STUDIES ON INTERCROPPING OF INDIAN MUSTARD WITH POTATO

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Abstract

Rapeseed and mustard comes next to groundnut in India and plays major role in the oilseeds economy of the country. There can be only two possibilities to increase its production and these are /a/ increase in area /b/ increase in productivity. Under the existing circumstances the increase in area is not possible, so the only alternative left is the increase in productivity. Various steps are being taken for this and one of them is intercropping of mustard with cereals, sugarcane and vegetables. In the present study, an experiment with 50, 100 and 150 kg N/ha was carried out for three years to work out the economics of intercropping of mustard with potato to find out its input output ratio. In pure potato, the ratio was 1:1.34, 1:1.49, 1:1.68 and 1:1.46 with 0, 50, 100 and 150 kg N/ha respectively. In the same way mustard in the ratio of 1:3 lines with potato, without effecting the plant number was 1:1.50, 1:1.85, 1:2.06 and 1:3.91. The highest input-output ratio was recorded in mustard 1:3.74, 1:4.30, 1:4.48 and 1:3.91 with 0, 50, 100 and 150 kg N/ha. Thus, it is recommended that the mustard growers should grow only mustard while the potato growers must follow inter-cropping of mustard in potato.

Introduction

Intercropping and mixed cropping have widely been practised by the farmers of South East Asia, especially India. There has been a practice of growing mustard in association with crops having similar requirements for their nutrient and water e.g. gram, wheat, barley etc. but very

little work has been done on intercropping of mustard in crops having different requirements like potato and sugarcane. The present studies were undertaken to explore the possibility of growing mustard as a companion crop in potato by adjusting potato tubers in such a way that the number of potato plants per unit area remains the same, and to work out the nitrogen requirement of crop combination that gives maximum net returns.

Material and method.

The experiment was conducted for three years during rabi 1982-85, at the research farm of the Department of Plant Breeding, Haryana Agricultural University, Hisar, Haryana /India/. Twelve treatments comprising three crop stands i.e. pure potato, pure mustard and one row of mustard after every third row of potato at four levels of Nitrogen viz. 0, 50, 100 and 150 kg N/ha were replicated thrice in randomized block design. Potato cultivar Kufari chandermukhi and Indian mustard cv RH-30 were planted simultaneously on 30th, 29th and 17th Oct. of 1982, 1983 and 1984 respectively.

The potato tubers were dibbled in ridges 50 cm apart at a distance of 20 cm between tubers. Pure mustard was sown in lines 30 cm apart and thinning was done 20 days after sowing within the line, to maintain plant to plant distance of 10-15cm. The potato tubers in the intercropping plot were dibbled at a distance of 15 cm between tubers instead of 20cm so as to adjust the same number of plants in three ridges instead of four. The fourth row thus saved was intercropped with mustard. Irrigation to every fourth row of mustard was regulated by closing every third and fifth ridge of potato.

A preplanting irrigation was applied uniformally and after planting seven irrigations were given to the potato crop while only one irrigation was enough for mustard crop. Recommended dose of fertilizer for potato crop, i.e. 50 kg P_2O_5/ha in the form of single superphosphate and 100 kg

K_2O/ha in the form of murate of potash was applied at the time of planting and the dose of nitrogen was applied in two splits i.e. half at sowing and half 30 days after sowing. The potato crop was ready for digging after 90 days after sowing while mustard crop matured in 135 days after sowing.

The average yields obtained during three years, gross returns/ha, cost of cultivation and input-output ratio have been given in Table 1.

Results and discussion.

The data presented in Table 1 reveals that the yield of potato, mustard and intercropping has shown an increasing trend from 0 to 100 kg N/ha. Further increase in nitrogen dose of 150 kg N/ha has resulted in the loss of yield of both the crops. The increase in yield of mustard upto 100 kg N/ha has also been reported by Borthakur and Borthakur /1980/ while Mehrotra et.al. /1978/ observed an increase upto 80 kg N/ha. Introducing mustard as an intercrop in potato resulted in decreased tuber yield of potato at all the levels of nitrogen when compared to pure potato, however, a substantial yield of mustard was realised which increased the net returns. Similar results have been reported by Rathi and Verma /1979/ while conducting an experiment on mustard and potato intercropping. Ray and Zandstra /1976/ also reported reduction in yield of potato but got additional yield of beans, however, Arias et.al. /1983/ found no reduction in potato yield when intercropped with bush beans. Net returns from intercropped plot were higher than pure potato or pure mustard at all the levels of nitrogen except where no nitrogen was given. In this case pure mustard recorded a net profit of Rs. 5140/- against Rs. 4234/- in case of intercropping.

Rey and Zandstra /1976/., Razzaque et.al. /1978/ and Rathi and Verma /1979/ also obtained higher net returns in intercropped plots than in pure potato crop.

The highest net returns were obtained in potato and mustard intercropped at 100 kg N/ha with an input-output

ratio of 1:2.06. However, the maximum output ratio has been observed /1:4.48/ in pure mustard grown at 100 kg N/ha.

From these results it is very clear that the farmers with limited resources should go for mustard cultivation with 100 kg N/ha while the farmers growing potato must go in for intercropping of mustard.

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Table-1: Showing the Av. yield (3 yrs), gross and net returns and input-output ratio with different doses of Nitrogen of Potato, mustard and their intercropping at Hisar during rabi 1982-85.

	Treatments	Pure potato	Pure Mustard	Inter cropping (P+m)
No.	1. Yield (q/ha)	128.32	17.05	109.26+ 6.69
	2. Gross returns (Rs/ha)	11805/-	7025/-	12808/-
	3. Cost of cultivation (Rs/ha)	8830/-	1885/-	8536/-
	4. Net returns (Rs/ha)	2975/-	5140/-	4234/-
	5. Input-output ratio	1:1.34	1:3.74	1:1.50
N.50	1. Yield (q/ha)	155.18	22.24	134.79+ 9.37
	2. Gross returns (Rs/ha)	14277/-	9163/-	16261/-
	3. Cost of cultivation (Rs./ha)	9076/-	2131/-	8782/-
	4. Net returns (Rs./ha)	5201/-	7032/-	7479/-
	5. Input-output ratio	1:1.49	1:4.30	1:1.85
N.100	1. Yield (q/ha)	170.13	25.88	150.68+ 11.41
	2. Gross returns (Rs./ha)	15662/-	10663/-	18564/-
	3. Cost of cultivation (Rs/ha)	9323/-	2378/-	9019/-
	4. Net returns (Rs./ha)	6339/-	8285/-	9545/-
	5. Input-output ratio	1:1.68	1:4.48	1:2.06
N.150	1. Yield (q/ha)	152.27	24.91	139.11+ 12.00
	2. Gross return (Rs/ha)	14009/-	10263/-	17742/-
	3. Cost of cultivation (Rs/ha)	9569/-	2624/-	9265/-
	4. Net returns (Rs/ha)	4440/-	7639/-	8477/-
	5. Input output ratio	1:1.46	1:3.91	1:1.91

Rates: Potato: Rs.91/- per quintal
Mustard: Rs. 412/- per quintal
Nitrogen: Rs. 4.67 per Kg.