Indian J. Weed Sci. **36** (3 & 4) : 239-242 (2004)

Integrated Weed Management in Kharif Sesamum

N. M. Sukhadia, B. B. Ramani, R. K. Mathukia and V. D. Khanpara
Department of Agronomy
Gujarat Agricultural University, Junagadh-362 001 (Gujarat), India

ABSTRACT

Field experiment was carried out on the medium black calcareous soil of Gujarat Agricultural University, Junagadh (Gujarat) during **kharif** seasons of 2000, 2001 and 2002. Four herbicides as sole application and its lower rate integrated with an interculturing were compared with interculture with weeding at 20 DAS, two intercultures with weeding at 20 and 40 DAS, weed-free (weeding at 15, 30, 45 and 60 DAS) and unweeded control. The results revealed that two intercultures with weeding at 20 and 40 DAS proved its superiority over rest of the weed management treatments in sesamum. Among herbicidal treatments, integration of herbicides with an interculturing proved better than their sole application.

INTRODUCTION

Sesamum (*Sesamum indicum* L.) is the second most important **kharif** oilseed crop of Saurashtra region of Gujarat. Yield reduction due to uncontrolled weeds in sesamum was observed to the tune of 55 to 65% (Punia *et al.*, 2001). In general, it is observed that integration of chemical weed control with cultural operations provides timely, easy, efficient and economical weed management than any single method of weed control. Keeping this view in mind, an experiment was carried out to study the effect of integrated weed management in **kharif** sesamum.

MATERIALS AND METHODS

The experiment was carried out during **kharif** seasons of 2000, 2001 and 2002 at Gujarat Agricultural University, Junagadh (Gujarat). The soil of the experimental field was medium black calcareous having pH 7.8 and EC 0.39 dSm^{-1}. It was medium, low and high in available N, P and K, respectively. Sesamum variety 'Gujarat Til-2' was drilled at 3 kg seed ha^{-1} at 45 cm row spacing on July 3, 2000, June 11, 2001 and June 22, 2002. In the respective years, the rainfall during **kharif** season was received 594.8, 848.2 and 540.3 mm with 23, 51 and 22 rainy days, respectively. The crop was grown with recommended package of practices, except weed management. Twelve treatments comprising interculture with weeding once (20 DAS), two intercultures with weeding (20 and 40 DAS), pendimethalin at 0.9 kg ha^{-1}, fluchloralin at 0.9 kg ha^{-1}, alachlor at 1.0 kg ha^{-1}, butachlor at 1.25 kg ha^{-1} and integration each of pendimethalin at 0.3 kg ha^{-1}, fluchloralin at 0.3 kg ha^{-1}, alachlor at 0.5 kg ha^{-1} and butachlor at 0.416 kg ha^{-1} with an interculturing at 20 DAS, weed-free (weeding at 15, 30, 45 and 60 DAS) and unweeded control were tried in a randomized block design with three replications. Interculturing operation was carried out in inter row space through bullock drawn implement simultaneous removal of weeds manually in intra row space. All the herbicides were applied on the next day of sowing with a manually operated knapsack sprayer fitted with flood jet nozzle at a spray volume of 500 l ha^{-1}. Weed counts were recorded at 60 DAS and were subjected to $\sqrt{x+0.5}$ transformation, while dry weight of weeds was recorded at harvest.

RESULTS AND DISCUSSION

Effect on Weeds

The weed flora of the experimental site constituted of *Digera arvensis* (37%), *Leucas*

Table 1. Effect of different weed management treatments on weeds in sesamum (Pooled over three seasons)

Treatment	Dose (g ha^{-1})	Density (No. m^{-2})					
		D. arvensis	*L. aspera*	*E. villosus*	*D. aegyptium*	*C. rotundus*	Total
Interculture with weeding	-	2.12	2.15	4.15	1.47	1.72	6.99
once (20 DAS)		(5)	(6)	(24)	(2)	(5)	(56)
Two intercultures with weeding	-	1.28	0.83	3.30	0.71	2.28	5.29
(20 and 40 DAS)		(2)	(0)	(13)	(0)	(10)	(31)
Pendimethalin	900	5.18	2.22	1.34	0.83	3.23	8.11
		(30)	(6)	(2)	(0)	(17)	(68)
Pendimethalin+IC	300	3.74	2.43	1.65	0.71	2.73	6.82
		(18)	(6)	(4)	(0)	(12)	(50)
Fluchloralin	900	5.46	3.03	1.28	1.13	2.18	8.84
		(39)	(9)	(2)	(2)	(7)	(81)
Fluchloralin+IC	300	3.47	1.94	2.10	1.15	2.01	6.72
		(19)	(4)	(9)	(2)	(7)	(48)
Alachlor	1000	5.87	2.85	2.28	2.25	3.54	10.45
		(44)	(10)	(9)	(9)	(22)	(112)
Alachlor+IC	500	3.97	1.57	3.20	1.74	2.14	7.24
		(20)	(3)	(16)	(4)	(9)	(60)
Butachlor	1250	6.27	2.12	1.71	1.20	3.65	9.46
		(48)	(5)	(4)	(2)	(21)	(93)
Butachlor+IC	416	3.89	1.71	2.38	1.20	1.95	6.22
		(18)	(4)	(8)	(2)	(6)	(44)
Weed-free (weeding at 15,	-	0.91	0.71	1.71	0.83	1.97	3.19
30, 45 and 60 DAS)		(1)	(0)	(3)	(0)	(5)	(10)
Weedy	-	6.69	2.70	4.69	2.55	2.31	12.05
		(55)	(8)	(35)	(13)	(9)	(151)
LSD (P=0.05)	-	2.11	0.99	NS	NS	NS	2.25

