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Efficacy of Different Herbicides in Bed Planted Late Sown Wheat

D. K. Shukla and O. P. Mishra
Department of Agronomy
Govind Ballabh Pant University of Agriculture & Technology, Pantnagar-263 145 (Uttaranchal), India

ABSTRACT

Pendimethalin at 1.0 kg ha^{-1} on beds as pre-emergence followed by cultivation in furrows was effective (WCE 62.0%) against grassy and non-grassy weeds resulting in lower total weeds density (35.0 No. m^{-2}) which was statistically at par with sulfosulfuron at 25 g ha^{-1}, tralkoxydim at 350 g ha^{-1} and hand weeding at 30 DAS. Maximum grain yield was obtained in bed planted weed-free plot (3725 kg ha^{-1}) which was at par with pendimethalin at 1.0 kg ha^{-1} on bed as pre-emergence followed by cultivation in furrows, sulfosulfuron at 25 g ha^{-1}, tralkoxydim at 350 g ha^{-1} and clodinafop at 60 g ha^{-1}.

INTRODUCTION

Productivity of irrigated wheat is greatly affected by different weeds under late sown condition. Adoption of rice-wheat rotation coupled with irrigation and fertilizer use provides favourable ecological conditions for the weed growth and development and creates a serious problem in the wheat crop. Wheat fields are generally infested with both grassy and non-grassy weeds. In various wheat growing states of our country, grassy weed especially *Phalaris minor* is causing yield reduction to the level of 30-80% (Brar and Singh, 1997). Isoproturon is being used successfully since 1982 for control of *P. minor* but due to its continuous use *P. minor* has developed resistance against it (Malik and Singh, 1993). This calls for use of other broad-spectrum herbicides for its management to avoid perceptible change in weed flora. Method of crop establishment also plays role in affecting weeds. Therefore, the present investigation was undertaken to find out the efficacy of various herbicides under bed planted late sown wheat.

MATERIALS AND METHODS

Field investigation was conducted during winter seasons of 1999-2000 and 2000-01 at Crop Research Centre of Govind Ballabh Pant University of Agriculture & Technology, Pantnagar, Uttaranchal. The soil of experimental field was silty clay loam in texture, medium in fertility with pH 7.2. Wheat cv. UP 2382 was drilled in three lines on beds with bed planter on December 29, 1999 and December 30, 2000 in a plot size of 6.5 x 3.0 m. Recommended dose of fertilizers 120 : 60 : 60 (N, P_2O_5 and K_2O) and irrigations at critical growth stages were applied uniformly to all treatments. Experiment with 12 treatments viz., isoproturon at 1.0 kg ha^{-1}, pendimethalin at 1.0 kg ha^{-1} on beds only, pendimethalin at 1.0 kg ha^{-1} on beds followed by cultivation in furrows, sulfosulfuron at 25 g ha^{-1}, tralkoxydim at 350 g ha^{-1}, clodinafop at 60 g ha^{-1}, fenoxaprop-p-ethyl at 90 g ha^{-1}, hand weeding at 30 DAS under bed planting and weedy and weed-free for both bed and conventional planting were replicated three times in randomized block design (Table 1). Herbicides were applied with the help of Maruti foot sprayer using 800 litre water per hectare. Pendimetahlin was applied next day of sowing and other herbicides were applied as blanket spray 30 days after sowing.

RESULTS AND DISCUSSION

Effect on Weeds

The experimental field was dominated by *Phalaris minor* (37.8%), *Coronopus didymus* (13.2%), *Chenopodium album* (13.2%) and *Melilotus*

Table 1. Effect of different herbicides on weeds at 60 DAS in wheat (Average of two crop seasons)

Treatment	Dose (g ha^{-1})	Weed density (No. m^{-2})				
		P. minor	*C. didymus*	*C. album*	*M. indica*	Total
Bed planting						
Isoproturon	1000	9 (2.34)	8 (2.17)	23 (3.21)	0 (0.00)	91 (4.53)
Pendimethalin on beds	1000	25 (3.29)	2 (1.34)	11 (2.53)	14 (2.72)	100 (4.63)
Pendimethalin on beds followed by cultivation in furrows	1000	5 (1.75)	2 (1.35)	1 (1.16)	0 (0.00)	35 (3.59)
Sulfosulfuron	25	27 (3.36)	4 (1.67)	0 (0.00)	6 (1.95)	47 (3.88)
Tralkoxydim	350	8 (2.17)	11 (2.53)	9 (2.29)	14 (2.72)	62 (4.15)
Clodinafop	60	2 (1.43)	6 (1.95)	25 (3.29)	21 (3.13)	110 (4.74)
Fenoxaprop-p-ethyl	90	5 (1.75)	10 (2.44)	16 (2.87)	9 (2.34)	92 (4.54)
Hand weeding at 30 DAS	-	5 (1.75)	0 (0.00)	0 (0.00)	24 (3.23)	57 (4.07)
Weedy	-	51 (3.96)	26 (3.31)	17 (2.93)	33 (3.55)	198 (5.30)
Weed-free	-	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Conventional planting						
Weedy	-	80 (4.40)	28 (3.38)	28 (3.38)	38 (3.69)	211 (5.36)
Weed-free	-	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
LSD (P=0.05)	-	0.62	0.43	0.30	0.38	0.70

