

Intercropping in linseed (*Linum usitatissimum*) with mustard (*Brassica juncea*) under rainfed condition of Chhattisgarh region

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ABSTRACT

A study was conducted during the winter season of 1992–93 and 1993–94 on intercropping of mustard [*Brassica juncea* (L.) Czernj. & Cosson] in linseed (*Linum usitatissimum* L.) under rainfed condition at Raipur. Intercropping of 1 row of mustard cv. 'Varuna' after every 5 rows of improved linseed varieties at 25 cm row spacing proved more advantageous over pure stands of either crop in respect of linseed equivalent, gross monetary returns, benefit : cost ratio and land-equivalent ratio. Linseed and mustard gave almost equal yields but the former was more economical.

Key words : Intercropping, Linseed, Mustard, Linseed equivalent, Economics, Rainfed

Mustard cultivation is gaining popularity in Chhattisgarh region under both irrigation and rainfed conditions. Linseed is a traditional oilseed crop, widely grown under rainfed condition during winter season. Sometimes, yield of linseed gets adversely affected due to damage caused by linseed fly, wilt or powdery mildew. The productivity of linseed is quite low (247 kg/ha) in this region. There is sufficient scope of growing a compatible intercrop with linseed to increase the productivity and profitability per unit area (Dubey and Sharma, 1994). Mustard is a tall-growing crop making it feasible to harvest its

additional yield without significant reduction in linseed yield. As information on this aspect is scanty for the region, the present investigation was conducted.

MATERIALS AND METHODS

A field experiment was carried out during the winter season of 1992–93 and 1993–94 in clay loam soil at Raipur. The pH of the experimental soil was 6.9, with available N, P, and K 198, 17 and 374 kg/ha respectively. Eight treatments as enumerated in Table 1 were tested in randomized block design with 4 replications. The row spacing for sole

Table 1. Seed yield of linseed and mustard under different intercropping systems

Intercropping	Seed yield (q/ha)						Linseed equivalent (q/ha)		
	1992-93		1993-94		Pooled		1992-93	1993-94	Pooled
	Linseed	Mustard	Linseed	Mustard	Linseed	Mustard			
Sole linseed cv. 'Kiran'	6.43		6.33		6.38		6.43	6.33	6.38
Sole linseed cv. 'Kiran' skipping 6th row	6.27		5.89		6.08		6.27	5.89	6.08
Sole mustard cv. 'Varuna'		6.26		6.63		6.44	5.21	5.52	5.37
Linseed cv. local + mustard	4.29	1.91	4.33	2.10	4.31	2.00	5.88	6.06	5.97
Linseed cv. 'Kiran' + mustard	5.24	1.82	5.18	2.09	5.21	1.95	6.75	6.83	6.79
Linseed cv. 'R 552' + mustard	4.50	1.81	5.02	2.16	4.76	1.98	6.01	6.41	6.21
Linseed cv. 'T 397' + mustard	4.92	1.85	5.06	2.11	4.99	1.98	6.46	6.64	6.55
Linseed cv. 'RLC 29' + mustard	4.91	1.89	4.83	2.06	4.87	1.97	6.48	6.51	6.50
CD (P = 0.05)	0.52	NA	0.47	NA	0.45	NA	0.31	0.26	0.33

Linseed and mustard were in 5:1 row proportion

NA, Not analysed statistically

Table 2. Gross monetary return, benefit : cost ratio and land-equivalent ratio (LER) under different intercropping systems

Intercropping system	Gross monetary returns (Rs/ha)			Benefit : cost ratio (pooled)	Land-equivalent ratio		
	1992-93	1993-94	Pooled		1992-93	1993-94	Pooled
Sole linseed cv. 'Kiran'	7,717	7,596	7,656	1.89	1.00	1.00	1.00
Sole linseed cv. 'Kiran' skipping 6th row	7,524	7,060	7,292	1.82			
Sole mustard cv. 'Varuna'	6,260	6,630	6,445	1.61	1.00	1.00	1.00
Linseed cv. local + mustard	7,058	7,296	7,177	1.79	0.97	1.00	0.98
Linseed cv. 'Kiran' + mustard	8,108	8,306	8,207	2.05	1.11	1.13	1.12
Linseed cv. 'R 552' + mustard	7,210	8,184	7,697	1.92	0.99	1.13	1.06
Linseed cv. 'T 397' + mustard	7,754	8,182	7,968	1.99	1.06	1.13	1.09
Linseed cv. 'RLC 29' + mustard	7,782	7,856	7,819	1.95	1.06	1.07	1.06
CD (P = 0.05)	NA	NA	296	NA	0.04	0.05	0.06

Linseed and mustard were in 5:1 row proportion
 Value of linseed and mustard was Rs 12,00 and 1,000/q respectively
 NA, Not analysed statistically

mustard and linseed was 50 cm and 25 cm respectively. A uniform dose of 30 and 30 kg N and P_2O_5 /ha was given to all the experimental plots at sowing. Linseed and mustard were sown with 25 and 5 kg seeds/ha on 14 and 16 October in the 2 consecutive years. Seed rate was regulated according to the proportion of area under each crop component in intercropping situations.

Seed yield of each treatment was recorded and economics worked out on the existing market price. Benefit : cost ratio (gross profit over every rupee of investment) was determined. The land-equivalent ratio (LER) was computed as suggested by Willey (1979). Linseed equivalent was determined by converting yield of mustard into linseed yield on the basis of their market value.

RESULTS AND DISCUSSION

Seed yield

Improved varieties of linseed, viz. 'Kiran', 'R 552', 'T 397', and 'RLC 29', gave seed yield of 5.21, 4.76, 4.99 and 4.87 q/ha respectively which were at par in seed yield under intercropping system and they gave significantly higher yield over local variety (4.31q/ha) on the basis of 2 years pooled data (Table 1). However, significant reduction in seed yield was observed for all varieties of linseed under intercropping stands as compared to sole crop yield of linseed cv. 'Kiran' during both the years. The linseed equivalent from the intercropping of 1 row of mustard after 5 rows of any improved variety of linseed was higher than their sole cropping. Skipping sixth row of linseed sown in rows

25 cm apart under sole cropping resulted in equal yield to that obtained in uniform row sowing. Both mustard and linseed gave almost equal seed yield under rainfed condition. These results are in close conformity with the findings of Sachan and Uttam (1992) and Singh and Rajput (1996).

Intercropping of mustard with improved varieties of linseed except local one significantly recorded more gross monetary returns than their sole cropping (Table 2). Though the yield of linseed was reduced when intercropped with mustard, the increased return due to additional seed yield of mustard and higher value of linseed helped in increasing the gross monetary returns under intercropping systems. Because of the lesser market price, the sole mustard had the lowest gross monetary return. The cost of cultivation for all the treatments was almost equal. Therefore, all the linseed + mustard intercropping systems except with the local variety of linseed recorded higher benefit : cost ratio than their pure cropping. Less monetary gain with the same cost of cultivation under pure mustard resulted in minimum profitability.

Land-equivalent ratio (LER)

All intercropping systems of improved varieties of linseed + mustard led to register LER values greater than 1.00 (Table 2). This gave an indication that intercropping of mustard with the improved varieties of linseed was more advantageous over sole cropping of either crop component with regard to yields.

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