Indian Journal of Weed Science 41(1&2) : 93-95, 2009 **Short communication**

Effect of integrated weed management on growth and productivity of soybean

D.S. Meena, Baldev Ram and Chaman Kumari Jadon
Agricultural Research Station, Kota, (Rajasthan)
E-mail : meenads1967@yahoo.co.in

ABSTRACT

A field experiment was conducted at Agricultural Research Station, Ummedganj, Kota during *kharif* 2005 to evaluate suitable integrated weed management practices for increasing productivity and profitability of soybean and comprised eight treatments laid out in randomized block design with three replications. Hand weeding twice gave significantly higher branches/plant, seeds/pod, seed yield, straw yield and highest weed control efficiency (88.2%) at 60 DAS and least weed density and its dry weight at 30 and 60 DAS compared to rest of the treatments. Next best treatments were in *situ* mulching with weeds at 30 DAS and quizalofop ethyl 50 g/ha + chlorimuron ethyl 9 g/ha significantly reduced weed density, its dry weight and recorded higher seed, straw yield and weed control efficiency as compared to rest of the herbicidal treatments.

Key Words : Integrated weed management, Productivity of soybean, *Kharif*

Soybean is grown as a major oilseed crop mainly in south-eastern parts of Rajasthan during *kharif* season. It covers 6.22 lakh hectares with an annual production 8.86 lakh tones in the state. Thus, the average productivity of soybean is 1425 kg/ha, which is quite less than its potential yield mainly due to heavy infestation of several monocot and dicot weeds. Hence, soybean productivity is adversely affected upto 35-80% depending on the extent of weed infestation (Billore *et al.* 1999 and Gupta *et al.* 2006). Manual weeding is the best option for weed control, but it is costly, time consuming and difficult due to intermittent rains. Timely unavailability of adequate labourers also possesses serious problem. Hence, present investigation has been carried out to find out effective integrated weed management.

A field experiment was conducted at Agricultural Research Station, Ummedganj, Kota (Rajasthan) during *kharif* 2005 to evaluate suitable integrated weed management practices for economically viable productivity of soybean. The soil of the experimental field was clay loam in textures, alkaline in reaction (pH 7.7), low in organic carbon (0.41%), medium in available K_2O (291.5 kg/ha) and low in available P_2O_5 (20.5 kg/ha) and available S (15.5 kg/ha).

The experiment was laid out in randomized block design comprising of eight treatments, *viz.,* T_1- *in situ* mulching with weeds at 30 days after sowing (DAS), T_2-polythene mulching as pre-emergence (PE), T_3-quizalofop ethyl 50 g/ha + chlorimuron ethyl 9 g/ha as post-emergence (POE), T_4 -quizalofop ethyl 50 g/ha as POE, T_5 -clomazone ethyl 1.0 kg/ha as PE, T_6 -clomazone ethyl 1.0 kg/ha as PE + 1 hand weeding at 30 DAS, T_7 - 2 hand weeding at 20 and 40 DAS and T_8- weedy check and replicated thrice. Sowing of soybean cv. Pratap soya 1 was done in July 14, 2005 by drilling 80 kg seeds/ha in rows 30 cm apart with a uniform dose of 20 kg N + 60 kg P_2O_5 kg/ha through diammonium phosphate and single super phosphate. Observation on density and dry weight of weeds were recorded at 30 and 60 DAS and on growth parameters, yield attributes and yields were recorded at harvest.

The predominant weed flora invaded crop during growing season in weedy check plots were *Celosia argentia, Commelina benghalensis, Echinochloa colona, Echinochloa crusgalli, Cynodon dactylon, Digera arvensis* and *Euphorbia hirta, etc.* Hand weeding twice at 20 and 40 DAS significantly reduced weed density and weed dry weight by 96.4 and 82.3% at 30 DAS and 95.1 and 88.2% at 60 DAS, respectively over weedy check (Table 1). Application of quizalofop ethyl 50 g/ha + chlorimuron ethyl 9 g/ha significantly reduced weed density and its dry weight as compared to clomazone ethyl to the tune of 37.1 and 49.8%, respectively. Weed control efficiency was maximum with hand weeding twice at both 30 DAS (82.3%) and 60 DAS (88.2%) growth stages among all weed management practices. The next treatments were clomazone ethyl 1.0 kg/ha + hand weeding once (81.5%) at 30 DAS and quizalofop ethyl 50 g/ha + chlorimuron ethyl 9 g/ha (83.9%) at 60 DAS. Clomazone ethyl 1.0 kg/ha as pre emergence alone did not prove effective weed control as season long weed control. Similar results were reported by several workers from different location (Vyas and Jain 2003 and Singh 2007).

