

Weed Management in Sunflower (*Helianthus annuus* L.)

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Sunflower is one of the most important oilseed crops in India and it ranks third after soybean and groundnut as a source of edible oil. It is a versatile crop, which can be grown in any season of year and its oil is rich in polyunsaturated fatty acid (PUFA). There are various factors responsible for low yield of sunflower; among them, weeds are the major threat resulting in a seed yield loss upto 45 to 55% (Wanjari *et al.*, 2001). Integration of cultural, mechanical and chemical weed control practices in any crop offers better management of all types of weeds. The present investigation was undertaken to find out an efficient weed management programme for irrigated sunflower.

A field experiment was conducted during summer and **kharif** 2006 at Annamalai University Experimental Farm, Annamalaiagar. The soil was clay loam with a pH of 7.8 and was low in available N (234.5 kg/ha), medium in available P₂O₅ (22.5 kg/ha) and high in available K₂O (327.5 kg/ha). The experiment was laid out in a randomized block design with 12 treatments (Table 1) with three replications in a plot size of 4 × 3 m. Sunflower hybrid Jaya was sown on third week of March at 60 × 30 cm spacing with 90 kg N, 60 kg P₂O₅ and 60 kg K₂O/ha under irrigated condition. In the unweeded control treatment, the weed flora was allowed to grow without any control measures. In twice hand weeding treatment, two hand weedings were done at 15 DAS and again at 30 DAS by hand pulling of weeds. In herbicide treatments, the herbicides were applied through knapsack sprayer fitted with a flood jet nozzle using 600 litres of water/ha. Fluchloralin 1.5 kg/ha was applied on dry soil and was followed immediately with irrigation to incorporate the herbicide in the soil, a pre-sowing treatment. Alachlor 1.5 kg/ha was sprayed at 3 DAS with adequate soil moisture. Herbicide treatments were

followed by one hand weeding on 30 DAS or intercropping by one row of blackgram in between two rows of main crop or mulching with sugarcane trash at 10 cm thickness on 21 DAS.

The weed flora in the experimental field consisted of *Echinochloa colona* (11%), *Cyperus rotundus* (59%), *Cleome viscosa* (8.5%), *Trianthema portulacastrum* (12%), *Eclipta alba* (4.0%), *Phyllanthus niruri* (3.0%) and *Phyllanthus madraspetensis* (2.5%).

Results presented in Table 1 clearly show that twice hand weeding at 15 and 30 DAS controlled weeds very effectively and this was similar to fluchloralin 1.5 kg/ha+intercropping. Alachlor was less efficient than fluchloralin. Similar trend of result was observed in weed dry weight and weed control index (WCI). The lowest weed dry weight and the highest WCI were recorded in twice hand weeding and this was on par with fluchloralin 1.5 kg/ha+intercropping. Use of alachlor 1.5 kg/ha with intercropping and mulching was also found to be effective in reducing the dry weight of weeds.

Diameter of capitulum, total number of seeds per head and seed yield increased significantly due to efficient weed management through the use of twice hand weeding at 15 and 30 DAS and it was on par with fluchloralin 1.5 kg/ha +intercropping. Lowest diameter of capitulum, total number of seeds per head as well as the seed yield were recorded in unweeded plot due to severe weed infestation. The lowest yield of 839 kg/ha was obtained from unweeded control plot.

REFERENCE

- Wanjari, R. H., N. T. Yaduraju and K. N. Ahuja, 2001. Critical period of crop-weed competition in rainy-season sunflower (*Helianthus annuus*). *Ind. J. Agron.* **46** : 309-313.

Table 1. Effect of weed control treatments on weed parameters and performance of sunflower

Treatment	No. of weeds/m ² (60 DAS)			Weed dry weight (g/m ²)	Weed control index at 60 DAS (%)	Diameter of capitulum (cm)	Total number of seeds/head	Seed yield (kg/ha)
	Grasses	Broad-leaved weeds	Sedges					
T ₁ -Unweeded control	10.18 (103.33)	6.09 (36.66)	3.93 (15.00)	176.23	-	15.11	503.67	839
T ₂ -Hand weeding twice (15 and 30 DAS)	7.51 (56.00)	3.25 (10.12)	3.08 (9.02)	16.00	91.16	19.75	955.21	1618
T ₃ -Fluchloralin (1.5 kg/ha) (PPI)	9.00 (80.66)	4.22 (17.33)	3.53 (12.00)	62.73	64.90	17.30	655.92	1063
T ₄ -Alachlor (1.5 kg/ha) (PRE)	9.12 (82.82)	4.26 (17.66)	3.58 (12.52)	74.82	58.36	16.94	615.60	1032
T ₅ -Fluchloralin @ 1.5 kg/ha+one hand weeding at 30 DAS	8.78 (76.66)	3.93 (15.00)	3.43 (11.32)	53.72	70.56	18.05	723.58	1137
T ₆ -Alachlor @ 1.5 kg/ha+one hand weeding at 30 DAS	8.87 (78.23)	4.10 (16.36)	3.48 (11.62)	57.84	67.64	17.67	687.96	1113
T ₇ -Fluchloralin @ 1.5 kg/ha+Mulching at 21 DAS (with sugarcane trash 10 cm thickness)	8.39 (70.00)	3.48 (11.66)	3.34 (10.66)	37.94	79.04	18.79	806.44	1277
T ₈ -Alachlor @ 1.5 kg/ha+Mulching at 21 DAS	8.59 (73.33)	3.58 (12.32)	3.35 (10.78)	44.18	74.59	18.41	756.60	1277
T ₉ -Fluchloralin @ 1.5 kg/ha+Intercrop (blackgram) at 3 DAS	7.61 (59.00)	3.30 (11.00)	3.19 (9.68)	19.64	90.11	19.52	948.32	1591
T ₁₀ -Alachlor @ 1.5 kg/ha+Intercrop (blackgram) at 3 DAS	7.90 (62.00)	3.43 (11.32)	3.20 (10.00)	33.82	81.14	19.16	850.34	1363
T ₁₁ -Mulching alone	9.33 (86.66)	4.48 (19.66)	3.81 (14.05)	94.84	46.55	16.15	535.62	911
T ₁₂ -Intercropping alone	9.19 (84.00)	4.33 (18.32)	3.67 (13.00)	82.76	54.12	16.55	573.04	972
LSD (P = 0.05)	0.19	0.10	0.12	4.01	-	0.34	15.56	83.6

DAS-Days after sowing.
Figures in parentheses indicate original values.