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INFLUENCE OF BLACK GRAM VARIETIES INTERCROPPED WITH SORGHUM

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Abstract

In order to explore the influence of blakcgram verities intercropped with Sorghum a field experiment was conducted during *kharif* season of 2005 at the Farm R.A.K. College of Agriculture, Sehore (M.P.), India. Out of ten black gram varieties, $\mathbf{T_9}$ inter cropped with sorghum at a row ratio of 1:1 proved the most effective for this region. The growth, root-nodulation, yield attributes of black gram and yield parameters were found maximum from this system of intercropping. The maximum yield of sorghum and black gram were 18.70 and 6.14 q/ha, respectively. The blackgram equivalent yield was 10.25 q/ha. with highest net return (Rs. 18907/ha).

Key words : Blackgram varieties, sorghum, randomized block design (RBD), yield.

Introduction

Intercropping is a pre-dominant feature of the dryland farming system of the semi-arid tropics. The system is chiefly as a risk bearing practice, which is geared up to make efficient use of the production resources to push-up per unit productivity and provide stability under aberrant weather conditions.

Black (*Phaseolus mungo* L.) is generally grown as a sole crop as well as mixed with sorghum, maize, bajra and cotton. The intercropping has been found to enhance the productivity and fertility per unit area in blackgram. However, all the recommended varieties did not perform well under intercropping system because of lack of suitable and compatible plant type, occurrence of drought and incidence of diseases and pests. Therefore, it necessitated the scrutiny of high yielding varieties of blackgram with suitable ideotypes for intercropping with sorghum to ensure maximum profit per unit area and improvement in soil health. Keeping in view, the above facts, the present investigation was undertaken to obtain of the maximum benefit per unit area.

Materials and Methods

The experiment was laid out in a randomized block design with ten treatments replicated thrice. The soil of experimental field was clay loam in nature having pH 7.7. Ten varieties of blackgram were used as treatment and these were JU 86, JU 3, Type 9, UTTARA, LGB 20, AKU 321, AZAD 2, TPU 4, AKU 9802 and RBU 38. The blackgram and sorghum were sown on 2nd July, 2005 at the seed rate of 20 and 7 Kg/ha, respectively. The fertilizer dose of blackgram was $N_{20}P_{60}K_{20}$ and for sorghum $N_{80}P_{40}K_{40}$. The crops were harvested on 9th September, 2005.

Results and Discussion

The data (table 1) revealed that blackgram varieties intercropped with Sorghum exerted significant influence upon its growth parameters. Out of tem blackgram varieties, $\mathbf{T_9}$ intercropped with sorghum at 1:1 row ratio remained aggressive in attaining its maximum height (43.72 cm.) branches (3.2/plant), leaves (10.3/plant), dry weight (15.50 g/plant), root nodules (15.34/plant) and its dry weight (27.32 mg).

The other varieties intercropped with sorghum reacted differently upon these parameters with respect to significant differences amongest each other. The significant variations among may be due to variations in their genetical behaviour capable of forming maximum growth parameters. The results are in close agreement with those Sadasivam *et al*. (1993), Ram and Singh (2002) and singh (2000).

Amongest the different sorghum + blackgram interopping treatements, sorghum + RBU-38 (1:1 row ratio) resulted in significantly higher yild attributes of blackgram over most of the intercrpping treatments (table

Table 1 : Growth parameters of blackgram as influenced by different intercropping treatments.

Sorrghum + blackgram in tercropping treatments	Plant height (cm.)	Branches/ plants	Leaves/ plant	Dry weight /plant (g)	Root nodules /plant	Dry weight of nodules (mg)
	60 DAS	60 DAS	45 DAS	60 DAS	45 DAS	45 DAS
S + JU 86	32.83	2.7	6.5	8.62	12.01	26.32
S + JU 3	42.11	3.2	10.3	15.50	15.34	27.32
S + T9	43.72	2.5	9.8	12.45	13.60	26.06
S + UTTARA	33.61	3.0	10.5	12.73	14.03	26.45
S + LGB 20	35.88	3.0	8.7	11.18	13.89	26.67
S + AKU 321	37.89	2.7	9.7	12.27	13.81	27.08
S + AZAD 2	29.89	3.0	9.5	8.87	13.13	26.72
S + TPU 4	35.11	2.7	9.3	12.62	14.52	26.06
S + AKU 9802	38.14	2.0	7.5	12.60	14.89	26.45
S + RBU 38	41.16	2.3	8.2	14.08	14.78	23.12
S. Em. ±	3.05	0.21	0.50	0.53	0.55	0.52
CD at 5%	9.06	0.63	1.48	1.58	1.63	1.55

Table 2 : Yield attributes, yield and economics from sorghum and blackgram crops under different intercropping treatments.

