

## EFFECT OF DIFFERENT WEED CONTROL PRACTICES IN IRRIGATED SOYBEAN

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### ABSTRACT

Field experiments were conducted on the clay loam soils of Annamalai University Experimental Farm in 1994 and 1995 during January to April. The treatments included three herbicides viz., metribuzin (0.5 and 1 kg ha<sup>-1</sup>), fluchloralin (1 kg ha<sup>-1</sup>) and pendimethalin (1 kg ha<sup>-1</sup>) tested individually and in combination with one hand weeding (HW) at 45 days after sowing (DAS) in comparison with two HW and an unweeded control. Among the herbicides, metribuzin at 1 kg ha<sup>-1</sup> + HW recorded least weed population and dry matter production at 60 DAS. The above treatment resulted in higher yields compared to other herbicides and their integration with one HW. However, it was comparable with two HW. In general, herbicides integrated with one HW gave more yield than herbicides alone.

**KEY WORDS :** Herbicides, metribuzin, fluchloralin, pendimethalin, weeds, soybean yield.

Weeds compete with crop for soil moisture, nutrients, light and thereby reduce the yield drastically. The first 30-40 days period after sowing soybean is considered to be critical to weed competition (Bhan, 1975). Since soybean is wider spaced and slow growing crop at its early stage, weed competition during this period is high. Though handweeding is commonly practiced by farmers, shortage of labour force during peak seasons results in the crop not being weeded during the critical period. Weed competition during early period (30-40 days) may lead to 40-70 per cent reduction in the grain yields of soybean (Bhan *et al.*, 1974). This necessitates use of herbicides to avoid weed competition at critical period of crop growth. Literature evidences on the weed control by herbicides in soybean grown in clayey soil of Cauvery delta are meagre. Hence, the present investigation was taken up to findout a suitable herbicide for soybean grown in clayey soil and its efficacy vis-a-vis conventional weeding.

### MATERIALS AND METHODS

Two filed experiments were conducted at the Annamalai University Experimental Farm, Annamalai Nagar in 1994 and 1995 during January-April. The soil was clay loam with pH 7.2, organic carbon 0.7%, low in available N (221 kg ha<sup>-1</sup>), medium in available P<sub>2</sub>O<sub>5</sub> (14.1 kg ha<sup>-1</sup>) and high in available K<sub>2</sub>O (326 kg ha<sup>-1</sup>). The experiment consisted of 10 treatments viz., fluchloralin 1 kg

ha<sup>-1</sup>, pendimethalin 1 kg ha<sup>-1</sup> and metribuzin 0.5 and 1 kg ha<sup>-1</sup> alone, individual herbicide + one hand weeding (HW) at 30 days after sowing (DAS) and 2 HW and control for comparison. The experiment was laid out in a randomised block design replicated thrice with a plot size of 5m x 4m. Fluchloralin was applied one day before sowing and incorporated into the soil. Other herbicides were sprayed 3 DAS. They were applied with the help of knapsack sprayer fitted with flat fan nozzle using a spray volume of 600l/ha. The soybean cv. Co 1 (irrigated) was dibbled with a spacing of 30 cm x 10 cm. Recommended dose of fertilizers Viz., urea, superphosphate and potassium chloride were applied @ 20 : 80 : 40 kg N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O respectively.

### RESULTS AND DISCUSSION

Major weed species recorded were *Echinochloa colonum* Link (54%), *Cyperus rotundus* L (28%), *Eleusine indica* L Geartn. (8%) *Trianthema portulacastrum* L (7%) and *Celosia argentea* L (3%).

At 60 DAS, metribuzin 1 kg ha<sup>-1</sup> + HW recorded least drymatter (DM) of weed and weed intensity (WI) which was comparable to two HW. It was followed by metribuzin 1 kg ha<sup>-1</sup> alone. Next to unweeded control, fluchloralin 1 kg ha<sup>-1</sup>/pendimethalin 1 kg ha<sup>-1</sup> produced highest DM of weeds. Integration of one HW with herbicides recorded lower DM of weeds than herbicide alone. The results were consistent in both the years. (Table 1).

