

Response of linseed (*Linum usitatissimum*) to irrigation and nitrogen

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The seed yield of rainfed linseed (*Linum usitatissimum* L.) remains low, as the crop is generally grown without fertilizer. It responds well to irrigation and nitrogen (Raghuwanshi *et al.*, 1987). Hence an experiment was conducted to study the response of linseed (*Linum usitatissimum* L.) to irrigation and nitrogen.

The study was carried out at Hisar during winter season (*rabi*) of 1986–87 and 1988–89 with linseed 'K 2'. The soil of the experimental site was sandy loam having 138 kg/ha available nitrogen, 18.9 kg/ha available phosphorus and 365.3 kg/ha available potassium, with pH 8.2. The treatments consisted of 4 irrigation schedules [irrigation at 0.4, 0.6, 0.8 irrigation water : cumulative pan evaporation (IW : CPE) ratios and no post-sowing irrigation] in main plots and 5 levels of N (0, 20, 40, 60 and 80 kg/ha) in subplots. The treatments were laid out in split-plot design replicated 4 times. Urea as the source of N was applied as per treatment in 2 splits (half at sowing and remaining half 1 month after sowing). The field capacity and the permanent wilting point were 17.02 and 7.14% respectively. A rainfall of 67.5 and 26.5 mm was recorded during crop season of 1986–87 and 1988–89 respectively. The experiment was

failed during 1987–88 due to severe drought.

Irrigation schedule at 0.6 and 0.8 IW : CPE ratios could not bring any significant difference in seed yield. Irrigation at 0.6 IW : CPE ratio increased the seed yield by 15.99 and 6.6% over no post-sowing irrigation and irrigation at 0.4 IW : CPE ratio respectively (Table 1). This might be due to availability of optimum moisture at important phenological stages, i.e. 50% flowering and grain-development stages, whereas the plants receiving less number of delayed irrigations induced water deficiency in plant body, resulting in lower number of capsules/plant. The results confirm the findings of Mahajan *et al.* (1986) and Tiwari *et al.* (1988). Application of 80 kg N/ha increased the number of seeds/capsule, test weight and the seed yield of linseed (Table 1). Similar result was also reported by Raghuwanshi *et al.* (1987).

Consumptive use of water increased with increase in the number of irrigation, but the water-use efficiency decreased with increase in water supply. Increasing levels of N up to 80 kg/ha resulted in higher consumptive use of water. This might be due to production of higher canopy under higher doses of N, resulting in greater transpiration losses. Water-use efficiency increased up to 60 kg

Table 1. Effect of irrigation schedule and nitrogen level on yield components and seed yield of linseed (pooled data of 2 years)

Treatment	Capsules/ plant	Seeds/ capsule	Test weight (g)	Seed yield (q/ha)	Consumptive use of water (mm)	Water-use efficiency (Rs/ha-mm)
<i>Irrigation (IW : CPE)</i>						
No post-sowing irrigation	56.78	8.20	7.85	9.88	100.47	10.01
0.4	75.76	8.30	8.28	10.75	160.97	6.75
0.6	78.44	8.35	8.07	11.46	210.48	5.45
0.8	86.89	8.27	8.19	11.68	238.36	4.91
CD (P = 0.05)	7.71	NS	NS	0.54		
<i>N (kg/ha)</i>						
0	46.77	7.98	7.88	8.48	164.57	5.20
20	59.55	8.23	8.01	10.19	173.25	5.90
40	77.35	8.25	8.10	11.36	184.15	6.19
60	88.83	8.41	8.27	12.16	195.20	6.24
80	98.84	8.47	8.27	12.54	207.91	6.04
CD (P = 0.05)	NS	0.18	1.44	0.33		

IW : CPE, Irrigation water : cumulative pan evaporation

N/ha only owing to higher seed yield in this treatment.

It was concluded that scheduling of irrigation at 0.6 IW : CPE ratio along with application of 80 or 60 kg N/ha was the most suitable level of N and irrigation schedule for linseed cultivation.

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