Sorghum+ blackgram intercorpping treatments	Pods/ plant	Seeds/ pod	1000-seed weight (g)	Grain yield/ plant (g)	Grain yield (q/ha)		Straw yield (q/h)		Harvest index	Blackgram equivalent yield (q/ha)	Net return (Rs/ha)	Cost benefit ratio
					Sorg-hum	Black-gram	Sorg-hum	Black-gram	(%) of blackgram			
S + JU 86	12.93	6.3	51.7	2.37	12.48	4.26	24.09	12.04	26	7	10785	01:1.60
S + JU 3	12.87	6.6	51.7	4	13.12	4.19	28.1	12.13	25	7.07	10958	1:1.61
S + T9	14.93	7	58.3	6.63	18.7	6.14	46.39	19.35	24	10.25	18907	1:2.81
S + UTTARA	11.4	6.5	50	3.33	14.72	3.61	34.96	14.26	20	6.85	10405	1:1.54
S + LGB 20	14.67	6.5	55	3.87	14.54	4.45	34.01	16.11	21	7.65	12406	1:1.84
S + AKU 321	10.93	6.9	41.7	4.23	14.04	2.51	34.05	14.07	15	6	7268	1:1.08
S + AZAD 2	12.47	6	55	3.17	16.61	3.74	42.23	14.63	20	7.39	11764	1:1.74
S + TPU 4	14.6	6.3	53.3	3.77	16.47	4.35	44.74	16.11	21	7.98	13220	1:1.96
S + AKU 9802	14.53	6.3	56.7	3.6	15.1	4.45	36.29	17.04	20	7.77	12700	1:1.88
S + RBU 38	15.47	5.9	65	3.33	17.63	4.75	46.51	17.04	21	8.63	14857	01:2.20
Sem±	0.98	0.31	2.6	0.34	1.1	0.44	1.11	0.5	1.78	-	-	-
CD at 5%	2.91	NS	7.8	1	3.27	1.32	NS	1.5	5.29	-	-	-

2). The maximum number of pods were 15.47/plant and 1000- seed weight 65.00 g, whereas srghum + $\mathbf{T_9}$ produced significantly higher 7.0 seeds/pod and 6.63g grain yield/plant over the remaining treatments. Drastics dissimilar variability in these yield attributes occurred when other blackgram varieties were intercropped with sorghum. Sorghum + AKU 321 brought about the lowest number of pods (10.93/ plant) and 1000 – seed weight (41.70g). Similarly, sorghum + RBU -38 recorded lowest seeds (5.9/pod) and grain yield (3.33g/plant).

With the emerging variation in yield-attributes, the grain and straw yields of sorghum and blackgram were also deviated accordingly under the different sorghum + blackgram treatment (table 2). Sorghum + $\mathbf{T_9}$ registered significantly higher grain and straw yield (6.14 and 19.35 q/ha, respectively) of blackgram as compared to all the remaining treatments including the second best (Sorghum + RBU-38 treatment) producing 4.7 and 17.04 q/ha, respectively.

The grain and straw yield of sorghum were equally higher in both of these treatments. The maximum grain and straw yield from sorghum + $\mathbf{T_9}$ us treatment was due to maximum seed/pod and grian yield/plant which were recorded under this treatment. Whereas the highest yield from second best treatment (Sorghum + RBU-38) was owing to highest pods/plant and 1000-seed weight from this treatment.

The harvest index of blackgram was found to deviate significantly due to intercropping treatments. It was found in the higher range (24 to 26%) in S +JU-86, S + JU-3 and S + $\mathbf{T_9}$ treatments. The significantly lowest harvest index (15%) was recorded from sorghum + AKU-321 treatment. The maximum HI in above varieties may be due to the fact that these varieties synthesized more photosynthates and the storage organ (seed) were developed better in these varieties over others.

Black gram equivalent yields and economics

The black gram equivalent yield was found highest (10.25q/ha) from sorghum + ($\mathbf{T_9}$) treatment followed by 8.63 q/ha. from soghum + RBU38 treatment. This was on account of the higher total productivity under both the intercropping treatments over the remaining treatments. Consequently the net income and B:C ratio were higher from both these treatments. Sorghum + ($\mathbf{T_9}$) intercropping gave maximum net income (Rs.18907/ha) and B:C ratio (2.81), followed by Sorghum + RBU 38 (Rs. 14875/ha and 2.20, respectively). Semilar result have also bean reported by chalka and Nepalia (2005) and Singh *et al*. (2005).

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