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Intercropping of soybean in redgram under rainfed condition

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Abstract

The field experiment was conducted for rainy season of 2016 at farm of college of agriculture Dhule to study the effect of intercropping of soybean in redgram under rainfed condition and advantages of soybean and red gram under rainfed condition. The mean seed yield of soybean was 18.50 q ha^{-1}. Numerically higher seed yield 25.45 q ha^{-1} was recorded by the sole soybean (T_6) treatment. Followed by intercropping treatment of redgram (Vipula) + soybean. Whereas minimum Seed yield was 15.49 q ha^{-1} registered by redgram (BDN-708) + soybean intercropping treatment. The mean straw yield of soybean was 32.42 q ha^{-1} numerically higher straw yield of soybean 50.90 q ha^{-1} was recorded by sole soybean (T_6) treatment. Followed by intercropping treatment redgram (Vipula) + soybean (T_7) treatment. The numerically lowest yield of soybean straw 24.79 q ha^{-1} is registered by intercropping treatment of redgram (BDN-708) + soybean (T_{11}) treatment.

Keywords: intercropping, rainfed conditions, productivity, Redgram equivalent yield

Introduction

The seed and equivalent yield of soybean in intercropping system with pigeonpea in 2:1 (2134 kg ha^{-1}) and 1:1 ratio (2110 kg ha^{-1}) were at par with sole soybean (2636 kg ha^{-1}) [1]. Intercropping may be feasible and viable agronomic practice for stepping up the production of pulses. Plant population, spatial arrangement and selection of suitable genotypes in intercropping have important effects on the balance of competition between component crops and their productivity. Now a day intercropping is receiving greater emphasis in Indian agriculture because of yield advantage, especially under adverse weather condition and substantially increase economic returns. Soybean and redgram differs in growth, habit and duration which increase complementary effects in space leading to more efficient use of growth resources. Taking this into consideration the present study was conducted to study the Intercropping of soybean in redgram under rainfed condition.

Materials and Methods

The field experiment was conducted at Post Graduate Research Farm, Agronomy Section, College of Agriculture, Dhule (Maharashtra). It is situated on latitude 20.4^0 N and longitude 74^0 E with an altitude of 258 m above mean sea level. The experiment was conducted on a clay loam soil having organic carbon 0.70 per cent, available nitrogen 163.07 kg/ha, available phosphorus 15.04 kg/ha, available potash 352.46 kg/ha, EC 0.34 ds/m, bulk density 1.29 mg/m^3 and moisture content 19 percent at 0.33 Mpa. was laid out in randomized block design with eleven treatments and three replications. The gross and net plot size were 6.00 x 5.40 m^2 and 5.20 x 4.50 m^2, respectively. The cultivars JS-335 Soybean, Vipula, BSMR-736, BSMR-853, Tara, and BDN-708 of redgram. The crop were sown at Redgram- 90 x 20 cm^2 and Soybean- 30 x 10 cm^2 1:3 row proportion in redgram intercropping. The recommended doses of FYM and inorganic fertilizers were applied as per recommendation to redgram (25:50:00 N:P$_2$O$_5$:K$_2$O kg ha^{-1}) and soybean (50:75:00 N:P$_2$O$_5$:K$_2$O kg ha^{-1}) were applied through urea and singal super phosphate (SSP). All the recommended practices were adopted to raise the crop.

Results and Discussion

Redgram Equivalent Yield (q ha^{-1})

The mean redgram equivalent yield was 22.14 q ha^{-1}. The redgram equivalent yield influenced significantly due to different treatments.

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The significantly maximum redgram equivalent yield was recorded by the redgram (BSMR-736) + soybean (T_8) intercropping treatment (25.62 q ha^{-1}) it was significantly higher than the rest of the treatments. It was 30.91 per cent higher over sole redgram (Tara) (T_4), 16.83 per cent higher over sole redgram (Vipula) (T_1), 16.51 per cent higher over sole redgram (BDN-708) (T_5), 10.43 per cent higher than sole redgram (BSMR-853) (T_3) and 8.28 higher over sole redgram (BSMR-736) (T_2) treatment. However it was at par with intercropping treatment (T_7) redgram (Vipula) + soybean (24.71 q ha^{-1}). Significantly minimum redgram equivalent yield was registered by sole soybean (T_6) treatment (13.04 q ha^{-1}).This result is in conformity those reported earlier by [2, 3, 4]. This is might be due to higher gross monetary returns obtained in intercropping system.

