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Bio-efficacy of Metribuzin and Prometryn in Wheat

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ABSTRACT

Metribuzin (200, 250 and 300 g ha^{-1}) provided effective control of *P. minor* and other weeds in wheat. Its higher doses were phytotoxic to wheat. The lower dose was also phytotoxic but at lower degree. Prometryn had poor weed control and high phytotoxicity on wheat. None of the doses of metribuzin yielded at par with isoproturon at 1.0 kg ha^{-1}, sulfosulfuron at 25 g ha^{-1} and weed-free.

INTRODUCTION

Phalaris minor is a dominating weed for the wheat crop particularly in rice-wheat cropping system due to favourable ecological conditions created by this system. Isoproturon is being used successfully since 1982 for control of *P. minor,* which has been most effective, economical and safe herbicide in wheat crop. However, continuous use of isoproturon has resulted in development of resistant bio-types of *P. minor* in Haryana and Punjab (Malik and Singh, 1993; Walia *et al.*, 1997). This calls for use of other broad spectrum herbicides for its management to avoid perceptible change in the weed flora. Therefore, the present investigation was undertaken to find out the bio-efficacy of metribuzin and prometryn in wheat.

MATERIALS AND METHODS

A field experiment was conducted to study the effect of various doses of metribuzin (70 WP) and prometryn (50 WP) on wheat and associated weeds during winter seasons of 2001-02 and 2002-03 at the 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}). The treatments consisted of three doses of each metribuzin (200, 250 and 300 g ha^{-1}) and prometryn (1.0, 1.5 and 2.0 kg ha^{-1}), isoproturon (1.0 kg ha^{-1}), sulfosulfuron (25 g ha^{-1}), weed-free and weedy (Table 1). Experiment with 10 treatments, replicated thrice, was laid out in randomized block design. Herbicides were applied at spray volume of 400 l ha^{-1} using flat fan nozzle at 35 days stage of the crop. Wheat variety UP 2338 was sown on December 6, 2001 and November 20, 2002 at 100 kg seed ha^{-1} at a row spacing of 20 cm. The crop was raised by adopting recommended package of practices.

RESULTS AND DISCUSSION

Effect on Weeds

Phalaris minor was the major weed in the experimental field with a density of 568 m^{-2} recorded at 30 days stage of the crop. The other weeds observed were *Chenopodium album, Melilotus alba, M. indica, Fumaria parviflora, Lathyrus aphaca* and *Medicago denticulata*. The density of *P. minor* as well as of other weeds was reduced due to application of all the herbicides (Table 1). Metribuzin at all the doses was highly effective in reducing the density of *P. minor,* other weeds and their dry matter production. There was almost complete control of *P. minor* at all the doses. Prometryn also caused reduction in the density of weeds and their dry matter production but its weed control efficacy was much less than other herbicides.

Table 1. Effect of treatments on weeds in wheat (Mean of two crop seasons)

Treatment	Dose (g ha^{-1})	Weed density (No. m^{-2}) 90 DAS		Weed dry weight (g m^{-2}) 90 DAS	
		P. minor	Total	*P. minor*	Total
Metribuzin	200	1	5	0.4	2.7
Metribuzin	250	0	2	0.0	1.0
Metribuzin	300	0	0	0.0	0.0
Prometryn	1000	60	77	218.9	269.0
Prometryn	1500	45	68	212.6	231.75
Prometryn	2000	17	49	77.9	94.0
Isoproturon	1000	2	9	1.1	10.0
Sulfosulfuron	25	3	7	1.0	7.1
Weed-free	-	0	0	0.0	0.0
Weedy	-	353	370	354.5	411.5
LSD (P=0.05)		-	-	25.7	18.2

Table 2. Effect of treatments on wheat crop

Treatment	Dose (g ha^{-1})	No. of crop shoots (m^{-2}) 90 DAS		No. of spikes (m^{-2})		Grain yield (kg ha^{-1})		
		2001-02	2002-03	2001-02	2002-03	2001-02	2002-03	Mean
Metribuzin	200	290	313	285	292	4096	4152	4124
Metribuzin	250	268	292	245	242	3473	3560	3517
Metribuzin	300	253	275	242	247	2883	2785	2834
Prometryn	1000	148	195	120	128	2607	2805	2706
Prometryn	1500	222	202	200	189	3020	2785	2903
Prometryn	2000	230	203	212	185	2217	2162	2190
Isoproturon	1000	328	347	318	323	4263	4780	4522
Sulfosulfuron	25	368	363	350	353	4405	4885	4645
Weed-free	-	319	363	311	357	4480	4808	4644
Weedy	-	132	178	127	132	1660	1508	1584
LSD (P=0.05)		-	-	-	-	502	498	-

Effect on Crop

The total number of shoots of wheat and also the number of wheat spikes were reduced to a great extent due to metribuzin at 250 and 300 g ha^{-1} because of its phytotoxic effect on wheat crop (Table 2). There was some toxicity of lower degree due to metribuzin at 200 g ha^{-1} also which recovered at later stages. Prometryn at all the doses was toxic to the wheat crop, which resulted in less number of crop shoots and number of wheat spikes.

Weedy condition caused 65.9% reduction in the grain yield of wheat (Table 2). Grain yields of wheat were significantly less due to metribuzin at 250 and 300 g ha^{-1} and at all the doses of prometryn when compared with that of metribuzin at 200 g ha^{-1}, isoproturon at 1.0 kg ha^{-1} and sulfosulfuron at 25 g ha^{-1}. The grain yield obtained due to metribuzin at 200 g ha^{-1} was significantly less than that of isoproturon, sulfosulfuron and weed-free, however, it was at par with isoproturon at 1 kg ha^{-1} during 200-02. The differences in grain yields due to isoproturon, sulfosulfuron and weed-free were non-significant.

REFERENCES

Malik, R. K. and S. Singh, 1993. Evolving strategies for herbicide use in wheat, resistance and integrated weed management. Proc. Int. Symp. Integrated Weed Management and Sustainable Agriculture, CCSHAU, Hisar, India. pp. 225-236.

Walia, U. S., B. K. Dhaliwal and L. S. Brar, 1997. Resistance to isoproturon in *Phalais minor* Retz. in Punjab. *Plant Prot. Quarterly* **12** : 134-140.