

Integrated Weed Management in Indian Mustard

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ABSTRACT

One hand weeding supplemented with thiozopyr at 120 or 150 g ha⁻¹ being statistically at par with two hand weedings (20 and 40 DAS) reduced the dry weight of weeds to the extent of 90% and resulted in seed yield of mustard statistically equivalent to weed-free plots. Chlorimuron caused 92-98% crop injury. Weeds growing throughout the crop season resulted in 24.7% reduction in seed yield of mustard.

INTRODUCTION

Inspite of substantial increase in the productivity, there is a high degree of fluctuation in the annual production of oilseeds owing to cultivation predominantly under low and uncertain rainfall and inputs starved conditions coupled with poor crop management nullify the advantage of fertilizer, irrigation and improved varieties in Indian mustard. Yield losses due to crop-weed competition in rapeseed and mustard have been estimated to the tune of 10-30% (Gill *et al.*, 1989; Bhan, 1992) and upto 58% (Banga and Yadav, 2001). Manual weeding at 3-4 weeks after sowing is the most common practice to control weeds in Indian mustard. But increasing wages and scarcity of labour compel to search for other alternative methods of weed management. Since herbicides either alone or in combination with manual weeding may serve the purpose, various chemicals in the present study were evaluated against complex weed flora in this valuable crop.

MATERIALS AND METHODS

Field experiment was conducted during 1999-2000 and 2000-01 at Research Farm of CCS Haryana Agricultural University, Hisar. The soil of the experimental field was sandy loam in texture, medium in fertility and had a pH of 8.0. The treatment consisting of thiazopyr at 120, 150, 240

and 300 g ha⁻¹ (pre-emergence), trifluralin at 1.0 and 1.25 kg ha⁻¹ (pre-plant incorporation), chlorimuron ethyl at 6 and 8 g ha⁻¹ (20 DAS), manual weeding (20 DAS) immediately followed by thiazopyr at 120 or 150 g ha⁻¹ (20 DAS), linuron at 750 and 1000 g ha⁻¹ (pre-emergence), and two hand weedings (20 and 40 DAS) weedy and weed-free with three replications were laid out in randomized block design. Mustard variety RH-30 was sown on Oct. 18, 1999 and Oct. 21, 2000 at a row spacing of 30 cm. All the herbicides were applied with knapsack sprayer using 500 l water ha⁻¹. The data on the population of individual weeds and their total dry weight were recorded at 60 days after sowing. Crop injury at 20 days after treatment (DAT) was recorded. The data of both the years were subjected to pooled analyses.

RESULTS AND DISCUSSION

Effect on Weeds

The experimental field was predominantly infested with *Asphodelus tenuifolius* (34%), *Chenopodium album* (18%), *Avena ludoviciana* (31%) and *Phalaris minor* (17%). Two hand weedings (20 and 40 DAS) being at par with one hand weeding followed by thiazopyr at 120 or 150 g ha⁻¹ were superior to all herbicidal treatments in reducing the density and dry weight of different weeds (Table 1). Weed control efficiency increased

Table 1. Effect of herbicides on weeds and crop (Pooled for two seasons)

Treatment	Dose (g ha ⁻¹)	Weed density (No. m ⁻²)			Total weed dry weight (g m ⁻²)	Crop injury at 20 DAI (%)	Seed yield (kg ha ⁻¹)	
		<i>A. tenuifolius</i>	<i>C. album</i>	<i>A. ludoviciana</i>				<i>P. minor</i>
Thiazopyr	120	45	16	29	17	136.3	0	1503
Thiazopyr	150	42	12	30	14	124.1	5	1541
Thiazopyr	240	41	9	23	13	98.7	9	1624
Thiazopyr	300	34	4	17	9	85.3	12	1686
Trifluralin	1000	36	4	27	9	94.2	0	1642
Trifluralin	1250	33	3	16	8	71.8	0	1728
Chlorimuron ethyl	6	35	6	18	10	55.3	92	78
Chlorimuron ethyl	8	32	4	12	7	40.8	98	43
HW (20 DAS) fb thiazopyr (20 DAS)	120	4	5	5	5	12.9	0	1942
HW (20 DAS) fb thiazopyr (20 DAS)	150	5	3	5	5	13.1	0	1894
Linuron	750	46	17	31	16	127.2	0	1387
Linuron	1000	43	12	33	14	111.7	0	1436
Weedings	-	2	2	4	4	13.4	0	1993
Weedy	-	43	23	39	22	141.8	0	1478
Weed-free	-	-	-	-	-	-	-	1962
LSD (P=0.05)	-	4	2	3	2	9.4	-	118

with the corresponding increase in the dose of each herbicide, however, it was below 70% when any of the herbicides was applied alone. One hand weeding followed by thiazopyr at both doses was similar to two hand weedings and reduced the dry weight of weeds to the extent of 90%. Among different weeds, *A. tenuifolius* was effectively controlled (90%) by hand weeding followed by thiazopyr at 120 or 150 g ha⁻¹ but not by thiazopyr, trifluralin, linuron and chlorimuron applied alone. Similarly, the treatment of hand weeding immediately followed by thiazopyr at 120 or 150 g ha⁻¹ controlled *A. ludoviciana* and *P. minor* to the extent of 87 and 77%, respectively. Thiazopyr, trifluralin, linuron and chlorimuron did not provide satisfactory control of these two grassy weeds (Table 1). The density of *C. album*, a broad leaf weed was remarkably reduced (74-87%) by thiazopyr at 300 g ha⁻¹, trifluralin at 1.0 and 1.25 kg ha⁻¹, chlorimuron 6 and 8 g ha⁻¹ and hand weeding followed by thiazopyr at 120 or 150 g ha⁻¹. However, linuron at 750 or 1000 g ha⁻¹ was ineffective against *C. album* also.

Effect on Crop

Chlorimuron at 6 and 8 g ha⁻¹ caused 92 to 98% crop injury and reduced the seed yield compared to all other treatments. Thiazopyr at all doses also

caused 5-12% crop phytotoxicity recorded at 20 days after treatment, but it recovered later on. Among different weed control treatments, one hand weeding supplemented with the application of thiazopyr at 120 or 150 g ha⁻¹ and two hand weedings (20 and 40 DAS) being statistically similar with each other (Table 1) resulted in seed yield of mustard statistically similar to weed-free check (1962 kg ha⁻¹). These treatments were superior to all other herbicidal treatments. Thiazopyr at 120 and 150 g ha⁻¹ and linuron at 750 and 1000 g ha⁻¹ resulted in very poor weed control (WCE 4-21%) and consequently produced seed yield of mustard equivalent to weedy check. Weeds growing throughout the crop season resulted in 24.7% reduction in seed yield of mustard.

REFERENCES

- Banga, R. S. and A. Yadav, 2001. Evaluation of herbicides against complex weed flora in Indian mustard. *Haryana J. Agron.* **17** : 48-51.
- Bhan, V. M. 1992. Weed management—A factor for sustainability in crop production. Proc. XII National Symposium on Resource Management for Sustained Crop Production, held at RAU, Bikaner. pp. 209-216.
- Gill, H. S., K. S. Sandhu, S. P. Mehra and Tarlok Singh, 1989. Efficacy of some herbicides for control of weeds in Indian mustard. *Indian J. Weed Sci.* **16** : 171-175.