



INTEGRATED WEED MANAGEMENT PRACTICES ON WEED CONTROL IN SUNFLOWER (*HELIANTHUS ANNUUS L.*)

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Abstract

A field experiment was conducted at Annamalai University experimental farm, Annamalainagar to find out the Effect of Integrated weed management practices on weed control in sunflower. The experiment was laid out in Randomized block design (RBD) with twelve treatments and replicated thrice *viz.*, unweeded control (T₁), Hand weeding twice at 15 and 30 DAS (T₂), Pre-emergence application of pendimethalin 0.68 kg ai ha⁻¹ (T₃), Pre-emergence application of pendimethalin 1 kg ai ha⁻¹ (T₄), Pre-emergence application of pendimethalin 0.68 kg ai ha⁻¹ + one hand weeding (30 DAS) (T₅), Pre-emergence application of pendimethalin 1 kg ai ha⁻¹ + one hand weeding (30 DAS) (T₆), Pre-emergence application of pendimethalin 0.68kg ai ha⁻¹ + Intercropping with blackgram (T₇), Pre-emergence application of pendimethalin 1kg ai ha⁻¹ + Intercropping with blackgram (T₈), Pre-emergence application of pendimethalin 0.68kg ai ha⁻¹ + Mulching with sugarcane trash at 21 DAS (T₉), Pre-emergence application of pendimethalin 1kg ai ha⁻¹ + Mulching with sugarcane trash at 21 DAS (T₁₀), Intercropping alone (T₁₁), Mulching alone (T₁₂). Results of the experiment revealed that Pre-emergence application of pendimethalin 1kg ai ha⁻¹ + Intercropping with blackgram was efficient and economically feasible alternative package to manage the weeds.

Key words: Sunflower, Integrated weed management and weed control efficiency.

Introduction

Sunflower is an important oil seed crop of India and a major source of vegetable oil in the world. USDA estimates that the world sunflower production in 2015-2016 will be 39.15 million tonnes. Sunflower production of 2015 was 40.12 million tonnes. This year 39.15 estimated million tonnes could represent with a decrease of 0.61 million tonnes or a 1.52 percent in sunflower production around the globe. In India sunflower production in 2014-2015 was 390 million tonnes with a yield of 1.67 tonnes ha⁻¹. Sunflower with its versatile nature is expected to play a crucial role in the oil seed economy of the country. Among various factors responsible for low seed yield of sunflower, judicious weed management is the major aspect for limiting the seed production in sunflower. The losses caused by the weed exceed the losses from any other category agricultural pests.

Weed competition is one of the biotic constrains in

realizing higher sunflower productivity due to wider spacing and application of higher dose of fertilizers. Heavy weed infestation is the dominant reason for low yield of sunflower. Uncontrolled weed growth reduced the seed yield of sunflower up to an extent of 55 per cent (Wanjari *et al.*, 2000). Continuous use of herbicides over a prolonged period leads to development of resistance in weeds making them difficult to control. The herbicides with mechanical and cultural weeding are effective in controlling major weeds. Hence, it is necessary to integrate the cultural, chemical and mechanical method of weed control which is eco friendly and economically viable. With this background, the present study was under taken.

Materials and Methods

A field experiment was conducted at Experimental farm, Department of Agronomy, Annamalai University, Annamalainagar to evolve the effect of Integrated weed management practices on weed control in sunflower. The

Table 1: Integrated weed management practices on weed control in sunflower.