Table 1. Effect of weed management practices on weed density, weed dry weight, weed control efficiency and weed competition index at different growth stages of soybean

Treatment	Weed density (no./m^2)		Weed dry weight (g/m^2)		Weed control efficiency (%)		Weed competition index
	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS	
In situ mulching with weeds at 30 DAS	159 (12.6)	52 (7.3)	65.3	12.1	10.5	88.8	9.65
Polythine mulching (PE)	75 (8.6)	86 (9.2)	43.3	18.4	40.6	81.8	25.19
Quizalofop ethyl 50 g/ha + chlorimuron ethyl 9 g/ha (POE)	45 (6.8)	66 (8.2)	14.7	16.2	79.9	83.9	15.27
Quizalofop ethyl 50 g/ha (POE)	49 (7.0)	72 (8.5)	19.4	32.1	73.5	78.1	18.43
Clomazone ethyl 1.0 kg/ha (PE)	57 (7.6)	105 (10.3)	17.1	23.3	76.6	76.9	27.26
Clomazone ethyl 1.0 kg/ha (PE) + 1 Hand weeding at 30 DAS	38 (6.2)	90 (9.5)	13.5	17.2	81.5	83.0	12.24
2 Hand weeding at 20 and 40 DAS	6 (2.7)	11 (3.4)	12.9	11.9	82.3	88.2	-
Weedy check	173 (13.2)	225 (15.0)	73.0	101.0	-	-	28.62
LSD (P= 0.05)	2	2	10.5	13.0	-	-	-

No. - Number, DAS - Days after sowing, PE- Pre-emergence, POE - Post-emergence

Growth and yield of soybean

Plant height, branch of plant and seed pod of soybean were significantly varied between different weed management practices (Table 2). Plant height (65.1 cm) and branches/plant (9.33) were recorded maximum with hand weeding twice among all treatments which were at par with *in situ* mulching with weeds at 30 DAS. Hand weeding twice at 20 and 40 DAS also produced maximum number of seeds/pod, which was significantly higher over weedy check, clomazone ethyl 1.0 kg/ha, polythene mulching, quizalofop ethyl 50 g/ha and quizalofop ethyl 50 g/ha + chlorimuron ethyl 9 g/ha. Seed index was unaffected by various treatments. Consequently, hand weeding twice at 20 and 40 DAS produced maximum seed and straw yields, which were comparable with these obtained *in situ* mulching with weeds at 30 DAS, clomazone ethyl 1.0 kg/ha + hand weeding once at 30 DAS and quizalofop ethyl 50 g/ha + chlorimuron ethyl 9 g/ha. Amongst the herbicidal weed control treatments, application of clomazone ethyl 1.0 kg/ha + hand weeding once at 30 DAS and quizalofop ethyl 50 g/ha + chlorimuron ethyl 9 g/ha proved better than others for seed and straw yields. Weed competition index was minimum with *in situ* mulching with weeds at 30 DAS closely followed by clomazone ethyl (1.0 kg/ha) + hand weeding once at 30 DAS. Similar results were reported by Pandya *et al.* (2004) and Singh (2007).

Table 2. Effect of weed management practices on growth parameters, yield attributes and yields of soybean of soybean.

Treatment	Plant height (cm)	Branches/ plant (no.)	Seeds/pod (no.)	Seed yield (kg/ha)	Straw yield (kg/ha)
In situ mulching with weeds at 30 DAS	62.3	9.0	3.0	2058	2771
Polythine mulching (PE)	55.8	7.3	2.8	1704	2230
Quizalofop ethyl 50 g/ha+ Chlorimuron ethyl 9g/ha (POE)	59.8	7.7	2.9	1930	2584
Quizalofop ethyl 50 g/ha (POE)	56.4	7.7	2.9	1858	2308
Clomazone ethyl 1.0 kg/ha (PE)	55.7	6.3	2.7	1657	2145
Clomazone ethyl 1.0 kg/ha (PE)+ 1 Hand weeding at 30 DAS	60.7	8.3	3.0	1999	2565
2 Hand weeding at 20 and 40 DAS	65.1	9.3	3.3	2278	2975
Weedy check	47.9	5.7	2.2	1626	2252
LSD (P= 0.05)	7.2	1.8	0.3	283	435

No- Number, DAS - Days after sowing, PE- Pre-emergence, POE - Post-emergence

REFERENCES

Billore SD, Joshi OP and Ramesh A. 1999. Energy productivity through herbicidal weed control in soybean. *Indian Journal of Agricultural Sciences* **69** (11): 770-772.

Gupta GK, Sharma AN, Billore SD and Joshi OP. 2006. Status and prospects of integrated pest management strategies in selected crops-soybean. In : *Integrated pest management: Practices and Applications*. Singh America, Sharma O P and Garg D K CBS Publishers, New Delhi (Eds.) Vol. 2 : 198-233.

Singh Guriqbal. 2007. Integrated weed management in soybean (*Glycine max*). *Indian Journal of Agricultural Sciences* **77** (10): 675-676.

Pandya N, Chouhan GS and Nepalia V. 2004. Effect of varieties, crop genotypes and weed management practices on weed growth and grain yield of soybean. *Indian Journal of Weed Science* **36** (3&4): 203-206.

Vyas MD and Jain AK. 2003. Effect of pre and post emergence herbicides on weed control and productivity of soybean (*Glycine max*). *Indian Journal of Agronomy* **48** (4): 309-311.