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WEED MANAGEMENT IN SUGARCANE INTERCROPPING SYSTEM

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ABSTRACT

A field experiment was conducted at Sugarcane Research Station, Cuddalore, during 1989-1992 to find out the suitable herbicide for sugarcane intercropping system. Experimental results revealed that the preemergence application of thiobencarb 1.25 kg/ha gave the highest weed control efficiency (84.9% in black gram, 88.3% in soybean and 77.6% in groundnut) and it was on par with hand weeding practice. In all the intercrops, application of thiobencarb @ 1.25 kg/ha was found to be economical and gave better weed control efficiency. The results were comparable with that of two hand weedings. However, metribuzin @ 0.5 kg/ha proved phytotoxic to intercrops.

KEY WORDS : Sugarcane, Intercrop, Weed Management

Sugarcane *(Saccharum officinarum L.)* provides an ample opportunity for raising intercrops in the early stage. Weeds colonise in the interspace by exploiting the profuse irrigation and nutrients applied to the sugarcane crop. Intercropping with legumes and oilseeds in sugarcane field assumes great importance as it gives early returns over space and times which also checked the weed growth in the interspace (Yadav and Prasad, 1990). Atrazine is the recommended herbicide for the sole crop of sugarcane. Hence the present study provides informations on the suitability of various herbicides for sugarcane intercropping systems without any deleterious effect.

MATERIALS AND METHODS

Field experiments were conducted during 1989-92 at the Sugarcane Research Station, Cuddalore, in randomised block design with three replications. The treatments included three intercrops (black gram, soybean and groundnut) raised in between sugarcane rows (CoSi.86071) with four weed control treatments (thiobencarb @ 1.25 kg/ha, alachlor 1.5 kg/ha, metribuzin 0.5 kg/ha and two hand weedings at 25 and 50 DAS) along with farmer's practice of two hand weeding and weedy check in sole sugarcane.

Intercrops were sown on the ridges in a single line at a spacing of 10cm, three days after planting of sugarcane setts. The herbicides were applied as

Table 1. Weed control efficiency and yield of intercrops due to different herbicides in sugarcane intercropping system

Treatment	Herbicide dosage (kg/ha)	Weed control efficiency (%)	Yield intercrop (kg/ha)	LER	CCS (%)	Sugar yield (t/ha)
S.C + Black gram + Thiobencarb	1.25	84.9	504.5	1.61	12.2	13.6
S.C + Black gram + Alachlor	1.5	73.9	397.5	1.44	12.0	12.8
S.C + Black gram + Metribuzin	0.5	74.9	321.5	1.35	11.8	12.8
S.C + Black gram + H.W.	–	79.6	425.5	1.50	12.5	13.2
S.C + Soybean + Thiobencarb	1.25	88.3	763.0	1.39	11.9	13.0
S.C + Soybean + Alachlor	1.5	62.5	748.5	1.34	11.9	12.4
S.C + Soybean + Metribuzin	0.5	75.3	606.0	1.27	12.1	12.7
S.C + Soybean + H.W.	–	84.7	816.5	1.43	12.0	13.2
S.C + Groundnut + Thiobencarb	1.25	82.7	233.0	1.12	11.8	12.5
S.C + Groundnut + Alachlor	1.5	69.8	238.0	1.08	11.0	12.3
S.C + Groundnut + Metribuzin	0.5	77.5	200.0	1.05	11.9	12.5
S.C + Groundnut + H.W.	–	80.7	189.5	1.08	11.8	12.5
S.C alone (conventional weeding)	–	72.7	–	–	12.2	13.1
S.C alone (weedy check)	–	–	–	–	11.8	10.5
CD = (p = 0.05)		5.6			NS	0.9

SC : Sugarcane; HW : Hand weeding

Table 2. Cane yield and economics of using different herbicides in sugarcane intercropping system

Treatment	Cane yield (t/ha)	Cane equivalent (t/ha)	Net return (Rs./ha)	Additional income (Rs./ha)
S.C + Black gram + Thiobencarb	111.3	126.4	31058	5087
S.C + Black gram + Alachlor	106.5	118.4	30654	4683
S.C + Black. gram + Metribuzin	107.3	116.9	29059	3088
S.C + Black. gram + H.W.	110.0	122.7	30951	4980
S.C + Soybean + Thiobencarb	108.8	124.1	31068	5097
S.C + Soybean + Alachlor	104.1	119.1	30231	4260
S.C + Soybean + Metribuzin	104.8	116.9	29210	3239
S.C + Soybean + H.W.	110.3	126.6	30817	4846
S.C + Groundnut + Thiobencarb	105.9	114.9	28107	2136
S.C + Groundnut + Alachlor	101.1	110.2	28017	2046
S.C + Groundnut + Metribuzin	101.0	108.7	27123	1152
S.C + Groundnut + H.W.	104.8	112.1	28239	2268
S.C alone (conventional weeding)	107.2	107.2	25971	-
S.C alone (weedy check)	88.5	88.5	19825	6146
CD = (p = 0.05)	2.8	6.12	-	-

Sugarcane @ Rs. 450/; Black gram @ Rs.1000/; Soybean @ Rs. 800/; Groundnut @ Rs. 1500/tonne.

preemergence application immediately after sowing of inter crops. No extra dose of fertilizers was applied to inter crops. Intercrops were harvested for grain on 78,93 and 110 days after sowing of black gram (cv TMV 1), soybean (cv Co_1) and groundnut (cv JL 24), respectively. Quality parameters of cane juice was estimated by the procedure of Spencer and Meade (1955).

