REFERENCES

LAL,S., 1985. Increasing production of pulses under moisture stress condition, Indian Fmg., 35(6) : 3-5.

SAXENA, M.C. and YADAV, D.S. 1975. Multiple cropping with short duration pulses. Indian J. Genet. 35 : 194-208.

SAHARIA, P. 1981. Effect of sowing dates and row spacing on growth and grain yield of greengram. J. Res. Assam Agric. Univ. 2:193-195.

SAHARIA, P. 1985. Response of green gram(mung) to sowing dates under rainfed conditions. Indian J.Agron. 30 : 345-348.

PRODUCTION POTENTIAL AND ECONOMICS OF WHEAT AND MUSTARD IN SOLE MIXED AND INTERCROPPING SYSTEMS

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ABSTRACT

A field experiment was conduced at Cropping Systems Research Centre, Gujarat Agricultural University, Navsari during 1979-1980 to 1981-1982. Recommended seed rates of two crops were mixed in different ratios of wheat and mustard (50:50, 66.7:33.3, 75:25 and 83.3:16.7 per cent) and wheat rows alternated with different number of mustard rows (1:1, 3:2, 6:2and 10:2) were compared with sole crops of wheat and mustard. The highest wheat equivalent (20.8 q ha⁻¹) LER (1.59) and gross returns (6243 Rs/ha⁻¹) were obtained when wheat and mustard seeds were mixed in ratio of 75:25 per cent which was similar to alternate rows (10:2 ratio) Thus a lower population of mustard in wheat either mixed or grown in rows gave the maximum profit.

KEY WORDS : Wheat, Mustrads, Sole cropping, Mixed Cropping, Intercropping, Ecomom

The practice of growing two or more crops was considered as a safeguard against total failure of any particualr crop. It was also reported that mixed cropping had advantage over mono-cropping in total productivity and for ensuring normal yields under adverse climate conditions coupled with less incidence of pest and diseases (Mehrotra and Ali 1970) Information regarding production potential of wheat and mustard in sole, and mixed and intercropping systems in rainfed area under deep black soil are lacking. Hence the present study was made to find out most economic and productive proportion of wheat and mustard crops in a mixed : intercropping systems as compared to sole cro

MATERIALS AND METHODS

The experiment was conducted during 1979-1980 to 1981-1982, at Cropping System Research Centre, Gujarat Agricultural University, Navsari. The experiment consisted ten treatments (Table 1) in a randomised block design with three replications in rabi season. The soil was deep, black, neutral in reaction and contained 0.40 percent organic carbon, 22.70

kg.ha^{-1} available P and 304 kg.ha^{-1} available K. All management practices viz., seed rate, fertilizer, spacing etc. were adopted as per recommendation for the main wheat crop. A fertilizer dose of 120 N + 60, P_2O_5 + 60, K_2O kg. ha^{-1} for wheat crop grown as sole or mixed or, intercropped and 40N, 40 P_2O_5 K_2O kg.ha^{-1} for sole mustard was applied. The full dose of N, P_2O_5 and K_2O were applied at sowing time as basal dose. A row spacing of 22.5 cm for all wheat based treatments and 45.0 cm for sole mustard was maintained. In the mixed cropping treatments, the seed mixtures of the wheat mustard were mixed in proportion as per treatment and in accordance with thair recommended seed rates (100 kg.ha^{-1} for wheat and 5.0 kg.ha^{-1} for mustard). Statistical analysis was done, converting yield on to wheat equivalent (q.ha^{-1})

RESULTSAND DISCUSSION

Grain yield of wheat and mustard grown pure and in association with each other as influenced by various treatments for the individual years as well over years are presented in Table 1. In general, the Yields of 1979-1980 and 1981-1982 were lower than that of 1980-1981 mainly due to seasonal effect and acute moisture stress occured at the time of milking stage.

Wheat and mustard as sole crops gave the highest grain yield as compared to mixed and intercropping systems during individual and in average yield (Table 1). The highest wheat grain yield of 12.70 q ha^{-1} was obtained in alternate rows of wheat and mustard 10:2 followed by seed mixture of wheat and mustard 75:25 per cent whih produced 12:21 ha-1.

The total productivity in terms of wheat equivalent revealed that the combinations of wheat and mustard with seed mixture ratio of 75:25 per cent produced the highest grain yield of 20:81 q ha^{-1}, followed by alternate rows of wheat and mustard 10:2 (19:83 q ha^{-1}). The results are in accordance with Sharma et al. (1987) who got higher wheat equivalent under 3:1 seed

mixtures of wheat and gram.The sole wheat, wheat and mustard mixture of 50:50, 66.7:33:3 and wheat and mustard in 1:1 and 6:3 rows of intercropping systems were found in line more or less for production.

