

Integrated weed management in soybean

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Abstract : In soybean, weed control trials were conducted in sandy loam. The results indicated that pre-emergence application of metolachlor at 1.0 Kg ha⁻¹ on 3 days after sowing (DAS) + one hand weeding at 20 DAS controlled weeds effectively. The plant height, number of branches per plant, number of pods per plant and grain yields were on par with weed free check. (*Key Words : Soybean Weed control, Metolachlor, Pendimethalin, Hand weeding*)

Soybean (*Glycine max (L.) Merr.*) is a leguminous oil seed crop rich in protein and oil. One among the major factors influencing the productivity of soybean is intense weed competition. According to Chandel and Saxena (1988) reduction in yield varies from 35 to 50 per cent depending upon the type of weeds, their intensity and crop weed competition. The land value is reduced due to the fecundity of seed production. Integrated weed control by combining chemical and manual methods becomes essential. Hence, in the present study an attempt was made to evaluate the integrated methods of weed control on seed yield of soybean.

Materials and Methods

Field experiments were conducted during summer seasons from 1995 - 1996 at Agricultural Research Station, Pattukkottai on sandy loam soils. Ten treatments were evaluated in Randomized block Design with three replications as follows.

- T₁ : Fluchloralin 1.0 Kg ha⁻¹
- T₂ : Pendimethalin 1.0 Kg ha⁻¹
- T₃ : Metolachlor 1.0 kg ha⁻¹
- T₄ : T₁ + One Handweeding
- T₅ : T₂ + One Handweeding
- T₆ : T₃ + One Handweeding
- T₇ : Farmers Practice : One handweeding on 20 DAS
- T₈ : Hand weeding on 15 and 30 DAS
- T₉ : Unweeded check
- T₁₀ : Weed free check

Results and Discussion

The major weed species of different groups were *Dactyloctenium aegyptium* among grasses and *Cyperus iria* among sedges. The dominant broadleaved weed was *Trianthema portulacastrum*.

Plant height

There was significant difference in plant height (Table 1) of soybean at harvest during both years.

Combination of both chemical with hand weeding was found to increase plant height than chemical with hand weeding was found to increase plant height than chemical alone. Integrated weed control methods were comparable with hand weeding twice and weed free check. Significant reduction in plant height was noticed in unweeded check. This clearly explained the reason for reduction in plant height due to weeds.

Number of branches plant⁻¹

The total number of branches per plant (Table 1) varied from 3.0 in unweeded check to 5.0 in weed free check. This was on par with metolachlor @ 1.0 kg ha⁻¹ + one hand weeding which recorded a mean value of 4.9 branches plant⁻¹ during both the years. Hand weeding twice recorded a value of 4.8. Similar findings were reported by Chandel *et al.*, (1995).

Number of pods plant⁻¹

There was significant response with respect to number of pods produced plant⁻¹ (Table 1) for the various weed control treatments. Maximum number of 57.3 pods plant⁻¹ was recorded in weed free check. This was on par with metolachlor 1.0 kg ha⁻¹ + one hand weeding treatment and plots hand weeded twice.

Grain yield

Grain yield data (Table 1) revealed significant response to the treatments. Metolachlor 1.0 kg ha⁻¹ + hand weeding was on par with hand weeding twice recording mean grain yield of 875 and 892kg ha⁻¹ respectively. However, of all the treatments weed free check recorded the highest grain yield of 972 kg ha⁻¹. This may be attributed to the reduced weed competition consequently producing more branches and pods plant⁻¹.

Weed population

The weed population on 30 DAS (Table 2) was significantly varying in different treatments recording highest number in unweeded check (512 m⁻²). Among the treatments hand weeding twice (28 m⁻¹) and metolachlor + one hand weeding (35 m⁻²) were on par

and significantly superior to the rest of the treatments. Combination of chemical and hand weeding reduced weeds significantly than using chemicals alone. This clearly indicates that one hand weeding is essential along with chemicals.

Weed dry matter

Data on weed dry matter production (Table 2) revealed that among the chemical + cultural methods, metolachlor + one hand weeding was significantly superior to the rest of the treatments. However, when compared to cultural methods hand weeding twice was found to record lesser weed dry matter than metolachlor + one hand weeding.

