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INTERCROPPING OF CORIANDER AND LINSEED IN WHEAT

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A study was conducted during Oct. 1987 - Mar. 1988 to determine the productivity of wheat + coriander and wheat + linseed intercropping under uniform, paired and triple row planting patterns having row arrangements of 20 cm, 15-25 cm and 15-15 cm, respectively. The sole crops of wheat was grown in 20 cm apart rows, while that of coriander and linseed in 10 cm apart rows. Results revealed that intercropping did not exert significant effect on the grain yield of wheat but the seed yield of coriander and linseed were reduced by intercropping comparing their respective sole crops.

Key words: Wheat, Coriander, Linseed, Intercrop.

Introduction

In Bangladesh, coriander and linseed are neglected crops with respect to area and production. Coriander is widely used as a condiment and linseed for oil. Farmers usually cultivate these crops on marginal land, often as intercrop. Farmers are not interested in sacrificing their lands for cultivating coriander and linseed as sole crops to meet local demand. The intercropping of coriander and linseed with other crops is the only way to increase their production. Preliminary investigations in Bangladesh on intercropping practices of wheat + potato, tobacco + wheat, wheat + mustard, wheat + linseed, wheat + lentil, wheat + chickpea, wheat + coriander have shown encouraging results [1, 3]. From these it can be envisioned that by intercropping of coriander and linsed with wheat, their production level can be raised and sustained.

The study was, therefore, undertaken to determine the productivity of wheat + coriander and wheat + linseed intercropping under different planting patterns.

Materials and Methods

The experiment was conducted at the Agronomy Field Laboratory, Bangladesh Agricultural University, Mymensingh during the Rabi season (Oct. - Mar.) of 1987-88. The soil of the experimental land was non calcareous dark grey floodplain having pH 6.9. The land was flat and above flood level. The treatment arrangements for intercropping are given in Table 1.

The experiment was laid out in a randomized complete block design with four replications. The unit plot size was 5 x 4m.

The experimental land was opened on December 6, 1987 with a tractor drawn disc plough. Then the land was prepared with country plough and ladder. All the treatments received a uniform application of 85-90-55 kg N, P_2O_5 and K_2O per hectare as urea, triple superphosphate and muriate of potash, respectively. One half of the urea and all of triple superphosphate and muriate of potash were applied to all the plots at final land preparation. The remaining half of the urea was top dressed in two equal splits-3 weeks after the emergence of seedling and after the appearance of panicle of wheat.

Wheat variety 'Kanchan' and local varieties of coriander and linseed were used as experimental materials. The seeds of wheat, coriander and linseed were sown in rows on Dec. 12, 1987. Intercultural operations were done uniformly in all the plots. The plots were provided with two irrigations. Wheat and coriander were harvested at 100 days after sowing. Linseed was harvested twice at 100 and 104 days after sowing depending on the maturity.

Experimental observations were made in respect of yield/ha, relative yield, wheat grain equivalent, land equivalent ratio and monetary advantage.

The relative yield was calculated by dividing the yield of wheat, coriander and linseed in intercrops with their respective sole crop yield. Wheat grain equivalent [4], land equivalent ratio [5] and monetary advantage [6] were calculated by using the following formula:

$$\text{Wheat grain equivalent} = Y_w + \frac{Y_c \times P_c}{P_w} \quad \text{(for coriander)}$$

Table 1.

	Treatment	Row spacing	Number of rows/plot	Seed rate (kg/ha)
1.	Wheat (UR*) sole	20-20	25	150
2.	Wheat (PR) sole	15-25	25	150
3.	Wheat (TR) sole	15-15-30	25	150
4.	Wheat (UR) + coriander	20-20	25+24	150+15
5.	Wheat (PR) + coriander	15-25	25+24	150+15
6.	Wheat (TR) + coriander	15-15-30	25+24	150+15
7.	Coriander (UR) sole	10-10	50	15
8.	Wheat (UR) linseed	20-20	25+24	150+10
9.	Wheat (PR) + linseed	15-25	25+24	150+10
10.	Wheat (TR) + linseed	15-15-30	25+24	150+10
11.	Linseed (UR) sole	19-10	50	10

* UR = uniform row, PR = paired row, TR = triple row

$$\text{Wheat grain equivalent} = Y_w + \frac{Y_L \times P_L}{P_w} \quad \text{(for linseed)}$$

where, Y_w = yield of wheat (kg/ha); Y_c = yield of coriander (kg/ha); Y_L = yield of linseed (kg/ha); P_c = price of coriander (tk/kg); P_w = price of wheat (Tk/kg); P_L = price of linseed (Tk/kg)

$$\text{Land equivalent ratio (LER)} = \frac{\text{Intercrop yield of linseed/coriander}}{\text{Sole crop yield of linseed/coriander}} + \frac{\text{Intercrop yield of wheat}}{\text{Sole crop yield of wheat}}$$

$$\text{Monetary advantage (Tk/ha)} = \text{Value of combined inter crop yield} \times \frac{\text{LER-1}}{\text{LER}}$$

The data were analysed using the 'Analysis of Variance' and the mean differences were tested (where required) by Duncan's New Multiple Range Test.

