/ha)									
0	12.99	39.38	32.47	12.93	26.92	23.90	4.04	2.64	4016
25	13.81	44.07	32.11	13.26	29.26	27.93	4.42	2.99	4318
50	14.66	46.99	31.48	13.31	31.16	30.71	4.81	3.32	4626
C. D. at 5%	0.65	3.39	0.30	0.13	1.38	2.27	0.24	0.23	—
Phosphorus (kg/ha)									
0	12.96	39.66	31.88	12.94	26.88	24.54	4.11	2.59	4014
10	13.83	43.54	32.02	13.25	29.18	27.00	4.38	3.00	4325
20	14.67	47.24	32.16	13.31	31.28	31.00	4.78	3.36	4621
C. D. at 5%	0.65	3.39	N.S.	0.13	1.38	2.27	0.24	0.23	—

of highest N and P uptake. However, application of P did not exert any significant effect on oil content of seed. Similar findings were earlier reported by Bhanvadia (1993). Protein content recorded at 20 and 10 kg P_2O_5/ha were statistically similar but significantly higher over control. Similar observations were also made by Ahmed *et al.*, (1985). Application of 20 kg P_2O_5/ha also gave maximum net profit of Rs 4621/ha.

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