

Integrated Weed Management in Coriander

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ABSTRACT

Integration of fluchloralin, pendimethalin, trifluralin and oxyfluorfen with one hand weeding at 30 days after sowing proved effective in reducing total weed density and dry weight of weeds as well as density of *Digera arvensis* and *Eluopus villosus*. Fluchloralin at 600 g ha⁻¹+1 HW at 30 DAS and oxyfluorfen at 80 g ha⁻¹+1 HW at 30 DAS produced seed yield at par with weed-free and also emerged out as economical weed management practice.

INTRODUCTION

In Saurashtra region of Gujarat state, irrigation facilities are very meagre. The major source of irrigation is lift irrigation through wells due to non-availability of major irrigation projects. Coriander is remunerative and short duration crop cultivated in **rabi** season. The low productivity of coriander in India can be ascribed to lack of improved agronomic practices. Among these, weed management is the most important one. Uncontrolled weeds reduced the coriander yield by 82% as compared to oxadiazon at 0.5 kg ha⁻¹ under middle Gujarat conditions. The conventional method of weed control i. e. hand weeding is very laborious, expensive and inefficient particularly due to narrow row spacing of the crop. Now-a-days, integrated weed management is the most efficient and acceptable approach to combat with the weed problems. Scientific information on integrated weed management in this crop is meagre for this region. Hence, an experiment on integrated weed management in coriander crop was carried out.

MATERIALS AND METHODS

A field experiment was conducted during winter seasons of 2000-01 to 2003-04 at Junagadh Agricultural University, Junagadh (Gujarat). The soil of the experimental field was medium black calcareous with pH 7.8 and EC 0.39 dSm⁻¹. In respect of availability of N, P and K, it was low, medium and

high, respectively. Total 12 treatments (Table 1) were assigned in randomized block design with three replications. The coriander var. Gujarat Coriander-1 was sown at 30 cm row spacing at 20 kg seed ha⁻¹ on November 8, 6, 1 and 13 and harvested on February 5, 23, 8 and 13 in the respective years. Fluchloralin was sprayed before sowing as pre-plant incorporation, whereas trifluralin, pendimethalin and oxyfluorfen were sprayed next day of sowing at spray volume of 500 l ha⁻¹. Spraying was done by manually operated knapsack sprayer using flood jet nozzle. Follow up weeding after herbicide application as per treatment was done 30 days after sowing. The crop was grown with standard package of practices for the region.

RESULTS AND DISCUSSION

Effect on Weeds

The weed flora of experimental site comprised *Cyperus rotundus* (33%), *Digera arvensis* (32%), *Eluopus villosus* (19%), *Dactyloctenium aegyptium* (4%) and other weed species (12%).

The density of *D. arvensis*, *E. villosus* and total weed density were significantly influenced due to different treatments (Table 1). However, effect on *C. rotundus* was non-significant. Integration of herbicides with one hand weeding (30 DAS) proved effective in reducing total weed density as well as density of *D. arvensis* and remained equivalent to

Table 1. Effect of treatments on weeds in coriander (Pooled over four years)

Treatment	Dose (g ha ⁻¹)	Density (No. m ⁻²)			Total weed density (No. m ⁻²)	Dry weight of weeds (g m ⁻²)
		<i>D.</i> <i>arvensis</i>	<i>E.</i> <i>villosus</i>	<i>C.</i> <i>rotundus</i>		
Fluchloralin	900	6.63 (25)	1.92 (3)	6.41 (39)	7.19 (75)	59.6
Fluchloralin fb HW 30 DAS	600	1.42 (1)	0.71 (0)	5.21 (19)	3.72 (22)	7.3
Trifluralin	750	7.88 (31)	2.82 (6)	8.35 (50)	8.79 (94)	64.6
Trifluralin fb HW 30 DAS	500	2.69 (3)	2.29 (3)	7.53 (33)	5.68 (42)	22.4
Pendimethalin	900	8.18 (31)	0.71 (0)	6.90 (44)	7.77 (82)	41.8
Pendimethalin fb HW 30 DAS	600	1.74 (1)	0.71 (0)	4.94 (14)	3.46 (15)	5.5
Oxyfluorfen	120	3.49 (6)	2.61 (3)	6.75 (47)	6.60 (64)	70.0
Oxyfluorfen fb HW 30 DAS	80	1.64 (1)	1.89 (3)	6.56 (39)	4.64 (41)	10.7
1 HW (15 DAS)	-	3.81 (6)	6.30 (19)	4.29 (14)	6.41 (45)	26.9
2 HW(15 & 30 DAS)	-	1.42 (1)	4.83 (14)	4.98 (19)	5.13 (34)	15.5
Weed-free	-	0.71 (0)	4.39 (11)	3.71 (11)	4.27 (21)	3.7
Unweeded	-	8.57 (36)	6.31 (22)	6.05 (39)	10.37 (117)	86.5
LSD (P=0.05)	-	3.44	3.01	NS	3.49	35.2

