

Weed management in irrigated wheat (*Triticum aestivum*)

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ABSTRACT

A field experiment conducted for 2 years on sandy-loam soil revealed that application of isoproturon mixed with soil 35 days after sowing was as effective as its spray application and wheat yield recorded was 95.2% to that of the best treatment. Isoproturon + urea had a toxic effect on the crop.

Isoproturon has been recommended for weed control in wheat (*Triticum aestivum* L. emend. Fiori & Paol.) and its spray application has been proved to be very effective against the weeds (Yaduraju and Ahuja, 1990). However, most of the farmers in India do not possess spraying equipments. Therefore it was felt necessary to see the relative efficacy of isoproturon application as dust (isoproturon powder mixed with soil or urea and spread evenly on soil surface after first irrigation) against the normal spray application. Keeping in view, the present experiment was planned and conducted.

MATERIALS AND METHODS

A field experiment was carried out at the IARI, New Delhi, during winter season of 1989–90 and 1990–91. Fifteen treatments of weed-control measures were tried in randomized block design with 4 replications (Table 1).

'HD 2329' wheat was sown on 19 and 28 November of 1989 and 1990, respectively. Half of the nitrogen (60 kg/ha) and full dose of phosphorus (60 kg/ha) and potash (40 kg/ha) were applied at sowing and the remain-

ing nitrogen was applied after first irrigation. The study on weeds was carried out from an area of 0.25 m².

RESULTS AND DISCUSSION

Weed growth

Weed growth in term of number and dry weight was significantly lower under all the weed-control treatments than the control in both the years, except the combination of 2,4-D and dicamba which recorded the dry weight of weeds as high as in the control in the second year and at 110 days in the first year (Table 1). Application of isoproturon (WP) mixed with soil 35 days was quite comparable to its spray application in reducing the weed growth. Yaduraju and Ahuja (1990) observed similar effects on weed growth with the application of isoproturon + soil. Black polythene covering after the first irrigation was also quite effective in checking the weed growth. Weed-control efficiency (WCE) was higher in black polythene covering (42–53%) and hand-weeding (45–59%) treatments respectively both at 75 and 110 days. The WCE in isoproturon-treated plots was also quite comparable particularly at 75 days.

Table 1. Effect of weed-control measures on weed growth infesting wheat

Weed-control-measure	1989-90				1990-91			
	75 DAS		110 DAS		75 DAS		110 DAS*	
	Number	Dry weight (g)	Number	Dry weight (g)	Number	Dry weight (g)	Number	Dry weight (g)
Isoproturon 0.75 kg/ha	2.4	3.8	2.8	5.9	2.2	3.0	2.5	4.8
Isoproturon 0.75 kg/ha powder + soil	2.4	4.0	2.9	5.9	2.5	3.3	2.4	4.8
Isoproturon 1.00 kg/ha powder + soil	2.1	3.7	2.9	5.4	2.5	3.6	3.4	6.0
Isoproturon 0.75 kg/ha powder + urea	2.4	3.8	2.5	3.6	2.6	3.5	2.2	5.1
Isoproturon 1.00 kg/ha powder + urea	3.3	4.6	2.4	3.9	2.7	4.7	2.6	5.7
Pendimethalin 1.00 kg/ha PE	3.0	3.8	3.4	5.3	2.4	4.0	2.7	6.3
2, 4-D 0.4 kg/ha	3.2	4.5	3.2	4.2	3.3	4.1	2.5	6.2
Dicamba 200 ml CP/ha	3.2	4.3	2.9	3.7	2.5	4.2	2.9	6.3
Dicamba 200 ml CP/ha + Isoproturon 0.75 kg/ha	3.2	4.1	2.9	4.0	2.2	3.6	2.6	5.7
2, 4-D 20 kg/ha + Dicamba 100 ml CP/ha	3.6	5.2	2.7	6.2	3.3	5.5	3.1	7.7
Fluroxypyr 0.10 kg/ha + Isoproturon 0.50 kg/ha	2.6	4.0	3.1	5.4	2.3	3.8	2.6	5.4
Black polythene cover	2.3	2.2	2.9	4.9	2.3	3.8	3.5	4.2
Hand-weeding	2.2	2.6	2.9	5.1	2.4	2.6	2.3	3.5
Unweeded check	4.7	6.4	4.1	8.4	4.2	6.3	4.2	7.2
CD (P = 0.05)	0.72	0.91	0.67	2.39	0.39	0.90	0.43	1.08