Treatments	Total weed count (m ²) at 30 DAS	Weed biomass (g m ⁻²) at 30 DAS	WCE (%)
T ₁ - Unweeded control	12.51(156.06)	132.10	-
T ₂ - Hand weeding twice at 15 & 30 DAS	2.98(8.42)	10.25	92.24
T ₃ - Pre-emergence application of pendimethalin 0.68 kg ai ha ⁻¹	11.17(124.34)	73.50	44.36
T ₄ - Pre-emergence application of pendimethalin 1 kg ai ha ⁻¹	10.09(101.46)	64.10	51.47
T ₅ - Pre-emergence application of pendimethalin 0.68 kg ai ha ⁻¹ + one hand weeding(30DAS)	7.20(51.34)	38.60	70.77
T ₆ - Pre-emergence application of pendimethalin 1 kg ai ha ⁻¹ + one hand weeding(30DAS)	6.03(35.96)	29.50	77.66
T ₇ - Pre-emergence application of pendimethalin 0.68 kg ai ha ⁻¹ + Intercropping with blackgram	4.83(22.86)	21.00	84.10
T ₈ - Pre-emergence application of pendimethalin 1 kg ai ha ⁻¹ + Intercropping with blackgram	3.02(8.64)	10.45	92.08
T ₉ - Pre-emergence application of pendimethalin 0.68 kg ai ha ⁻¹ + Mulching with sugarcane trash (21DAS)	9.14(83.13)	56.00	57.60
T ₁₀ - Pre-emergence application of pendimethalin 1 kg ai ha ⁻¹ + Mulching with sugarcane trash (21DAS)	8.17 (66.27)	47.50	64.04
T ₁₁ - Intercropping alone	11.18(124.62)	96.40	27.02
T ₁₂ - Mulching alone	11.19(124.79)	97.60	26.11
S.EdCD (p=0.05)	0.160.33	3.507.21	

(Figures in parenthesis indicates the original value).

experimental farm is situated at 11°24' North Latitude, 79°44' East Longitude with an altitude of +5.79 m above mean sea level. The experiment was laid out in Randomized block design with twelve treatments and replicated thrice *viz.*, unweeded control (T₁), Hand weeding twice at 15 and 30 DAS (T₂), Pre – emergence application of pendimethalin 0.68 kg ai ha⁻¹ (T₃), Pre–emergence application of pendimethalin 1 kg ai ha⁻¹ (T₄), Pre–emergence application of pendimethalin 0.68 kg ai ha⁻¹ + one hand weeding (30 DAS) (T₅), Pre–emergence application of pendimethalin 1 kg ai ha⁻¹ + one hand weeding (30 DAS) (T₆), Pre–emergence application of pendimethalin 0.68kg ai ha⁻¹ + Intercropping with blackgram (T₇), Pre – emergence application of pendimethalin 1kg ai ha⁻¹ + Intercropping with blackgram (T₈), Pre–emergence application of pendimethalin 0.68kg ai ha⁻¹ + Mulching with sugarcane trash at 21 DAS (T₉), Pre–emergence application of pendimethalin 1kg ai ha⁻¹ + Mulching with sugarcane trash at 21 DAS (T₁₀), Intercropping alone (T₁₁), Mulching alone (T₁₂). The observations on Total weed count, weed biomass and weed control efficiency were recorded.

Results and Discussion

Total weed count:

Among the weed control treatments, the least total weed population m⁻² was recorded in hand weeding twice at 15 and 30 DAS recorded 8.42 m⁻² at 30 DAS. Pre-

emergence application of pendimethalin 1 kg ai ha⁻¹ + Intercropping with blackgram recorded the total weed count of 8.64 m⁻² at 30 DAS and was on par with each other. It might be due to efficient and prolonged weed control by herbicide, efficiently supplemented by smothering effect of intercropping for the control of late emergence weeds. Highest total weed counts were recorded in unweeded control. Application of pre-emergence pendimethalin checked the annual grassy and certain broad leaved weeds by inhibiting their shoot and root growth. The primary mode of action of pendimethalin is to inhibit microtubule formation in cells of susceptible manocot and dicot weeds which are an important part of cell division process.

Weed biomass:

All the treatments significantly influenced the weed biomass. Hand weeding twice at 15 and 30 DAS excelled others by recording the least weed biomass of 10.21 g m⁻² at 30 DAS. This was on par with pre-emergence application of pendimethalin 1 kg ai ha⁻¹ + Intercropping with blackgram with weed biomass of 10.45 gm² at 30 DAS. The weedy check recorded significantly the highest number and dry weight of weeds owing to uncontrolled condition favored luxurious weed growth leading to increased density and dry matter of weeds. These findings are in close conformity with those reported by Verma *et al.*, (2009).

Weed control efficiency:

Among the treatments, Hand weeding twice at 15 and 30 DAS found to be superior as indicated by the weed control efficiency of 92.24 percent at 30 DAS. Followed by Pre-emergence application of pendimethalin 1 Kg ai ha⁻¹ + Intercropping with blackgram recorded WCE of 92.08 percent. This might be due to effective weed control achieved under these weed management treatments in terms of reduced weed biomass of weeds. Results were almost similar reported by Renukaswamy *et al.*, (2012).

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