NS-Not Significant.

weed-free and two hand weedings done 15 and 30 DAS. Sole herbicides, except fluchloralin 900 g ha⁻¹ proved ineffective in reducing total weed density and density of *D. arvensis* and remained at par with unweeded control. For the control of *E. villosus*, all the herbicidal treatments either sole or integrated with one hand weeding proved significantly superior over unweeded control as well as other cultural practices tested in the experiment. Integration of all the herbicides with one hand weeding and treatment of one HW and two HW restricted the dry weight of weeds significantly over unweeded control and remained at par with weed-free. On the other hand, sole herbicidal treatments proved ineffective in checking dry weed weight and remained at par with unweeded control. Integration of pendimethalin at 600 g ha⁻¹, fluchloralin at 600 g ha⁻¹, oxyfluorfen at 80 g ha⁻¹ and trifluralin at 500 g ha⁻¹ recorded higher weed control efficiency of 93.6, 91.6, 87.6 and 74.1%,

respectively. Integrated treatments also recorded lower weed index as compared to sole herbicides, 1 HW, 2 HW as well as unweeded control.

Effect on Crop

Plant height was not significantly affected due to different treatments (Table 2). All the treatments recorded significantly higher number of branches and umbels per plant over unweeded control and the maximum values were recorded under weed-free. However, trifluralin at 750 g ha⁻¹ in case of number of branches and both the treatments of trifluralin and pendimethalin at 900 g ha⁻¹ in case of number of umbels per plant remained at par with unweeded control. Positive effect of these yield attributes resulted in significantly higher seed yield under weed-free, fluchloralin at 600 g ha⁻¹+1 HW at 30 DAS,

Table 2. Effect of treatments on yield attributes, yield and economics in coriander (Pooled over four years)

Treatment	Dose (g ha ⁻¹)	Plant height (cm)	No. of branches/ plant	No. of umbels/ plant	Seed yield (kg ha ⁻¹)	Stover yield (kg ha ⁻¹)	Net returns (Rs. ha ⁻¹)
Fluchloralin	900	58.4	7.4	11.9	950	1592	15710
Fluchloralin fb HW 30 DAS	600	58.4	7.8	12.2	1139	1669	16340
Trifluralin	750	57.2	6.6	9.0	893	1600	14972
Trifluralin fb HW 30 DAS	500	63.3	7.1	9.5	1041	1528	14302
Pendimethalin	900	62.3	7.7	10.0	934	1663	15209
Pendimethalin fb HW 30 DAS	600	64.6	8.4	11.7	991	1566	14419
Oxyfluorfen	120	59.0	7.6	11.2	861	1557	14069
Oxyfluorfen fb HW 30 DAS	80	60.8	7.8	11.3	1098	1850	16034
1 HW (15 DAS)	-	55.2	7.9	10.8	935	1685	13786
2 HW (15 & 30 DAS)	-	63.7	8.1	11.2	969	1736	12419
Weed-free	-	58.3	8.9	14.0	1250	1778	16358
Unweeded	-	57.1	4.8	7.2	697	1481	12446
LSD (P=0.05)	-	NS	1.9	3.4	228	NS	-

NS--Not Significant.

oxyfluorfen at 80 g ha⁻¹+1 HW at 30 DAS and trifluralin at 500 g ha⁻¹+1 HW at 30 DAS over unweeded control. The magnitude of increase in seed yield over unweeded control under above mentioned treatments was 79, 63, 58 and 49%,

respectively. Effect of different treatments was non-significant on stover yield. The maximum net return was accrued under weed-free closely followed by fluchloralin at 600 g ha⁻¹+1 HW and oxyfluorfen at 80 g ha⁻¹ pre-emergence+1 HW.