

Relative Efficacy of Herbicides in Wheat

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India ranks second next to China in global wheat production. Presently wheat accounts for one third of India's total food grain production. The adoption of fertilizer responsive, high-yielding dwarf wheat varieties suffered a setback owing to their poor ability to compete with grassy weeds particularly *Phalaris minor* and wild oats. Wheat fields are generally infested with both grassy as well as broadleaf weeds and cause yield loss of 7-50% depending upon the type and their intensity (Gill, 1979). Isoproturon is a commonly used herbicide for the control of grassy weeds and 2, 4-D is effective against broadleaf weeds. However, their continuous use has either resulted in shift of weed flora towards resistant species or emergence of resistant strains in some species (Yadav *et al.*, 1996). This calls for the use of other broad spectrum herbicides either independently or in combination with isoproturon for the management of complex weed flora to avoid perceptible weed flora. Therefore, the present investigation was undertaken to find out the efficacy of some broad spectrum herbicides alone or in combination with isoproturon for control of grassy and non-grassy weeds in wheat.

Field experiment was conducted during winter seasons of 2003-04 and 2004-05 at Regional Research Sub-station, Chakdaha of Bidhan Chandra Krishi Viswavidyalaya, Nadia, West Bengal. The soil of the experimental plot was sandy clay loam in texture having 46.5% sand, 25.0% silt and 28.5% clay, medium in organic carbon (0.68%), low in available phosphorus (16.0 kg ha⁻¹) and potassium (126.00 kg ha⁻¹). Experiment with 11 treatments replicated three times was laid out in a randomized block design. The herbicides evaluated were isoproturon at various doses, metsulfuron-methyl alone and in combination with isoproturon,

clodinafop and sulfosulfuron (Table 1). Herbicides were applied as spray at 30 and 35 days after sowing of crop at spray volume of 500 l ha⁻¹. Wheat variety UP 262 was sown on November 21, 2003 and November 25, 2004 with the help of a seed drill at a row spacing of 20 cm at 100 kg seed ha⁻¹. Recommended package of practices other than weed control was adopted to grow the experimental crop.

Weed flora of the experimental field consisted of *Phalaris minor* (50%), *Chenopodium album* (30%), *Avena fatua* (10%), *Melilotus alba* (5%) and *Anagallis arvensis* (5%). All the treatments significantly reduced the density and dry weight of weeds compared to weedy check. Hand weeding (30 and 45 DAS) gave lowest total weed count and weed dry weight at 60 DAS. Clodinafop (60 g ha⁻¹) applied 30 DAS gave highest weed control efficiency (89.1%). Clodinafop was very effective in reducing density of *P. minor* and *C. album* but not effective against other weeds.

None of the treatments caused any phytotoxic effects on the crop at any stage. On an average, there was more than 60% reduction in the grain yield of wheat in weedy plots when compared with weed-free check (Table 1). Grain yield was higher due to clodinafop at 60 g ha⁻¹ (3048 kg ha⁻¹) with lowest weed index (13.3%). This was the second best treatment after hand weeding.

REFERENCES

- Gill, K. S. 1979. Wheat agronomy of dwarf wheat. Research on dwarf wheat. ICAR, New Delhi.
 Yadav, A., R. S. Balyan, V. K. Garg and R. K. Malik, 1996. Resistance against isoproturon in different biotypes of little seed canary grass. *Test of Agro-chemicals and Cultivars (AAB)* 17 : 34-35.

Table 1. Effect of weed control methods on weeds and crop yield

Treatment	Dose (g ha ⁻¹)	Stage of application (DAS)	Total weed density (No. m ⁻²)						Total weed dry weight (g m ⁻²)						Grain yield (kg ha ⁻¹)	
			2003-04		2004-05		2003-04		2004-05		2003-04		2004-05		2003-04	2004-05
			30	60	30	60	30	60	30	60	30	60	30	60	DAS	DAS
Isoproturon	750	30	52	24	54	25	12.3	07.4	14.1	07.9	1780	1710				
Isoproturon	1000	30	38	20	39	21	10.3	06.0	11.0	07.7	2003	1932				
Metsulfuron-methyl	4	30	82	39	88	38	24.1	10.3	25.5	10.4	1648	1602				
Metsulfuron-methyl	5	30	76	30	75	32	20.0	08.1	19.8	08.8	1830	1854				
Metsulfuron-methyl+Isoproturon	3+750	35	32	17	33	15	07.8	05.1	08.1	04.8	2146	2101				
Metsulfuron-methyl+Isoproturon	4+1000	35	25	12	24	13	06.2	04.1	06.3	04.6	2310	2300				
Clodinafop	60	30	11	05	12	06	03.4	02.1	03.7	02.5	3081	3015				
Sulfosulfuron	25	30	17	09	19	10	05.2	03.9	05.9	04.1	2789	2624				
Hand weeding	-	30 & 45	06	03	07	03	02.4	02.0	02.1	01.8	3134	3182				
Weed-free	-	-	-	-	-	-	-	-	-	-	3502	3531				
Weedy	-	-	101	82	106	80	32.6	22.0	33.1	20.8	1202	1210				
LSD (P=0.05)	-	-	04	03	004	03	01.0	00.4	01.1	00.7	0122	0160				