Table 1. Effect of herbicides on weed population, weed drymatter, pods plant<sup>-1</sup> and seed yield of irrigated soybean

Treatments	Weed population at 60 DAS No.m <sup>-2</sup>		Weed drymatter at 60 DAS g m <sup>-2</sup>		No. of pods plant <sup>-1</sup>		Seed yield kg ha <sup>-1</sup>		Net return Rs. ha <sup>-1</sup>		B - C ratio	
	1994	1995	1994	1995	1994	1995	1994	1995	1994	1995	1994	1995
Control (unweeded)	15.96 (255)	15.53 (242)	19.02 (362)	18.49 (342)	38	35	380.1	310.2	-	-	-	-
HW at 30 and 45 DAS	7.83 (61)	7.95 (63)	8.32 (69)	7.63 (58)	110	112	1481.2	1500.2	9136	8876	2.05	1.97
Fluchloralin 1 kg	12.20 (149)	12.37 (153)	13.57 (184)	12.37 (153)	59	62	750.3	771.2	734	1074	1.08	1.10
Fluchloralin 1 kg + HW (45 DAS)	11.32 (128)	10.99 (121)	12.89 (167)	10.96 (120)	68	69	1031.4	781.3	3719	719	1.43	1.08
Pendimethalin 1 kg	10.11 (102)	11.34 (129)	12.72 (162)	11.27 (127)	70	71	1110.0	700.6	5336	516	1.66	1.03
Pendimethalin 1 kg + HW (45 DAS)	10.73 (115)	9.99 (100)	11.59 (134)	10.21 (104)	81	77	989.5	991.2	3041	3521	1.36	1.42
Metribuzin 0.5 kg	9.83 (97)	9.67 (94)	10.45 (109)	9.19 (84.5)	78	82	931.4	930.0	3446	3296	1.44	1.41
Metribuzin 0.5 kg + HW (45 DAS)	8.77 (77)	9.08 (82)	9.48 (89)	9.08 (82)	86	88	1071.2	1151.2	4776	5736	1.57	1.71
Metribuzin 1 kg	9.42 (89)	9.62 (93)	9.40 (88)	9.02 (81)	90	93	1091.4	1110.3	4586	4771	1.53	1.57
Metribuzin 1 kg + HW (45 DAS)	7.22 (52)	6.87 (50)	8.01 (64)	6.35 (40)	116	118	1491.3	1521.4	9136	9496	2.04	2.08
CD (P = 0.05)	0.92	2.12	1.07	1.34	11	11	33.1	21.1	-	-	-	-

\* Figures in parentheses indicate original values and others  $\times + 0.5$ ; HW - hand weeding; DAS - Days after sowing.

Least DM of weeds with metribuzin 1 kg ha<sup>-1</sup> along with one HW might be due to early weed control by the herbicide and the control of second flush of weeds by HW. Dwivedi *et al.* (1991) reported that integration of one HW after herbicide application reduce the weed DM significantly. Minimum DM of weeds was recorded with two HW at 30 and 45 DAS (Singh *et al.*, 1992).

During both the years, highest pods yield and seed yield were recorded in metribuzin 1 kg ha<sup>-1</sup> + one HW which, however, was comparable with two HW at 30 and 45 DAS. As could be expected, metribuzin alone at both doses registered lower pods yield and seed yield than its integration with one HW. Lowest seed yield was obtained in unweeded plots. Pendimethalin and fluchloralin did not vary with each other. In general, application of herbicides supplemented with one HW gave higher pods and seed yield than herbicides alone. Higher pods and seed yield in metribuzin 1 kg ha<sup>-1</sup> + one HW could be attributed to a weed free condition during the critical period of crop growth (from the germination of the crop to 60 DAS). This shows the importance of integration of HW with herbicide. According to Bhan *et al.* (1974), soybean yields

were maximum when crop was kept free for the first 30 days or longer after sowing. Higher yield with two HW at 30 and 45 DAS obtained in the present study is in line with the earlier findings of Singh and Chandel (1995). Increase in seed yield was found to be associated with effective weed control treatments and highest net return (Rs. 9496 ha<sup>-1</sup>) and benefit cost ratio (2.08) were obtained with application of metribuzin 1 kg ha<sup>-1</sup> + HW at 45 DAS.

#### REFERENCES

- BHAN, V.M. (1975). Weeds associated with soybean and their control. *Soybean production, Protection and utilization*. Univ. Illinois. pp. 147 - 156.
- BHAN, V.M., SINGH, M. and MAURYA, R.A. (1974). Studies on the requirement of weed-free maintenance in soybean. *Indian J. Weed Sci.* 6: 12 - 15.
- DWIVEDI, V.D., PANDEY, R.P. and NAMDEO, K.N. (1991). Weed control in pigeon - sorghum intercropping system. *Indian J. Agron.*, 36: 234-238.
- SINGH, M. and CHANDEL, A.S. (1995). Effect of weed control methods on soybean (*Glycine max.*) *Indian J. Agron.*, 40: 58 - 62.
- SINGH, R., KALIA, B.D. and NEGI, P.S. (1992). Integrated weed management in soybean. *Indian J. Weed Sci.*, 24: 93-95.

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