The crop of wheat and mustard sown in proportion of 75:25 per cent seed mixture gave the highest net return which was Rs.771. ha^{-1} and Rs.3387.ha^{-1} more over pure wheat and mustard, respectively. The maximum mean return of Rs.6243 ha^{-1} was obtained when the crop of wheat and mustard were sown in the proportion of 75:25 per cent seed mixture followed by alternate rows 10:2 which produced Rs.5949 ha^{-1} in comparison with pure ropping of wheat (Rs.5472 ha^{-1}). The higher return under 75:25 seed mixture and in 10:2 alternate rows of wheat and mustard which are primarly attributed to its highest yield under these treatments.

Wheat and mustard mixed intercropped was more efficient than their sole stands as evident by LER. Absolute value of the genuine yield advantage was also calculated according to equation proposed by willey (1979).

Monetary advantage = Value of combined LER x Intercrop LER^{-1}.

The value of additional product hectare of land area was maximum (Rs.2316) under the seed mixtue ratio of 75:25 per cent wheat and mustard seed followed by alternate row sowing of wheat and mustard in 10:2 line gave Rs.1669.ha^{-1}.

Land equivalent ratio (LER) calculated from combined mixed and intercrop yields was higher as compared to sole crop of wheat and mustard indicating greater biological efficiency of mixed and intercropping treatments. Higher LER of 1.59 was recorded when wheat and mustard were sown in seed mixture ratio of 75:25 per cent. The mean LER for different intercropping treatments ranged between 1.13 to 1.59. Prancis et al. (1978) have also reported that land utilization efficiency increased with intercropping system.

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This showed incompatibility of a crop combination of wheat and mustard in the ratio of 75:25 under residual moisture conditions of deep black soil. In the wake of necessity for increased production of oil seeds and cereals, this practice of mixed cropping provides assured hopes for balanced production.

REFERENCES

PRANCIS, C.A., FLOR, C.A. PRAGER, M. 1978. Effect of bean association on yield and yield components of maize. *Crop Sci.* 18:760-764.

MEHROTRA O.N. AND ALI, A.A. 1970. Mixed cropping - a Scientific analysis. *Sci. Cul.* 36:196-198.

SHARMA, R.P., ROY, R.K., SINGH, A.K. and JHA, R.N. 1987. Production potential of wheat and grain in sole and mixed/inter-cropping systems. Indian J.Agron. 32:235-237.

WILLEY R.W. 1979. Intercropping - its importance and research needs. Part-I. Competition and yield advantage. Fild, Crop Abst. 32(1):1-10.

Table 1. Grain yield of wheat and mustard, wheat equivalent, LER and total monetary return under different treatments.

Treatments		Grain yield (q/ha⁻¹) wheat and mustard				Wheat equivalent q/ha⁻¹	L E R				Gross Returns (Rs/ha⁻¹)
		1979-1980	1980-1981	1981-1982	Mean		1979-1980	1980-1981	1981-1982	Mean	
Pure stand wheat		13.24	23.92	17.56	18.24	18.24	1.0	1.0	1.0	1.0	5472
Pure stand mustard		3.90	6.47	5.19	5.19	9.52	1.0	1.0	1.0	1.0	2856
Seed mixture ratio	50:50	4.28	13.76	7.78	8.61	16.42	1.10	1.42	1.26	1.26	4926
Seed mixture ratio	66.7 : 33.3	6.17	17.49	4.68	9.45	15.68	0.92	1.40	1.06	1.13	4704
		1.79	4.31	4.10	3.40						
Seed mixture ratio	75.25	4.78	21.38	10.48	12.21	20.81	1.26	1.77	1.55	1.59	6243
		3.50	5.65	4.93	4.69	4.69					
Seed mixture ratio	83.3 : 16.7	5.58	21.85	8.81	11.91	17.87	0.90	1.37	1.46	1.24	5361
		1.85	2.94	4.97	3.25						
Alternate rows	1:1	6.27	14.32	7.96	9.52	16.11	1.19	1.07	1.40	1.22	4833
		2.80	3.06	4.90	3.59						
Alternate rows	4:2	4.28	14.47	7.55	8.77	15.96	1.15	1.36	1.13	1.21	4788
		3.21	4.90	3.64	3.92						
Alternate rows	6:2	5.69	15.68	7.16	9.51	17.27	1.15	1.58	1.16	1.30	5181
		2.81	5.99	3.89	4.23						
Alternate rows	10.2	7.89	19.91	10.30	12.70	19.83	1.05	1.61	1.52	1.39	5649
		1.79	5.01	4.86	3.89						
S. Em. ±		—	—	—	—	1.54	—	—	—	—	—
C. D. at 5%		—	—	—	—	4.60	—	—	—	—	—

Selling price of wheat : 3.0 Rs/kg

mustard : 5.50 Rs/kg