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Evaluation of some post-emergence herbicides against weeds in summer irrigated gingelly (*Sesamam indicum* L)

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ABSTRACT

A field experiment was conducted during summer 2004-2005 to evaluate suitable post-emergence herbicides to see their effect on weeds and growth and yield of summer gingelly. The herbicides used were pendimethalin, fenoxaprop-p-ethyl, imazethapyr and cyhalofop butyl each integrated with one hand weeding (HW). Results indicated that lowest weed population and highest weed control efficiency (WCE) were achieved with the application of pendimethalin @ 1 kg ai/ha followed by 1HW at 35 days after sowing (DAS). Higher values of plant height, leaf area index (LAI), capsules/plant and grain yield were achieved under pendemethalin spray @ 1 kg ai/ha+1 HW followed by fenoxaprop-p-ethyl @ 100 g/ha+1 HW which was found to be on par with cyhalofop butyl @ 100 g/ha+1 HW and 2 HW.

Keywords: Herbicides; summer gingelly; weed control; herbicides

INTRODUCTION

Gingelly (*Sesame indicum* L) the queen of oil seeds is an important oil seed crop. In India it is cultivated on an area of 19.1 lakh hectares with an average productivity of 305 kg/ha. In Tamil Nadu it occupies an area of 1.5 lakh hectares with an average productivity of 395 kg/ha (Anon 2002). Gingelly has been considered as a summer catch crop in different cropping systems. Availability of adequate moisture due to irrigation provides congenial conditions for weeds to compete with the crop and causes yield losses of 20 to 70 per cent (Vas and Sidhu 1993). Thus there is a need to develop suitable weed management practices to enhance the productivity of this crop.

MATERIAL AND METHODS

A field experiment was carried out during summer 2004-2005 in the Agricultural Farm, Madurai using gingelly variety TMV 3. The soil of the experimental

field was sandy clay loam in texture, classified as low in available nitrogen, medium in available $P_2 0_5$ and K_2O contents with neutral reaction. The treatments were composed of:

T_1: Pre-emergence (PE) application of pendimethalin @ 1.0 kg ai/ha+1 hand weeding (HW) at 35 DAS

T_2: Post emergence (PoE) application of fenoxaprop-p-ethyl @ 100 g/ha at 15 DAS+1 HW at 35 DAS

T_3: PoE application of imazethapyr @ 100 g/ha at 15 DAS+1 HW at 35 DAS

T_4: PoE application of cyhalofop butyl @ 100 g/ha at 15 DAS+1HW at 35 DAS

T_5: PoE application of tank mix of fenoxaprop-p-ethyl @ 50 g/ha+imazethapyr @ 50 g/ha at 15 DAS+1 HW at 35 DAS

T_6: PoE application of tank mix of imazethapyr @ 50 g/ha+cyhalofop butyl @ 50 g/ha at 15 DAS+1 HW at 35 DAS

T_7: Hand weeding twice at 15 and 35 DAS

T_8: Unweeded control.

The treatments were applied in randomized block design with 3 replications each. Gingelly was sown at a spacing of 30x30 cm. The recommended doses of 35:23:23 kg NPK/ha were applied uniformly to all plots in the form of urea, single super phosphate and muriate of potash respectively.

Data were recorded wrt weed population, weed control efficiency (WCE), plant height, leaf area index (LAI), capsules/plant and grain yield of gingelly.

RESULTS AND DISCUSSION

Weed flora

Weed flora of the experimental field was composite in nature consisting of grasses, sedges and broad leaved weeds. Grasses were more dominant than sedges and broad leaved weeds. The major grassy weeds were *Echinochloa colonum* and *Cynodon dactylon* whereas *Cyperus rotundus* and *C difformis* were the predominant sedges observed. The important broad leaved weeds of the experimental field were *Eclipta alba* and *Trianthema portulacastrum.*

Effect on weed growth

Weed population was significantly reduced by weed management practices. PE application of pendimethalin @ 1 kg ai/ha followed by 1 HW at 35 DAS recorded the lowest total weed density. The lowest grassy weed density was recorded under T_4 which was found to be on par with T_2 and T_7. This was followed by T_3. The individual application of herbicides performed better than their tank mixture

with other herbicides. The highest total WCE was recorded under T_1 followed by T_7. Though highest WCE on grasses was recorded under T_4 followed by T_2 reason for their low total WCE was due to their ineffectiveness towards sedges and BLW (Table 1).

Effect on crop

All weed management practices significantly improved the growth and yield components of gingelly as compared to unweeded check. Highest plant height was recorded under T_1 followed by T_2 which was found to be on par with T_4 and T_7. This may be due to no weed competition during the critical period of crop weed competition particularly in the early stages of crop growth (Singh 1995). In case of PoE herbicides or manual weeding the crop received the first HW or herbicide spray only at 15 DAS till that period the crop might have suffered from severe weed competition.

T_1 recorded significantly higher values of plant height, LAI, total number of capsules per plant and test weight (Table 2). This treatment was followed by T_2 which was on par with T_4 and T_7. The control plot recorded lowest values of all the parameters. The seed yield was significantly influenced by the weed management practices. The highest seed yield was recorded with T_1 and the lowest with T_8. The reason might be due to the fact that the reduction in total weed population rendered the crop with better

Table 1. Weed population and WCE as influenced by different weed management practices in summer gingelly

Treatment	Weed population (no/m^2)				WCE (%)	
	Grasses	Sedges	BLW	Total	Grasses	Total
T_1	5.67	2.00	3.00	10.67	86.9	84.5
T_2	4.33	4.67	19.00	28.00	90.00	59.4
T_3	18.67	2.33	12.00	33.00	56.9	52.2
T_4	4.00	5.00	20.00	29.00	90.7	58.0
T_5	21.67	3.67	15.67	41.01	49.9	40.5
T_6	22.00	4.00	16.33	42.33	49.2	38.6
T_7	4.67	4.67	4.33	13.67	89.2	80.2
T_8	43.33	5.33	20.33	68.99		
SED$\pm$	0.65	0.22	1.58			
$CD_{0.05}$	1.34	0.50	2.5			

Table 2. Weed population and WCE as influenced by different weed management practices in summer gingelly

Treatment	Plant height at harvest (cm)	LAI at 60 DAS	Total no of capsules/plant	1000 seed weight (g)	Seed yield (kg/ha)
T_1	97.40	4.20	78.10	3.10	770
T_2	95.25	4.00	76.33	3.06	730
T_3	92.11	3.60	73.67	3.00	676
T_4	95.00	3.82	76.00	3.06	722
T_5	89.97	3.36	71.33	2.96	634
T_6	89.50	3.33	71.67	2.96	630
T_7	94.25	3.96	75.67	3.05	715
T_8	87.00	3.10	69.50	2.85	562
SED±	0.99	0.77	0.17	0.02	17.28
$CD_{0.05}$	2.14	0.20	1.70	0.04	37.3

availability of all the essential nutrients which in turn helped to achieve higher source sink capacity which positively reflected on higher grain yield.

It can be concluded that pre-emergence application of pendimethalin @ 1 kg ai/ha followed by 1 HW at 35 DAS controlled the weeds efficiently for realizing higher seed yield in summer gingelly. Post-emergence application of fenoxaprop-p-ethyl @ 100 g/ha or cyhalofop butyl @ 100 g/ha at 15 DAS followed by 1 HW at 35 DAS recorded the lowest grassy weed density and higher seed yield and was found to be on par with 2 hand weedings at 15 and 35 DAS.

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