

Effect of sowing date, nitrogen and row spacing on growth, yield attributes and yield of Indian mustard (*Brassica juncea*)

G.S. BUTTAR AND C.S. AULAKH

Regional Research Station, Punjab Agricultural University, Bathinda 151 001

Received: September 1998

ABSTRACT

A field experiment was conducted during 1996–97 and 1997–98 to study the effect of date of sowing, nitrogen and row spacing on growth, yield attributes and yield of Indian mustard [*Brassica juncea* (L.) Czernj. & Cosson]. The seed yield of Indian mustard obtained was significantly higher when the crop was sown on 25 October than that sown on 15 November and 5 December. The seed yield increased with increased application of N up to 125 kg/ha during 1997–98, which was significantly higher as compared to 100 kg and 75 kg. During 1996–97, the N application did not show significant effect on seed yield. Significantly higher seed yield was recorded with 15-cm-row spacing than 22.5 cm and 30 cm. The plant height decreased with delayed sowing. Yield-attributing characters, i.e. pods/plant and secondary branches, were highest under early sowing.

Key words : Sowing date, N, Row spacing, Growth, Yield, Indian mustard

Indian mustard is an important winter (*rabi*)-season oilseed crop of Punjab. In south-western part of state the sowing of the crop is delayed due to late picking of the cotton crop. Indian mustard responds to nitrogen (Antil *et al.*, 1986). There is dire need to develop technology for obtaining relatively higher yield of Indian mustard under late-sown conditions. Therefore, the present study was planned.

MATERIALS AND METHODS

A field experiment was conducted during 1996–97 and 1997–98 at Regional Re-

search Station, Bathinda, Punjab, on sandy-loam soil, low in nitrogen, medium in phosphorus and potash. The soil had pH 7.5. The experiment was laid out in split-plot design with 3 dates of sowing (25 October, 15 November and 5 December) in main plots and 3 N levels (75, 100 and 125 kg N/ha) and 3 row spacings (15 cm, 22.5 cm and 30 cm) in subplots with 3 replications. The plot size was 6.0 m × 4.5 m. The variety used was 'RLM 619'. Phosphatic fertilizer was drilled before sowing in the form of single superphosphate @ 187 kg/ha. Half the dose of N was applied at sow-

ing as urea and the remaining was applied at first irrigation. Thinning was done 20 days after sowing to keep the distance between the plants 15–20 cm during both the years. Irrigations were applied, depending on the need of the crop and rainfall. For the control of insect-pest and diseases spray schedule as per the recommendations of the university was followed. The weather remains dry during the crop season except few showers in January during both the years. The oil content was estimated with nuclear magnetic resonance spectroscope (New Port Analyser Model 'MK 111A') at harvesting. The oil yield was calculated by multiplying percentage oil content with

seed yield. The crop was harvested on various dates from last week of March to first week of April, depending on the maturity of the crop.

RESULTS AND DISCUSSION

Date of sowing

Seed yield of Indian mustard was affected significantly by date of sowing (Table 1). Early sowing (25 October) gave significantly higher seed yield than late sowing (15 November and 5 December). Shastry and Kumar (1981) and Narang and Singh (1987) also made similar observations. The secondary branches/plant, plant height, pods/plant and seed yield/plant (Ta-

Table 1. Effect of row spacing, date of sowing and nitrogen on plant height, number of pods/plant, secondary branches and seed yield of Indian mustard

Treatment	Plant height (cm)		Pods/plant		Secondary branches/plant		Seed yield (kg/ha)	
	1996–97	1997–98	1996–97	1997–98	1997–97	1997–98	1997–97	1997–98
<i>Date of sowing</i>								
25 Oct.	196	195	281	263	11.77	16.29	1,973	1,575
15 Nov.	174	174	266	249	10.52	11.74	1,197	876
5 Dec.	145	148	148	131	7.77	6.70	782	738
CD (P = 0.05)	6.0	4.0	22.0	28.0	2.93	4.10	56.0	71.0
<i>Nitrogen (kg/ha)</i>								
75	173	167	219	201	10.11	11.96	1,336	1,029
100	167	173	232	212	9.66	11.11	1,362	1,049
125	175	178	245	230	10.29	11.66	1,255	1,111
CD (P = 0.05)	NS	NS	15.0	18.0	NS	NS	NS	45.0
<i>Row spacing (cm)</i>								
15.0	171	172	223	206	9.55	11.29	1,466	1,156
22.5	172	171	228	212	10.37	11.55	1,317	1,037
30.0	172	174	244	225	10.14	11.88	1,169	997
CD (P = 0.05)	NS	NS	16.0	15.0	NS	NS	49.0	44.0

ble 1) were also higher in 25 October sowing. This might be due to the fact that under earlier-sown crop, the temperature and other climatological parameters played a major role for growth and yield attributes. But short-growth period and adverse temperature might have affected the yield in late-sown crop. The higher seed yield in early-sown crop was owing to favourable yield-attributing parameters. But gradual decrease in the yield with delay in sowing might be due to the prevailing low temperature at vegetative phase which could have adversely affected the plant growth and development. Similar findings were also reported by Singh and Singh (1991).

Nitrogen

Application of N caused variation in plant height, secondary branches and pods/plant. The seed yield increased with increasing level of N from 75 kg/ha to 125 kg/ha. The differences among various N levels were statistically non-significant during 1996–97. Higher seed yield with 125 kg/ha may be due to more pods/plant (Table 1). Increase in seed yield of Indian mustard with increase in N levels was also reported by Mohan and Sharma (1992).

Row spacing

Row spacing of 15 cm gave significantly higher seed yield than 22.5 cm and 30 cm spacing during 1996–97. But during 1997–98, seed yield at 22.5 cm and 30 cm were statistically at par with each other but significantly lower than that at 15-cm-row

spacing. This increase in yield due to closer spacing may be due to more number of plants per unit area. Plants spaced widely (30 cm) gave more secondary branches, pods/plant and seed yield/plant. But more plants/ha under 15 cm spacing gave higher yield. Similar results were reported by Giri and Ganga Saran (1985) and Bhan *et al.* (1995).

REFERENCES

- Antil, R.S., Kumar, Vinod and Singh, Mahendra. 1986. Effect of N on yield and its uptake at different stages of raya. *Indian Journal of Agronomy* 31 (1) : 37–44.
- Bhan, Suraj, Uttam, S.K. and Awathi, U.D. 1995. Effect of plant spacing and direction of sowing on growth and yield of rainfed Indian mustard. *Indian Journal of Agronomy* 40 (4) : 636–638.
- Giri, G. and Ganga Saran. 1985. Influence of planting geometry and nitrogen on performance of Indian rape under rainfed conditions. *Indian Journal of Agronomy* 30 (4) : 470–476.
- Mohan, K. and Sharma, H.C. 1992. Effect of nitrogen and sulphur on growth, yield attributes and oil yield of Indian mustard. *Indian Journal of Agronomy* 37 (4) : 748–754.
- Narang, R.S. and Singh, S. 1987. Studies on sowing dates of Indian mustard for double cropping under irrigated conditions. 32 (3) : 208–209.
- Shastri, A.B. and Kumar, A. 1981. Variation in yield, its attributes and quality of Indian mustard in relation to planting time and levels of plant population. *Indian Journal of Agricultural Sciences* 51 : 27–32.
- Singh, Y. and Singh, M. 1991. Effect of sowing time, spacing and nitrogen levels on yield of mustard. *Indian Journal of Agronomy* 36 (3) : 429–430.