RESULTS AND DISCUSSION

Weed control efficiency

The pre emergence application of thiobencarb @ 1.25 kg/ha gave the highest weed control efficiency (84.9% in black gram, 88.3% in soybean and 77.6% in groundnut) and it was on par with hand weeding practice (Table 1). In all the intercrops, application of thiobencarb was found to be economical and gave better weed control efficiency. However, application of metribuzin 0.5 kg/ha proved phytotoxic to intercrops.

Cane yield

The cane yield difference was significant among the treatments (Table 2). Raising of pulses as intercrops has not affected the cane yield. This is in agreement with the findings of Shivkumar and Srivatsava (1994). Application of thiobencarb in black gram, soybean intercrops yielded comparatively higher cane yield of 111.2 t/ha and 108.8 t/ha respectively. Hand weeding practice was found to be comparable with the use of thiobencarb. Intercropping of groundnut reduced the cane yield. This may be due to longer duration of groundnut as intercrops.

Cane yield equivalent

The intercropping system with pulses gave higher cane yield equivalent over sole crop of sugarcane. Application of thiobencarb to intercrops and hand weeding twice recorded more cane yield equivalent when compared to other herbicides and sole sugarcane system.

Juice quality

There was no significant difference in recovery and commercial cane sugar as for the juice quality (Table 2). This showed that intercropping of pulses and application of various herbicides to intercropping situation in sugarcane did not affect the quality of juice. Similar findings were also made by Pawar and Bhosale (1987).

Economics

On the basis of the mean of 2 years the highest net return of Rs.31068 and Rs.31058 was obtained in sugarcane + soybean and sugarcane + black gram intercropping system (Table 2) respectively when applied with thiobencarb which gave an

respectively. The other herbicides and hand weeding also recorded marked additional income over sole crop of sugarcane. However, groundnut intercropping reduced main crop yield which inturn reduced the additional income.

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ESTIMATION OF GENETIC PARAMETERS AND INTERRELATIONSHIP OF QUANTITATIVE TRAITS IN CHICKPEA

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ABSTRACT

Genotypic and phenotypic coefficient of variation, heritability, and expected genetic advance were studied for grain yield and its contributing characters in 34 varieties of chickpea at the Agricultural Research Station, Durgapura, Jaipur during *rabi* season. The highest value of genotypic and phenotypic coefficients were obtained in 1000 grain weight. High heritability estimates were obtained for all the characters under study. Thousand grain weight and grain yield per plant had fairly good value of genetic advance as percentage of mean along with high heritability and therefore these characters may be considered reliable for selection in chickpea. Correlation studies revealed that grain yield per plant showed significant positive genotypic correlation with pods per plant and 1000 grain weight, while it showed negative genotypic correlation with plant height and days to flower.

KEY WORDS : Coefficient of Variation, Heritability, Genetic Advance, Correlation

Chickpea is a multipurpose pulse crop of India. Its leaves are used as green vegetable and grains are used as raw pulse. There is a pressing demand of high yielding varieties of chickpea. The yield is influenced by a number of factors. Environment has a great influence upon many of economically important characters which are quantitatively inherited. Thus it becomes difficult to judge whether the observed variability is heritable or is due to the environment. It becomes therefore, necessary to breakup the observed variability into its heritable and non-heritable components as this proves useful to the plant breeder in selecting suitable plants. The aim of the present study is, to find out, those characters which may be helpful in selecting good genotypes for better yield. The study of suitable genetic parameters and correlations between yield and its components will be helpful in getting above objective.

MATERIALS AND METHODS

in winter season. Five plants were selected to record the plant height, days to flower, days to maturity, pods per plant, grain yield per plant and 1000 grain weight. The mean values were statistically analysed according to Panse and Sukhatme (1957). Genotypic and phenotypic coefficients of variability (Burton, 1952), heritability (Burton and Devane, 1953; Hanson *et al.*, 1956), expected genetic advance (Johnson *et al.*, 1955) and the genotypic, phenotypic and environmental correlations (Panse and Sukhatme, 1957) were calculated.

RESULTS AND DISCUSSION

The estimates of genotypic and phenotypic coefficient of variation, heritability, genetic advance and its percentage of mean for the six characters studied, are presented in Table 1. The 1000 grain weight showed highest value for genotypic and phenotypic coefficient of variation followed by pods per plant which showed