Indian J. Weed Sci. **37** (1 & 2) : 131-132 (2005) *Short Communication*

Effect of Chemical and Mechanical Methods on Weed Management, Growth and Grain Yield of Soybean [*Glycine max* (L.) Merrill]

Guriqbal Singh
Department of Plant Breeding, Genetics and Biotechnology
Punjab Agricultural University, Ludhiana-141 004 (Punjab), India

Soybean encounters competition from various grassy and broad-leaved weed species particularly in the early stages of crop growth. Unchecked weeds may cause as high as 84% reduction in the grain yield of soybean (Singh *et al.*, 2004). Weeds can be controlled with hand weeding. However, the labour shortage and inclement weather conditions lead to delayed weeding. Critical crop-weed competition in soybean is 27 to 40 days after sowing (Chhokar *et al.*, 1995). Therefore, delayed weeding is ineffective in obtaining high yields. Hence, an experiment was conducted to study the effect of chemical and mechanical methods of weed control on weeds and grain yield of soybean.

A field experiment comprising 12 treatments (Table 1) was conducted at the Punjab Agricultural University, Ludhiana in a randomized complete block design with three replications. Variety SL 295 was sown on June 20, 2003 in rows 45 cm apart using 75 kg seed ha^{-1}. Alachlor, clomazone and pendimethalin were applied as pre-emergence immediately after sowing, whereas quizalofop ethyl was applied as post-emergence 18 days after sowing (DAS) with knapsack sprayer using 500 litres of water ha^{-1}. Hand weeding (HW) and hoeings were done using *Khurpa* and wheel hand hoe, respectively, as per the treatments. In the treatment of *in situ* mulching with weeds, hand weeding was done 30 DAS and the hand weeded weeds were placed between the two rows of soybean to cover the soil surface so that weeds under the mulch may be suppressed. The major weed flora in the experimental site in the weedy plots at 45 DAS included *Cyperus rotundus* (with relative density of about 50%), *Dactyloctenium aegyptium* (20%), *Eragrostis pilosa* (15%), *Commelina benghalensis* (8%) and others (7%). Data on dry matter of weeds were recorded at 45 DAS.

Weedy check recorded significantly higher weed dry matter than all other treatments (Table 1).

Table 1. Effect on weeds and grain yield of soybean

Treatment	Dose (kg ha^{-1})	Weed dry matter (g m^{-2})	Grain yield (kg ha^{-1})	No. of pods $plant^{-1}$	100-seed weight (g)
Alachlor	2.0	28.6	3585	61.6	11.77
Clomazone	1.0	30.6	2962	66.4	12.37
Clomazone+HW 30 DAS	1.0	12.6	3200	67.4	11.62
Pendimethalin	1.0	30.3	3051	60.8	11.90
Pendimethalin+HW 30 DAS	1.0	20.0	3081	60.9	11.69
Pendimethalin+HW 30 DAS	0.45	18.6	4000	68.7	12.32
Quizalofop-ethyl	0.0375	38.3	3200	58.5	11.59
Quizalofop-ethyl	0.050	37.3	3377	58.5	12.09
In situ mulching with weeds 30 DAS	-	27.3	3377	53.6	12.03
Hoeings with wheel hand hoe 30+45 DAS	-	15.3	3407	62.8	11.47
Hand weedings 30+45 DAS	-	12.3	3318	56.4	11.06
Weedy	-	134.0	2666	50.6	12.10
LSD (P=0.05)		13.4	590	6.6	NS

NS–Not Significant.

Two hand weedings done 30 and 45 DAS had the lowest weed dry matter (90.8% WCE), which was closely followed by clomazone at 1 kg ha^{-1} + HW 30 DAS, two hoeings with wheel hand hoe at 30 and 45 DAS, and pendimethalin at 0.45 and 1 kg ha^{-1} integrated with HW 30 DAS. Pendimethalin and alachlor controlled all other weeds very effectively except *C. rotundus* and *C. benghalensis*, which were controlled partially. However, *C. benghalensis* was drastically reduced by clomazone application. Quizalofop ethyl did not control dicot weeds but controlled grassy weeds effectively.

Pendimethalin at 0.45 kg ha^{-1} integrated with hand weeding 30 DAS recorded the highest grain yield. The other treatments which were significantly superior to weedy check were alachlor at 2 kg ha^{-1}, two hoeings at 30+45 DAS either with hand or wheel hand hoe and quizalofop ethyl at 50 g ha^{-1}. Weedy check recorded 19.6 and 33.3% reduction in the grain yield over two hand weedings done 30+45 DAS and pendimethalin at 0.45 kg ha^{-1}+HW 30 DAS, respectively.

REFERENCES

Chhokar, R. S., R. S. Balyan and S. S. Pahuja, 1995. The critical period of weed competition in soybean [*Glycine max* (L.) Merrill]. *Indian J. Weed Sci.* **27** : 197-200.

Singh, V. P., G. Singh and M. Singh, 2004. Bio-efficacy of tepraloxydim and dimethanamid in soybean. *Indian J. Weed Sci.* **36** : 271-273.