Results and Discussion

The results of the study are presented in Table 2. From the table it is evident that the grain yield of wheat was not significantly affected by different treatments. The seed yield of coriander and linseed were reduced by growing them in intercropping arrangements compared to their respective sole cropping. Inter or intra-specific competition for light, water and nutrients appeared to have resulted in such situation [7]. In the present study, though the intercrops (coriander/linseed) lost part of their individual yields, they ultimately gave higher combined yields. These results are in partial conformity with the findings of Winters [8].

In all the intercropping arrangements, except wheat (PR) + coriander and wheat (PR) + linseed, the relative yield of wheat was increased in both wheat + coriander and wheat + linseed intercropping. The relative yield of coriander and linseed was significantly reduced in intercropping arrangements in comparison to their sole crops irrespective of planting patterns. This result is in agreement with the findings of Rahman and Shamsuddin [3].

In wheat + coriander intercropping, higher wheat grain equivalents were obtained in all the planting arrangements except the paired row planting when compared to the sole cropping of wheat. Similar trends were also observed in wheat + linseed intercropping. The higher market prices of coriander and linseed were the probable causes of the increase in the wheat grain equivalents for the intercrop.

The wheat + coriander intercropping (except paired row planting) gave an LER advantage of 19 - 23%. Maximum LER (1.23) was obtained from uniform row planting. The wheat + linseed intercropping under different planting patterns gave LER advantages from 11 - 76%. Maximum LER (1.76) was obtained from uniform row planting. These results conform favourably with the findings of Mohta and De [9] and Bhuiya *et al.* [2].

In the intercropping of wheat + coriander under different planting patterns, the highest monetary advantage (Tk. 2892/ha) was obtained from uniform row planting. This treatment also gave higher relative yield and LER. The wheat + linseed intercropping with different planting patterns, gave the high-

TABLE 2. GRAIN/SEED YIELD, RELATIVE YIELD, WHEAT GRAIN EQUIVALENT, LAND EQUIVALENT RATIO AND MONETARY ADVANTAGE OF DIFFERENT INTERCROPPING VERSUS SOLE CROPPING.

Treatment	Grain/seed yield (kg/ha)			Relative yield			Wheat grain equivalent (kg/ha)	LER	Monetary advantage (Tk/ha)***
	Wheat	Coriander	Linseed	Wheat	Coriander	Linseed			
1. Wheat (UR sole	1900	–	–	1.00	–	–	1900	1.00	00
2. Wheat (PR) sole	2550	–	–	1.00	–	–	2550	1.00	00
3. Wheat (TR) sole	1980	–	–	1.00	–	–	1980	1.00	00
4. Wheat (UR) + coriander	2080	130b*	–	1.09	0.14	–	2380	1.23 (23%)**	2892.76
5. Wheat (PR) + coriander	2090	155b	–	0.82	0.17	–	2447	0.99	160.66
6. Wheat (TR) + coriander	2010	120b	–	1.06	0.13	–	2286	1.19(19%)	2372.45
7. Coriander (UR) sole	–	925a	–	–	1.00	–	2134	1.00	00
8. Wheat (UR) + linseed	2130	–	380b	1.12	–	0.64	2714	1.76(76%)	7617.70
9. Wheat (PR) + linseed	1860	–	225b	0.73	–	0.38	2206	1.11(11%)	1420.98
10. Wheat (TR) + linseed	1960	–	300b	1.04	–	0.51	2421	1.55(55%)	5583.92
11. Linseed (UR) sole	NS	–	590a	–	–	1.00	907	1.00	00
CV (%)	0.05	0.03	0.06						

* In a column figures with letter (s) in common do not differ significantly at 5% level of probability; NS = Not significantly different at P=0.05;
** Figures in the parentheses indicate the corresponding LER advantage in intercropping compared to sole wheat.;
*** Price of wheat Tk. 6.50/kg, coriander Tk. 15.00/kg and linseed Tk. 10.00/kg 1 US$ = Tk. 33.00

est monetary advantage (Tk. 7617/ha) in uniform row planting. The values of relative yield and LER also support this observation. These findings are in agreement with the findings of Roy and Biswas [10] and Karim [11].

Among the different intercropping arrangements of wheat + coriander and wheat + linseed, the uniform row planting pattern proved to be the best in respect of relative yield, wheat grain equivalent, land equivalent ratio and monetary advantage. It may therefore, be concluded that intercropping of wheat + coriander and wheat + linseed in uniform row planting pattern will produce good yields and higher monetary advantages.

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