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Evaluation of Indian mustard (*Brassica juncea*) varieties in association with lentil (*Lens culinaris*)

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ABSTRACT

In a 2-year field investigation 'Kranti' proved the best among tested varieties of Indian mustard [*Brassica juncea* (L.) Czernj. & Cosson] when raised in association with lentil (*Lens culinaris* Medikus), as it gave the highest seed yield with a minimum decrease in the yield of lentil. The highest lentil-equivalent yield (q/ha) and net profit (Rs 27.75 and 10,692/ha) were obtained under lentil + 'Kranti' Indian mustard at 6 : 1 row ratio and found significantly superior among all the combinations.

Legumes with oilseeds intercropping may prove useful in stabilizing yields and returns over place and time and help in stapping up the production of pulses and oilseeds in the country. Intercropping is more advantageous than the sole stands of pulses and oilseeds (Singh and Verma, 1982). A number of new varieties of Indian mustard [*Brassica juncea* (L.) Czernj. & Cosson] are available for commercial cultivation in Uttar Pradesh, but no information is available on their performance in association with lentil (*Lens culinaris* Medikus). Hence an experiment was conducted to study the suitability of new Indian mustard varieties at different row ratios with lentil.

MATERIALS AND METHODS

The field experiment was conducted during the winter season of 1990–91 and 1991–92 on sandy-loam soil (pH 7.91) of Bahraich, having 188.1, 42.4 and 201.7 kg/ha of available N, P_2O_5 and K_2O respectively. The treatment consisted of intercropping systems (Table 1) and were replicated 4 times in randomized block design.

Sowing of lentil varieties 'PL 406' and 5 varieties of Indian mustard ('Vardan', 'Rohini', 'Kranti', 'Krishna' and 'ND 8501') was done on 17 and 16 November in both the years. Uniform dose of 15 kg N/ha, 40 kg P_2O_5/ha and 30 kg K_2O/ha was applied to all plots at the time of sowing and 65 kg N/ha applied only to Indian mustard crop as top-dressing at 35 days after sowing. The seeds were drilled manually in the furrows spaced at 25 cm with recommended seed ratio (lentil @ 40 kg/ha and Indian mustard @ 6 kg/ha). Thinning was performed 20 days after sowing to keep plant-to-plant spacing of 5 cm in lentil and 10 cm in Indian mustard.

RESULTS AND DISCUSSION

Lentil yield

As compared to sole lentil, all the varieties of Indian mustard showed a

depressing effect on the grain yield of lentil except 'Kranti' at row ratio of 6 : 1 (Table 1). The extent of reduction in the yield of lentil was maximum (43.96%) in 'ND 8501' (4 : 1). Indian mustard varieties 'Vardan', 'Rohini' and 'Krishna' decreased the seed yield of lentil by 32.43 and 10.26, 23.06% and 11.09, and 32.60 and 13.46% in the row ratios of 4 : 1 and 6 : 1 respectively. The row ratio of 6 : 1 gave higher seed yield of lentil than 4 : 1 during both the years. This might be attributed to lesser competition for moisture, nutrients and light. These results are in aggrement with the findings of Singh *et al.* (1986) and Sachan and Uttam (1992).

Indian mustard yield

Significant differences were observed in

Table 1. Grain yield of lentil and Indian mustard varieties at different row ratios with lentil

Treatment	Lentil yield (q/ha)			Indian mustard yield (q/ha)		
	1990–91	1991–92	Pooled	1990–91	1991–92	Pooled
Lentil sole	18.27	17.98	18.13			
Lentil + 'Vardan' (4 : 1)	12.31	12.19	12.25	7.62	7.86	7.74
Lentil + 'Vardan' (6 : 1)	16.54	16.00	16.27	5.48	5.50	5.51
Lentil + 'Rohini' (4 : 1)	14.00	13.89	13.95	7.74	7.85	7.80
Lentil + 'Rohini' (6 : 1)	16.02	16.22	16.12	6.37	6.70	6.54
Lentil + 'Kranti' (4 : 1)	14.63	14.57	14.60	8.39	8.50	8.45
Lentil + 'Kranti' (6 : 1)	17.17	17.29	17.23	6.01	6.19	6.10
Lentil + 'Krishna' (4 : 1)	12.18	12.26	12.22	6.53	6.50	6.52
Lentil + 'Krishna' (6 : 1)	15.85	15.53	15.69	4.21	4.29	4.25
Lentil + 'ND 8501' (4 : 1)	10.23	10.09	10.16	7.14	7.40	7.27
Lentil + 'ND 8501' (6 : 1)	14.03	13.75	13.89	5.12	4.97	5.05
CD (P = 0.05)	1.68	1.65	1.67	0.94	0.97	0.95

Table 2. Lentil-equivalent yield (q/ha) and net profit (Rs/ha) obtained by lentil-based intercropping system at different row ratios

Treatment	Lentil-equivalent yield (q/ha) (pooled)	Net profit (Rs/ha)		
		1990–91	1991–92	Pooled
Lentil sole	18.13	7,057	6,912	6,985
Lentil + 'Vardan' (4 : 1)	23.28	8,920	9,016	8,968
Lentil + 'Vardan' (6 : 1)	24.84	9,685	9,454	9,563
Lentil + 'Rohini' (4 : 1)	25.57	9,843	9,860	9,852
Lentil + 'Rohini' (6 : 1)	26.33	10,004	10,318	10,161
Lentil + 'Kranti' (4 : 1)	27.57	10,580	10,662	10,632
Lentil + 'Kranti' (6 : 1)	27.75	10,345	11,038	10,692
Lentil + 'Krishna' (4 : 1)	21.11	8,147	8,147	8,147
Lentil + 'Krishna' (6 : 1)	24.39	8,515	10,307	9,411
Lentil + 'ND 8501' (4 : 1)	19.77	7,568	7,667	7,618
Lentil + 'ND 8501' (6 : 1)	20.93	8,196	7,959	8,078
CD (P = 0.05)	1.12	239	321	304

seed yield of Indian mustard varieties in association with lentil during both the years (Table 1). 'Kranti' (4 : 1) gave the highest seed yield of 8.45 q/ha, followed by 'Rohini' (4 : 1) of 7.80 q/ha and 'Vardan' (4 : 1) of 7.74 q/ha. 'Krishna' and 'ND 8501' gave significantly lower seed yields than 'Kranti'. In narrow row ratio (4 : 1) yield of Indian mustard was more than wider (6 : 1) row ratio. Shah *et al.* (1991) also reported similar results.

Lentil-equivalent yield

A higher lentil-equivalent yield was recorded in lentil intercropped with 'Kranti' (6 : 1) and 'Kranti' (4 : 1). These treatments gave higher lentil-equivalent yields than sole crop of lentil (Table 2). The lowest lentil-equivalent yield was obtained from sole lentil.

Net return

Intercropped 'Kranti' with lentil gave the highest net profits of Rs 10,632 and Rs 10,692/ha at row ratios of 4 : 1 and 6 : 1 respectively, which were 52.20 and 53.07% higher than sole lentil (Table 2). Intercropping of 'Rohini' gave a net profit of Rs 10,161 and Rs 9,852/ha at 6 : 1 and 4 : 1 row ratios respecitvely. The other combinations gave much lower net profit 'Rohini' combinations.

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