The data were subjected to $\sqrt{x+0.5}$ transformation and values in parentheses are original.

aspera (5%), *Indigofera glandulosa* (5%), *Phyllanthus niruri* (2%), *Eluropus villosus* (24%), *Dactyloctenium aegyptium* (8%), *Echinochloa colona* (6%), *Cyperus rotundus* (6%) and other weed species (7%).

Interculture with weeding once, two intercultures with weeding at 20 and 40 DAS, weed-free and integration of herbicides with an interculturing reduced the density of *D. arvensis* significantly over unweeded control (Table 1). Herbicides alone could not cause such reduction. Two intercultures with hand weeding (20 and 40 DAS) and weed-free caused significant reduction in density of *L. aspera*, while rest of the treatments failed in this respect. All the treatments significantly reduced the density of *E. villosus*, except one interculture and weeding at 20 DAS, alachlor 0.5 kg ha^{-1}+IC and butachlor 0.416 kg ha^{-1}+IC. Except

Table 2. Effect of different treatments on weed dry matter, sesamum and net returns (Pooled over three seasons)

Treatment	Dose (g ha^{-1})	Dry weight of weeds (kg ha^{-1})	Number of branches $plant^{-1}$	Number of siliquae $plant^{-1}$	Seed yield (kg ha^{-1})	Stalk yield (kg ha^{-1})	Net returns (Rs. ha^{-1})
Interculture with weeding once (20 DAS)	-	1426	2.5	30.7	309	1197	2712
Two intercultures with weeding (20 and 40 DAS)	-	148	2.8	40.0	421	1340	3193
Pendimethalin	900	4502	1.2	11.5	95	528	534
Pendimethalin+IC	300	2660	1.5	12.3	199	982	1494
Fluchloralin	900	5004	1.5	13.5	127	665	1500
Fluchloralin+IC	300	3040	1.8	16.8	213	1060	2023
Alachlor	1000	4259	1.5	12.3	139	787	1963
Alachlor+IC	500	2904	1.7	13.4	204	1003	1610
Butachlor	1250	4634	1.7	12.9	112	652	1470
Butachlor+IC	416	2881	1.8	19.8	227	1049	2444
Weed-free (weeding at 15, 30, 45 and 60 DAS)	-	91	2.6	32.1	370	1150	1877
Weedy	-	5846	1.1	8.0	87	536	1815
LSD (P=0.05)	-	1748	0.5	9.3	85	408	-

alachlor 1.0 kg ha^{-1}, all the treatments caused significant reduction in total weed density. Integration of herbicides with an interculturing recorded lower total weed density as compared to their application alone.

All the treatments recorded lower dry weight of weeds as compared to unweeded control (Table 2). Two intercultures with weeding at 20 and 40 DAS and interculture with weeding once recorded similar dry weight to that of weed-free plots. Integration of herbicides with an interculturing recorded significantly lower dry weight of weeds over unweeded control, while sole application of all the herbicides remained at par with unweeded control.

Effect on Crop

All the treatments recorded higher branches and siliqua $plant^{-1}$ which resulted in higher seed yield over unweeded control (Table 2). Significantly more branches and siliquae $plant^{-1}$ as well as seed and stalk yields were recorded due to two intercultures with weeding at 20 and 40 DAS, weed-free and interculture with weeding once over unweeded control. These three treatments recorded 384, 325 and 255% higher seed yield and 150, 123 and 115% higher stalk yield over unweeded control. The higher yield under two intercultures with weeding at 20 and 40 DAS might be due to good aeration in rhizosphere owing to interculturing operations as compared to hand weeded weed-free plots. Integration of an interculturing with herbicides

produced higher seed and stalk yields over its sole application. This is in conformation with the findings of Punia *et al.* (2001). Among different treatments, two intercultures with weeding at 20 and 40 DAS recorded the highest net returns of Rs. 3193 ha^{-1} and followed by interculture with weeding once (Rs. 2713 ha^{-1}) and butachlor at 0.416 kg ha^{-1}+IC (Rs. 2444 ha^{-1}).

REFERENCE

Punia, S. S., M. Raj, A. Yadav and R. K. Malik, 2001. Bioefficacy of dinitroaniline herbicides against weeds in sesame *(Sesamum indicum* L.). *Indian J. Weed Sci.* **33** : 143-146.