

Response of linseed (*Linum usitatissimum*) varieties to nitrogen in alluvial soils of West Bengal

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Received: November 1993

Oilseed production is less in West Bengal because of unavailability of land, good seed of high-yielding varieties, improper application of fertilizer and lack of other production technology. In West Bengal linseed (*Linum usitatissimum* L.) is cultivated for non-edible purpose.

A field experiment with linseed was conducted during the winter season of 1988–89 and 1989–90 at University Farm, Kalyani. The experiment was laid out in factorial randomized block design with 3 replications. During 1988–89, 6 varieties ('Himalini', 'Subhra', 'RLC 6', 'Neelum', 'T 397' and 'Neela') were given 0, 40 and 80 kg N/ha. Next year one more variety 'Garima' was added. P_2O_4 @ 40 kg/ha and K_2O 20 kg/ha were given with N as basal. The sources of N, P and K were urea, single superphosphate and muriate of potash respectively. The soil was sandy loam in texture, medium in fertility status (0.7% organic carbon, 0.07% total N, 35 and 160 kg/ha of available P and K respectively) and neutral in reaction (pH 7.4). The crop was sown on 6 December 1988 and 3 December 1989. The crop received 4 irrigations including 1 at presowing. The crop was free from major insect pest and diseases.

The highest plant height was recorded in 'Neelum' during 1988–89 and in 'Garima'

during 1989–90. 'T 397' recorded significantly higher number of bolls/plant in both the years. 'Neelum' recorded significantly higher number of seeds/boll and 1,000-seed weight in both the years. During 1988–89 the seed yields of 'Himalini', 'Subhra' and 'Neelum' were at par, but significantly higher than the other varieties. During 1989–90 'Neela' gave the highest yield, followed by 'Neelum' and 'T 397'. The pooled data showed that 'Neelum' gave the highest seed yield, followed by 'Subhra', 'Himalini' and 'Neela' (Table 1).

Increasing rate of N increased the plant height, yield attributes and yield significantly in both the years (Table 1). These results confirm the findings of Mukherjee *et al.* (1987), Pawar *et al.* (1990) and Patidar and Lal (1992). The increase in oil yield was 61.6 and 141.8% during 1988–89 and 35.6 and 52.6% during 1989–90 at 40 and 80 kg compared with 0 kg N/ha respectively. The response of seed yield of linseed to different N levels was linear. The functional form of seed yield response to N application was as:

$$Y = 6.376 + 0.05875 (X) \quad (r^2 = 0.99)$$

where Y is the expected seed yield (q/ha) at X level of N (kg/ha) and r^2 is the correlation coefficient.

It may be concluded that 'Neelum' gave

Table 1. Effect of varieties and N on yield attributes and oil content in linseed

Treatment	Plant height (cm)		Bolls/ plant		Seeds/ ball		1,000-seed weight (g)		Seed yield (q/ha)			Oil content (%)		Oil yield (kg/ha)	
	1988- 89	1989- 90	1988- 89	1989- 90	1988- 89	1989- 90	1988- 89	1989- 90	1988- 89	1989- 90	Pooled	1988- 89	1989- 90	1988- 89	1989- 90
<i>Variety</i>															
'Himalini'	61.7	59.4	43.0	41.5	7.3	7.3	6.65	6.70	8.56	9.84	9.20	28.0	27.7	243	274
'Subhra'	60.7	60.5	38.2	32.0	7.2	7.0	6.85	6.75	8.98	10.08	9.53	33.3	25.3	323	256
'RLC 6'	56.7	61.3	36.3	33.8	7.0	7.1	4.90	4.70	5.44	7.89	6.71	30.0	29.7	151	237
'Neelum'	74.4	64.1	37.8	36.0	8.2	7.4	10.04	10.10	8.91	11.21	10.06	33.7	33.3	303	374
'T 397'	65.8	69.1	47.9	47.3	7.3	6.7	8.01	7.95	6.39	10.46	8.43	35.6	35.0	226	367
'Neela'	61.6	67.8	37.1	36.3	6.8	7.3	5.44	5.44	6.12	12.10	9.11	36.0	36.0	221	437
'Garima'		69.5		32.5		7.5		9.63		8.69	8.69		33.7		294
CD (P = 0.05)	3.6	2.0	3.9	2.6	0.6	0.3	0.38	0.30	0.81	0.67	0.61			28	22
<i>N (kg/ha)</i>															
0	57.6	62.3	31.5	28.7	7.4	6.8	6.49	6.83	4.61	8.11	6.60	29.8	30.0	146	247
40	67.0	64.8	38.3	35.8	7.2	7.4	6.88	7.24	7.18	10.34	8.88	33.9	32.3	236	335
80	70.3	66.6	50.5	46.9	7.2	7.4	7.57	7.89	10.41	11.70	11.06	33.2	32.3	353	337
CD (P = 0.05)	2.5	1.3	2.8	1.4	NS	0.3	0.27	0.20	0.58	0.44	0.40			19	14

significantly higher yield due to more seeds/boll and 1,000-seed weight among the varieties. Nitrogen application significantly increased seed yield up to 80 kg N/ha.

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Indian J. Agron. 40 (1) : 134–136 (March 1995)

Effect of macro- and micronutrients in combination with organic manures on the production of sesame (*Sesamum indicum*)

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Received: October 1993

A field experiment was conducted during the rainy season (*kharif*) of 1990–1992 at Tikamgarh in sandy soil, having pH 7.26–7.90, organic carbon 0.20–0.32%, available N, P_2O_5 , and K_2O respectively 109.4–150.4 kg/ha, 4.58–13.27 kg/ha and 197.9–294.7 kg/ha, electrical conductivity 0.12–0.16 mmhos/cm, available S 8.0–8.5 ppm and Zn 1.18 ppm. The treatments comprised 8 fertilizer combinations (Table 1). These were laid out in randomized block design with 3 replications. The crop was sown between 4 and 18 July with 30 cm x 10 cm spacing. The crop was harvested between 30 September and 14 October. The

rainfall received during the season 1990, 1991 and 1992 was 1,192, 699 and 852 mm respectively, with 38, 32 and 41 rainy days.

Growth and yield-components were found highest in treatments having NPK + farmyard manure + Mg + Zn (Table 2). This was followed by NPK + farmyard manure only. Application of NPK was found significantly superior to the control, and NPK + farmyard manure was superior to NPK alone. The $N_{40}P_{30}K_{20}$ (40, 30 and 20 kg/ha of N, P and K) gave 69.7% more seed yield than no NPK. However, further increase in yield was less (4.9% or 0.35 q/ha) due to $MgSO_4$ and Zn along with NPK +

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