Table 2. Effect of herbicides on weed control efficiency and grain yield of wheat

Treatment	Dose (g ha^{-1})	Weed control efficiency (%) 60 DAS			Grain yield (kg ha^{-1})		
		1999-2000	2000-01	Mean	1999-2000	2000-01	Mean
Bed planting							
Isoproturon	1000	54.9	46.2	50.5	3470	2910	3190
Pendimethalin on beds	1000	52.4	41.6	47.0	3546	2790	3168
Pendimethalin on beds followed by cultivation in furrows	1000	68.2	55.9	62.05	3955	3363	3659
Sulfosulfuron	25	66.7	53.5	60.1	3788	3436	3612
Tralkoxydim	350	55.4	48.9	52.2	3864	2970	3417
Clodinafop	60	42.4	50.1	46.3	3636	3000	3318
Fenoxaprop-p-ethyl	90	47.4	44.6	46.0	3485	2606	3045
Hand weeding 30 DAS	-	49.1	47.2	48.15	3364	2820	3092
Weedy	-	0.0	0.0	-	2788	2565	2676
Weed-free	-	100.0	100.0	100.0	3957	3493	3725
Conventional planting							
Weedy	-	0.0	0.0	-	3303	2576	2939
Weed-free	-	100.0	100.0	100.0	3706	3243	3474
LSD (P=0.05)	-	-	-	-	508	564	-

indica (18.2%).The density of these total weeds was higher in conventionally sown wheat than in bed planted wheat (Table 1). Application of all herbicides on beds reduced the population of *P. minor* and *C. didymus*, except isoproturon at 1.0 kg ha^{-1}, and clodinafop at 60 g ha^{-1} was ineffective against *C. album*. Among the herbicides, pendimethalin at 1.0 kg ha^{-1} followed by cultivation in furrows recorded minimum total weed density (35 No. m^{-2}) but the difference was non-significant with sulfosulfuron at 25 g ha^{-1} and tralkoxydim at 350 g ha^{-1} and hand weeding 30 DAS (Table 1). Weed control efficiency was recorded maximum (62%) when pendimethalin was applied at 1.0 kg ha^{-1} on beds followed by cultivation in furrows as compared with other herbicides (Table 2). Similar results were also reported by Balyan (1999).

Effect on Crop

Highest wheat grain yield (3725 kg ha^{-1}) was obtained in bed planted weed-free plot, which was at par with conventional planted weed-free plot (Table 2). Pendimethalin at 1.0 kg ha^{-1} on bed followed by cultivation in furrows, sulfosulfuron at 25 g ha^{-1}, tralkoxydim at 350 g ha^{-1} and clodinafop at 60 g ha^{-1} produced statistically similar yield to bed planted weed-free treatment. This may be due to more value of yield attributing characters and less infestation of weed in bed planting as compared to conventional planting. In general, bed planted weed-free plot recorded more grain yield (7%) than conventional planted weed-free plot. In weedy plot, the grain yield reduced comparatively more under bed planted (28.0%) than conventionally planted (15.0%) wheat.

REFERENCES

Balyan, R. S. 1999. Efficacy of sulfosulfuron, tralkoxydim and metribuzin applied alone and tankmixed on weeds in wheat. *Indian J. Weed Sci.* **31** : 80-83.

Brar, L. S. and S. Singh, 1997. Efficacy of diclofop-methyl against isoproturon resistance *Phalaris minor* in relation to wheat cultivar and spacing. *Proc. Brighton Crop Protection Conf. – Weeds* **1** : 331-336.

Malik R. K. and Samunder Singh, 1993. Evolving strategies for herbicide use in wheat. Resistance and integrated weed management. Proc. International Symposium on Integrated Weed Management for Sustainable Agriculture, CCS Harayana Agricultural University, Hisar, Haryana, India, 18-20 November.