

Effect of Carfentrazone-ethyl on Non-grassy Weeds and Wheat Yield

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ABSTRACT

Carfentrazone-ethyl against *Chenopodium album*, *Melilotus alba*, *Melilotus indica*, *Lathyrus aphaca*, *Vicia sativa*, *Medicago denticulata* and *Rumex acetosella*. Its weed control efficiency at 20 g ha⁻¹ ranged from 90.6 to 100%. Carfentrazone at 20 and 25 g ha⁻¹ had better efficacy than 2, 4-D and was comparable with metsulfuron methyl. Total weed dry matter production in 2, 4-D treated plots was higher than that of carfentrazone-ethyl at 15 and 25 g ha⁻¹. The grain yields recorded with carfentrazone-ethyl at 15 and 25 g ha⁻¹ and metsulfuron methyl at 4 g ha⁻¹ were similar to weed-free treatment.

INTRODUCTION

Wheat is being infested by complex weed flora comprising both grassy as well as non-grassy weeds. After development of resistance in *Phalaris minor* against isoproturon in some parts of Haryana and Punjab (Malik and Singh, 1993; Walia *et al.*, 1997), clodinafop-propargyl, fenoxaprop-p-ethyl and sulfosulfuron are presently being used for its resistant biotypes. Clodinafop and fenoxaprop are ineffective in all non-grassy weeds resulting in build of broad leaf weeds in wheat fields treated with these herbicides. 2, 4-D provides good control of some of the non-grassy weeds but causes malformed spikes in many wheat cultivars (Balyan and Panwar, 1997). The weeds like *Melilotus indica*, *Medicago denticulata* and *Lathyrus aphaca* are not controlled effectively by 2, 4-D. Hence, there is an urgent need to evaluate new herbicides for the control of non-grassy weeds in wheat field which may provide wider weed control spectrum. Keeping these points in view, the present investigation was undertaken to study the performance of carfentrazone-ethyl in wheat.

MATERIALS AND METHODS

A field experiment was conducted to study the effect of carfentrazone-ethyl on non-grassy weeds and wheat yield during winter seasons of

2000-01 and 2001-02 at Crop Research Centre of G. B. Pant University of Agriculture & Technology, Pantnagar, U. S. Nagar (Uttaranchal). The soil of experimental field was clay loam, medium in organic carbon (0.7%), available phosphorus (18 kg P ha⁻¹) and potassium (266 kg K ha⁻¹). Experiment with eight treatments and three replications was laid out in randomized block design. Treatments consisted of three doses of carfentrazone-ethyl (15, 20 and 25 g ha⁻¹), 2, 4-D Na salt at 500 g ha⁻¹, metsulfuron methyl at 4 g ha⁻¹, weed-free and weedy (Table 1). Herbicides were sprayed at 400 l ha⁻¹ spray volume using knapsack sprayer fitted with flat fan nozzle at 35 days stage. Wheat variety PBW 343 was sown on December 1, 2000 and November 26, 2001 at 100 kg seed ha⁻¹. Recommended package of practices other than weed control was adopted to grow the experimental crop.

RESULTS AND DISCUSSION

Effect on Weeds

Weed flora of the experimental field consisted of *Chenopodium album*, *Melilotus alba*, *Melilotus indica*, *Lathyrus aphaca*, *Vicia sativa*, *Medicago denticulata* and *Rumex acetosella*. Weed control efficacy of the treatments was worked out on the basis of density recorded at 60 days stage of the crop (Table 1). There was almost complete control

Table 1. Effect of carfentrazone-ethyl on weeds in wheat (Mean of two crop seasons)

Treatment	Dose (g ha ⁻¹)	Weed control efficiency (%) 60 DAS						
		<i>C. album</i>	<i>M. alba</i>	<i>M. indica</i>	<i>L. aphaca</i>	<i>V. sativa</i>	<i>M. denticulata</i>	<i>R. acetosella</i>
2, 4-D	500	95.5	96.4	8.9	9.3	51.6	10.1	100.0
MSM	4	100.0	94.1	95.0	96.4	96.4	98.4	88.3
Carfentrazone	15	21.4	26.4	19.4	23.4	62.2	50.9	96.9
Carfentrazone	20	100.0	94.4	91.7	95.9	98.8	91.6	99.2
Carfentrazone	25	100.0	100.0	100.0	100.0	100.0	97.0	100.0
Carfentrazone+2, 4-D	10+125	91.4	26.1	22.0	22.6	51.4	13.4	95.9
Weed-free	-	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Weedy	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MSM–Metsulfuron-methyl.

Table 2. Effect of carfentrazone-ethyl on total weed dry matter production and grain yield of wheat

Treatment	Dose (g ha ⁻¹)	Total weed dry matter (g m ²) 60 DAS			Wheat grain yield (kg ha ⁻¹)		
		2001	2002	Mean	2001	2002	Mean
2, 4-D	500	36.2	41.7	40.0	4595	4385	4490
MSM	4	3.8	4.1	4.0	5320	5450	5385
Carfentrazone	15	51.6	56.0	53.8	4125	4050	4088
Carfentrazone	20	4.5	3.2	3.9	5250	5385	5318
Carfentrazone	25	1.2	1.4	1.3	5165	5270	5218
Carfentrazone+2, 4-D	10+125	45.8	47.2	46.5	4385	4250	4318
Weed-free	-	0.0	0.0	0.0	5160	5350	5255
Weedy	-	151.7	161.3	156.5	3235	3050	3143
LSD (P=0.05)		-	-	-	516	428	-

MSM–Metsulfuron-methyl.

of non-grassy weed species present in the experimental field due to carfentrazone-ethyl at 25 g ha⁻¹. The weed control efficiency of this herbicide at 20 g ha⁻¹ on various weeds ranged from 90.6 to 100%. The efficacy was reduced at 15 g ha⁻¹. Carfentrazone at 20 and 25 g ha⁻¹ had better efficacy than 2, 4-D. Carfentrazone at higher doses was comparable with metsulfuron methyl with respect to weed control spectrum and efficacy. The pre-mix formulation of carfentrazone-ethyl and 2, 4-D (10+125 g ha⁻¹) was not very effective on various weeds except *C. album*. The total weed dry matter production recorded in 2, 4-D treated plots was higher than that of carfentrazone-ethyl at 20 and 25 g ha⁻¹ (Table 2).

Effect on Crop

Uncontrolled weeds resulted in 40.2% reduction in the grain yield of wheat (Table 2). All the treatments

yielded significantly higher than the weedy check. The grain yields recorded with carfentrazone at 20 and 25 g ha⁻¹ were similar to weed-free treatment. There was significantly less wheat yield due to carfentrazone at 15 g ha⁻¹ than the metsulfuron methyl and higher doses of carfentrazone-ethyl. No spike malformation was observed in 2, 4-D and metsulfuron methyl treated wheat crop.

REFERENCES

- Balyan, R. S. and R. S. Panwar, 1997. Herbicidal control of broad leaf weeds in wheat. *Haryana J. Agron.* **13** : 33-38.
- Malik, R. K. and S. Singh, 1993. Evolving strategies for herbicide use in wheat : Resistance and integrated weed management. In : Proc. Int. Symp. on Integrated Weed Management for Sustainable Agriculture. Indian Soc. of Weed Sci., Hisar, India, November 18-20, Vol. **1** : 225-228.
- Walia, U. S., L. S. Brar and B. K. Dhaliwal, 1997. Resistance to isoproturon in *P. minor* in Punjab. *Plant Protection Quarterly* **12** : 138-140.