Gross Monetary Returns
The highest gross monetary return (₹ 204990 ha^{-1}) recorded in the treatment (T_8) redgram (BSMR-736) + soybean was higher than other intercropping treatments, followed by (T_7) redgram (Vipula) + soybean. The lower value of gross monetary returns (₹ 170515 ha^{-1}) was recorded in redgram (BDN-708) + soybean (T_{11}).These results are in agreement with the results reported by [5].

Net monetary returns
Numerically higher net monetary return (₹ 146464 ha^{-1}) was recorded in the treatment (T_8) redgram (BSMR-736) + soybean than other treatments, followed by (T_2) sole redgram (BSMR-736) than rest of the intercropping systems. The minimum net monetary returns (₹ 57668 ha^{-1}) were recorded in sole soybean (T_6).These results are in agreement with the results reported by [6, 7].

Land Equivalent Ratio
The mean land equivalent ratio influenced significantly due to different treatments. The significantly maximum land equivalent ratio (1.36) was recorded under the redgram (Vipula) + soybean (T_7) intercropping treatment it was significantly higher than the rest of the treatments and it was remained at par with all the intercropping treatments. Significantly lowest LER was recorded under treatment redgram (BDN-708) + soybean (T_{11}). This results are in conformity those reported earlier by [7, 8].

Table 1: Grain and Straw yield, Redgram equivalent yield, gross and net monetary returns, LER, B:C ratio as influenced treatment

Treatment	Seed yield (q ha^{-1}) (q ha^{-1})		Straw yield (q ha^{-1})		Redgram equivalent yield (q ha^{-1})	Gross monetary return (Rs ha^{-1})	Net return (₹ ha[-1])	B:C ratio	LER
	Redgramm	Soybean	Redgram	Soybean					
T_1: Sole edgram (Vipula)	21.57	-	47.03	-	21.93	175430	127773	3.68	1
T_2: Sole redgram (BSMR-736)	25.23	-	56.66	-	23.66	189280	141623	3.97	1
T_3: Sole redgram (BSMR-853) DAS	22.81	-	50.20	-	23.20	185563	137906	3.89	1
T_4: Sole redgram (Tara)	19.26	-	40.65	-	19.57	156585	108928	3.29	1
T_5: Sole redgram (BDN-708)	21.64	-	47.31	-	21.99	175914	128257	3.69	1
T_6: Sole soybean (JS-335)	-	25.45	-	50.90	13.04	104349	57668	2.24	1
T_7: Redgram (Vipula) + soybean	14.78	18.94	32.48	35.23	24.71	197681	139155	3.38	1.36
T_8: Redgram (BSMR-736) + soybean	16.39	17.52	36.73	30.31	25.62	204990	146464	3.50	1.24
T_9: Redgram (BSMR-853) + soybean	14.59	17.28	32.24	29.21	23.66	189264	130738	3.23	1.22
T_{10}: Redgram (Tara) + soybean	14.29	16.44	31.01	27.13	22.92	183334	124808	3.13	1.29
T_{11}: Redgram (BDN-708) + soybean	13.20	15.49	27.72	24.79	21.31	170515	111989	2.91	1.08
SE (m) $\pm$	-		-	-	0.36	-	-	-	0.11
C.D.at 5%	-	-		-	1.07	-	-	-	0.34

References
1. Billore SD, Mitra PC, Joshi OP, Ramesh A, Bundella, VPS. Agro-economic Feasibility of soybean based intercropping system. Indian J Agric. Sci. 2000; 70(8):530-531.
2. Singh UK, Neena B, Kumar V. System productivity and profitability of pigeonpea based intercropping under rainfed condition. J Applied Bio. 2009; 19(1&2): 23-26.
3. Dubey OP, Garg DC, Dixit JP, Tiwari KP. Intercropping of short duration pigeonpea. Indian J Agron. 1991; 36(20):253-254.
4. Prasad K, Srivastav VC. Pigeonpea and soybean intercropping under rainfed situation. Indian J Agric. Sci. 1991; 61:243-246.
5. Patra AP, Chaterjee BN. Intercropping of soybean with rice, maize and pigeonpea in the plains of West Bengal. Indian J Agric. Sci. 1986; 56(6):413-417.
6. Verma KP, Warsi AS. Production potential of pigeonpea based intercropping system under rainfed condition. Indian J Agron. 1997; 42(3):419-421.
7. Koshta AK, Karanjkar SV. Economics of intercropping systems under rainfed farming Financing Agril. 1986; 18(1&2):33-36.
8. Tomar RS, Upadhayay MS, Sharma RA. Effect of planting patterns in pigeonpea + soybean intercropping system. Indian J Agron. 1987; 32(4):322-325.