

Response of cumin (*Cuminum cyminum* L.) to row spacing and seed rate

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Abstract

A field trial was conducted at Jobner (Rajasthan, India) to study the response of cumin to row spacing and seed rate. Row spacing of 15.0, 22.5 and 30.0 cm recorded significantly higher mean seed yields (2.69-2.85 q/ha) over broadcast sown crop (2.45 q/ha) and were on par. Seed rate of 12 and 14 kg/ha produced significantly higher mean seed yield (3.01 and 3.00 q/ha) over 8, 10 and 16 kg/ha seed rate. Row spacing of 22.5 cm with 14 kg/ha seed rate gave the highest mean seed yield of 3.55 q/ha. Maximum net returns of Rs 9656 and Rs 11,088/ha with B:C ratios of 2.46 and 2.77 were obtained with the row spacing of 22.5 cm and seed rate of 12 kg/ha, respectively.

Key words : cumin, *Cuminum cyminum*, spacing, seed rate.

Introduction

Cumin (*Cuminum cyminum* L.) is an important seed spice crop grown in subtropical parts of India and is cultivated mainly in Rajasthan and Gujarat. Maintenance of optimum plant population is an important agronomical aspect of crop production. The production per plant is always greater in wider spaced plant; however, better performance of the individual plant with wider spacing cannot compensate the loss in yield with low plant population. On the other hand, the struggle for existence increases with increase in plant population because of competition for growth factors. Such competition can be reduced by maintaining an optimum row

spacing and seed rate. However, the optimum seed rate for higher yield may vary under different row spacings. Since meagre information is available on these aspects, the present study was carried out to find out the optimum row spacing and seed rate for maximum yield of cumin.

Materials and methods

The experiment was conducted during the winter season of 1989-90 and 1990-91 at SKN College of Agriculture, Jobner (Rajasthan, India). The treatments consisted of 4 row spacings (15.0, 22.5, 30.0 cm and broadcast) and 5 seed rates (8,10,12,14 and 16 kg/ha) replicated thrice in a randomized block

design. The soil of the experimental field was loamy sand having pH 8.1 and 8.0, organic carbon 0.18 and 0.21%, N 0.05 and 0.07%, available P 0.003 and 0.005% and K 0.24 and 0.29% during the respective years. A uniform dose of 15 kg N and 15 kg N/ha was applied at sowing. The crop was top dressed with 15 kg N/ha at 30 days after sowing. The seed of cumin variety RZ-19 was sown in second fortnight of November and harvested in second fortnight of March during both the years of experimentation.

Results and discussion

Row spacing

The branches/plant (1989-90) and umbels/plant (1990-91) increased significantly under broadcast sown crop com-

pared to 15.0, 22.5 and 30.0 cm row spacing. Significantly more umbels/plant in 1989-90 and grains/plant in 1990-91 were recorded with wider row spacing of 30.0 cm than 15.0 cm row spacing and broadcast. The significant improvement in these parameters under wider row spacing might be due to relatively less competition for growth factors. Sharma & Prasad (1990) reported similar effect of row spacing on fennel. The maximum test weight of 5.23 g recorded under 22.5 cm row spacing (1989-90) was significantly higher over 15.0 cm row spacing (Table 1). The maximum seed yield of 2.89 q/ha (1989-90) and 2.90 q/ha (1990-91) obtained under 15.0 and 22.5 cm row spacing, respectively, was significantly higher over broadcast sown crop probably due to optimum plant population. Row spacing of 15.0, 22.5 and 30.0

Table 1. Effect of row spacing and seed rate on growth and yield attributes of cumin

Treatment	Branches/ plant		Umbels/ plant		Grains/ umbel		Test weight (g)	
	1989- 90	1990- 91	1989- 90	1990- 91	1989- 90	1990- 91	1989- 90	1990- 91
<i>Row spacing (cm)</i>								
15.0	4.3	4.6	14.0	19.3	25.9	26.2	4.77	4.52
22.5	4.4	4.9	16.0	19.2	25.3	27.6	5.23	4.80
30.0	4.4	4.9	16.7	21.6	25.5	27.8	5.16	4.75
Broadcast	5.0	5.0	15.1	23.5	26.3	26.7	4.95	4.61
CD at 5%	0.5	NS	1.6	0.8	NS	1.0	0.31	NS
<i>Seed rate (kg/ha)</i>								
8	4.6	4.9	16.3	21.6	24.7	27.5	4.87	4.56
10	4.5	4.5	16.7	20.6	25.9	26.9	5.52	4.82
12	4.8	5.0	15.7	21.2	25.9	27.3	4.85	4.58
14	4.6	4.9	14.3	20.7	25.4	26.9	5.00	4.61
16	4.4	4.8	14.9	20.4	26.8	25.8	5.20	4.78
CD at 5%	NS	NS	NS	0.9	NS	1.1	NS	NS