* DAS, days after sowing

Table 2. Effect of weed-control measures on grain yield and weed-control efficiency in wheat

Weed-control measure	Grain yield (q/ha)			Weed-control efficiency	
	1989-90	1990-91	Pooled	75 DAS	110 DAS*
Isoproturon 0.75 kg/ha	54.6	41.9	48.2	46.5	31.6
Isoproturon 0.75 kg/ha powder + soil	54.3	40.3	47.3	42.6	31.6
Isoproturon 1.00 kg/ha powder + soil	54.9	39.9	47.4	42.6	26.2
Isoproturon 0.75 kg/ha powder + urea	50.4	37.0	43.7	42.5	43.2
Isoproturon 1.00 kg/ha powder + urea	49.8	36.6	43.2	26.8	37.2
Pendimethalin 1.00kg/ha PE	56.2	41.9	49.0	38.6	24.7
2, 4-D 0.4 kg/ha	54.4	41.1	47.8	32.3	32.3
Dicamba 200 ml CP/ha	55.8	41.1	48.5	33.1	34.3
Dicamba 200 ml CP/ha + Isoproturon 0.75kg/ha	55.0	41.9	48.5	39.4	36.6
2, 4-D 20kg/ha + Dicamba 100 ml CP/ha	49.0	26.2	42.7	15.8	26.2
Fluroxypyr 0.10kg/ha + Isoproturon 0.50kg/ha	56.9	42.7	49.8	38.6	32.0
Black polythene cover	56.4	43.1	49.7	52.7	41.7
Hand-weeding	56.4	43.1	49.7	52.7	41.7
Unweeded check	47.9	33.0	40.4		
CD (P = 0.05)	4.98	5.80	5.38		

* DAS days after sowing

Grain yield

Fluroxypyr 0.1 kg/ha + isoproturon 0.5 kg/ha gave the maximum grain yield of 56.9 q/ha (1989-90), which was at par with all other treatments except isoproturon + urea and 2, 4-D + dicamba and the control which also did not differ significantly with each other (Table 2). Panwar *et al.* (1992) also recorded higher yields with the combination of fluroxypyr and isoproturon. Similar were the results in the second year except the black polythene covering and the hand-weeding treatments which recorded the highest yield. Pooled analysis also showed the similar trend as obtained in the first year. This is because of the reduced growth of weeds under these treatments.

Efficacy of isoproturon powder + soil or urea was quite effective, as these treatments were on par with isoproturon 0.75 kg/ha (spray), 2, 4-D 0.4 kg/ha and fluroxypyr 0.2 kg/ha. Yaduraju and Ahuja (1990) recorded

the highest yield with spray application of isoproturon. The performance of isoproturon powder with soil proved better than its application with urea, as herbicide dust along with urea made injury to crop plants which took sufficient time to recoup.

Though spread of polythene also proved quite effective against weed and in raising yield but the cost of application was very high. Since isoproturon powder along with soil at both the levels gave 95.2% grain yield to that of the best treatment, it may be used by farmer.

REFERENCES

- Panwar, R. S., Malik, R. K. and Malik, R. S. 1992. Effect of weedicides on weed control in wheat (*Triticum aestivum*) crop. *Indian Journal of Agronomy* 37 (2): 320-323.
- Yaduraju, N. T. and Ahuja, K. N. 1990. Effect of time and method of isoproturon application on weed control in wheat. *Indian Journal of Agronomy* 35 (4): 353-356.