Net returns and B : C ratio

The highest net return (Table 3) of Rs. 4530 ha

¹ was recorded in metolachlor 1.0 kg ha⁻¹ followed by one hand weeding (T6) plots which was significantly superior to the rest of the treatments. This was followed by hand weeding twice (Rs. 4265 ha⁻¹). Due to increased cost of labour for weeding, economically weed free check was not superior inspite of recording higher yields. This was also reflected in higher B : C ratio of 1.7 in metalachlor 1.0 kg ha⁻¹ + one weeding followed by 1.61 in hand weeded twice plots.

Considering the economics and grain yield metolachlor @ 1.0 kg ha⁻¹ + one hand weeding may be recommended in labour scarce areas and in places where labour availability is not a problem hand weeding twice is environmentally safe in achieving higher productivity in soybean.

Table 1. Effect of weed control treatments on the performance of soybean

Treatments	Plant height (cm)		No. of branches / plant		No. of pods plant		Grain yield (kg ha ⁻¹)	
	1995	1996	1995	1996	1995	1996	1995	1996
T1 Fluchloralin 1.0 kg a.i. ha ⁻¹	71.8	74.6	3.7	3.6	28.6	24.2	545	642
T2 Pendimethalin 1.0 kg a.i. ha ⁻¹	70.3	73.2	3.7	3.4	30.5	25.8	568	636
T3 Metalachlor 1.0 kg a.i. ha ⁻¹	68.5	74.2	3.7	3.8	36.4	26.4	584	664
T4 T1 + One Handweeding	72.5	76.4	4.2	4.4	38.6	39.4	600	814
T5 T2 + One Handweeding	74.8	74.5	4.3	4.6	42.8	38.6	618	848
T6 T3 + One Handweeding	84.3	87.6	4.8	5	52.8	52.4	826	924
T7 Farmers Practice : One handweeding on 20 DAS	71.8	71.4	3.5	3.2	40.4	30.4	649	676
T8 Hand weeding twice on 15 and 30 DAS	84	86.2	4.7	4.8	56.7	48.4	886	898
T9 Weed free check	85.5	88	4.8	5.2	60.4	54.2	975	968
T10 Unweeded ckeck	55	45.4	3.2	2.9	17.2	18.8	245	324
SEd	27	0.65	0.23	0.125	2.25	2.26	24.4	14.8
CD (P=0.05)	10.8	2.5	0.9	0.5	8.8	8.6	92.8	56

Table 2. Effect of weed control treatments on weeds

Treatments	Weed count (No./m ²)		Weed dry matter (g/m ²)		
	1995	1996	1995	1996	
T1	Fluchloralin 1.0 kg a.i. ha ⁻¹	380	168	390	172
T2	Pendimethalin 1.0 kg a.i. ha ⁻¹	320	152	340	166
T3	Metalachlor 1.0 kg a.i. ha ⁻¹	286	144	290	140
T4	T1 + One Handweeding	168	96	170	72.4
T5	T2 + One Handweeding	120	78	140	65.5
T6	T3 + One Handweeding	34	36	56	12.5
T7	Farmers Practice :				
	One handweeding on 20 DAS	71	144	95	98.2
T8	Hand weeding twice on 15 and 30 DAS	24	32	42	17.5
T9	Weed free check	7	9	30	8
T10	Unweeded ckeck	540	484	520	545
	SEd	8.9	11.3	13	14
	CD (P=0.05)	35	45	55	55

Table 3. Economics of weed control treatments.

Treatments	Net return (Rs./ha)		B:C ratio		
	1995	1996	1995	1996	
T1	Fluchloralin 1.0 kg a.i. ha ⁻¹	2590	3050	1.02	1.2
T2	Pendimethalin 1.0 kg a.i. ha ⁻¹	2770	3020	1.08	1.18
T3	Metalachlor 1.0 kg a.i. ha ⁻¹	2860	3155	1.1	1.24
T4	T1 + One Handweeding	590	3868	1.33	1.52
T5	T2 + One Handweeding	3650	4029	1.36	1.58
T6	T3 + One Handweeding	4670	4391	1.68	1.72
T7	Farmers Practice :				
	One handweeding on 20 DAS	2960	3210	1.1	1.26
T8	Hand weeding twice on 15 and 30 DAS	4260	4270	1.54	1.68
T9	Weed free check	4320	4100	1.5	1.61
T10	Unweeded ckeck	2060	1540	0.84	0.76
	SEd	18.3	11.1	0.28	0.76
	CD (P=0.05)	65.8	42	0.9	0.8

References

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