NS = Not significant

cm were at par but recorded significantly higher mean seed yield over broadcast sown crop. Similar results were reported by Bharagava *et al.* (1996) in cumin. The highest mean net return of Rs. 9656/ha with B:C ratio of 2.46 was obtained with 22.5 cm row spacing.

Seed rate

Seed rate of 8 kg/ha produced significantly more number of umbles/plant over 14 and 16 kg/ha seed rate and number of grains/umbel over 16 kg/ha seed rate during 1990-91 (Table 2) which could be attributed to more space available to individual plants at lower seed rate, relatively less competition for light, nutrients and moisture enabling the plant to exploit its potential as compared to its counterpart at higher seed rate. Singh *et al.* (1987) reported

similar effect of lower seed rate on coriander. However, maximum seed yield of 2.91 and 3.10 q/ha obtained with 12 and 14 kg/ha seed rate during 1989-90 and 1990-91, respectively, was significantly higher over 8 and 16 kg/ha seed rate during first year and over 8, 10 and 16 kg/ha seed rate during second year. Significantly higher mean seed yield of 3.01 q/ha obtained with 12 kg/ha seed rate over 8, 10 and 16 kg/ha seed rate may be ascribed to optimum plant population. Seed rate of 12 and 14 kg/ha were at par in this respect. Lal (1969) reported similar effect of seed rate on cumin yield. Maximum mean net return of Rs 11,088/ha with B:C ratio of 2.77 was recorded with 12 kg/ha seed rate.

Interaction effect

Interaction effect of row spacing and seed rate on seed yield was significant

Table 2. Effect of row spacing and seed rate on seed yield and economics of cumin

Treatment	Seed yield (q/ha)			Net return (Rs/ha)			B:C ratio		
	1989-90	1990-91	Mean	1989-90	1990-91	Mean	1989-90	1990-91	Mean
<i>Row spacing (cm)</i>									
15.0	2.89	2.80	2.85	7596	11269	9433	1.93	2.73	2.33
22.5	2.76	2.90	2.83	7316	11995	9656	1.95	2.96	2.46
30.0	2.70	2.67	2.69	7174	10917	9046	2.00	2.86	2.43
Broadcast	2.55	2.34	2.45	6648	9135	7892	1.87	2.42	2.20
CD at 5%	0.21	0.26	0.17	-	-	-	-	-	-
<i>Seed rate (kg/ha)</i>									
8	2.56	1.94	2.25	6576	6941	6759	1.86	1.81	1.84
10	2.80	2.32	2.56	7526	8976	8251	2.07	2.36	2.22
12	2.91	3.10	3.01	8006	14169	11088	2.16	3.37	2.77
14	2.69	3.30	3.00	6996	14159	10578	1.84	3.52	2.68
16	2.67	2.73	2.70	6816	10901	8859	1.77	2.66	2.22
CD at 5%	0.24	0.29	0.19	-	-	-	-	-	-

Table 3. Seed yield (q/ha) of cumin as influenced by row spacing and seed rate (Pooled data of 1989-90 and 1990-91)

Row spacing(cm)	Seed rate (kg/ha)				
	8	10	12	14	16
15.0	2.31	2.86	3.10	3.32	2.62
22.5	2.34	2.69	2.99	3.55	2.61
30.0	2.28	2.62	3.17	2.73	2.64
Broadcast	2.00	2.06	2.81	2.40	2.95
CD at 5% = 0.37					

in pooled data (Table 3). Row spacing of 22.5 cm with 14 kg/ha seed rate gave maximum seed yield of 3.55 q/ha which was significantly higher over rest of the treatment combinations except 15.0 cm row spacing with the same seed rate of 14 kg/ha.

The study thus indicated that cumin

sown at 22.5 cm row spacing with a seed rate of 14 kg/ha, gave maximum seed yield of 3.55 q/ha.

References

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