

Chemical weed control in wheat through on farm demonstrations in Rewa district of Madhya Pradesh

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ABSTRACT

A field experiment under on farm trials programme of KVK, was conducted in farmers field during *rabi* 2005-06 and 2006-07 on wheat (*Triticum aestivum* L.) crop cv. *GW-273* to evaluate the efficiency of two herbicide 2,4-D and isoproturon and their tank mixture. *Phalaris minor* among the monocot weeds and *Lathyrus aphaca* among dicot were the major weeds in the demonstration fields, Post emergence application of 2,4-D 0.75 kg/ha + isoproturon 1.0 kg/ha at 25-30 days after sowing (DAS) gave maximum grain yield (3646 kg/ha) followed by the alone application of isoproturon 1.0 kg/ha at 25-30 DAS with grain yield (3222 kg/ha) and 2, 4-D 0.75 kg/ha at 25-30 DAS (2910 kg/ha). The application of 2,4-D + isoproturon increased the grain yield by 35.4% over control and 19% and 26.8% over individual application of 2,4-D and isoproturon, respectively. The application of 2,4-D + isoproturon also resulted higher weed control efficiency (80.4%).

One of the major reasons of low yield in rainfed and irrigated wheat in the Rewa division, Madhya Pradesh is the severe weed infestation. This region faces diverse type of weed flora consisting of grasses and broad leaf weeds (Upadhyaya *et al.* 2003). Hand weeding is effective and common method to control the weeds but scarcity and high wages of labour, particularly during the peak period make this operation difficult and uneconomic. Different post emergence herbicides are used to control weed species in wheat crop (Singh *et al.* 2003, Pandey *et al.* 2006). The application of herbicide mixture may be useful for the control of diversified broad leaf and narrow leaf weed flora (Panwar *et al.* 1995, Singh *et al.* 2006). Therefore, present study was under taken in the farmers view point with only two selected herbicides and their tank mixture.

MATERIALS AND METHOD

The field experiment was conducted under on farm trial (OFTs) in the four adopted villages namely, Raura, Sahijana, Kapsa and Amara under Krishi Vigyan Kendra (KVK), Rewa, Madhya Pradesh during *Rabi* season of 2005 and 2006. Ten farmers in each village were selected for the OFTs and each village was considered as replications. The soil was silty clay loam in all the locations with pH 7.2 ± 0.2 , organic carbon content $0.38 \pm 0.03\%$ and available N, P and K content of 310, 10 and 320 kg/ha, respectively. The experiment consisted of 4 treatments *viz.*, T₁ - 2,4-D 0.75 kg/ha at 25-30 days after sowing (DAS), T₂ - isoproturon 1.0 kg/ha at 25-3 DAS and T₃ - 2,4-D 0.75 kg/ha + isoproturon 1.0 kg/ha tank mixture at 25-30 DAS and comparison with control (T₄). Wheat cv.

GW-273 was used for the test crop. The crop was sown during 2nd week of November in both the years in 4000 m² plot size for demonstration. A common fertilizer dose 100:30:40 kg of N, P and K/ha respectively was applied. Full dose of P and K and half dose of N was applied as basal and remaining N was top dressed in two equal splits at tillering and booting stages of crop growth. The crop was grown under semi irrigated ecosystem with two irrigations at tillering and booting stage after planking. The required quantity of herbicides was applied with manually operated sprayer using 500 liters of water/ha with flat fan nozzle. Weeds count (number of weeds/m²) was sampled at randomly 50 DAS with the help of 1.0 m² quadrat. Dry matter of weeds, weed control efficiency, yield attributes and yield were recorded at harvest and the analyzed the data.

RESULTS AND DISCUSSION

Weed flora

Major monocot weeds were *Phalaris minor*, *Avena ludoviciana* and *Cynodon dactylon*. Major dicot weeds were *Lathyrus aphaca*, *Vicia sativa* and *Chenopodium album*. Out of these *Phalaris minor* and *Lathyrus aphaca* were the most dominant monocot and dicot weeds, respectively.

Weed population

With regard to weed population, unweeded check recorded significantly higher weed population (345.3/m²) followed by application of 2,4-D, 0.75 kg/ha (286.2/m²) and isoproturon 1.0 kg/ha (150.5/m²) at 50 days after sowing (DAS). Among the weeds, density was maximum

in *P. minor* (66.8%) followed by *L. aphaca* (25%). The minimum weed density was found in *C. album* (8.7%) (Table 1).

Dry matter of weeds

Two year pooled data (Table 1) revealed that weed management treatments significantly reduced dry weight of weeds compared to weedy check. The minimum total weed dry weight (63.6/m²) was observed under 2,4-D 0.75 kg/ha + isoproturon 1.0 kg/ha as post emergence at 25-30 DAS, while the maximum total dry weight (215.5 g/m²) was recorded in the field of weedy check. The superiority of 2,4-D + isoproturon in controlling weeds to rest of the

treatments was because of the fact that this combined application of 2,4-D + isoproturon at 25-30 DAS controlled both narrow and broad leaf weeds. (Panwar *et al.* 1995, Pandey *et al.* 2006).

Weed control efficiency

The weed control efficiency was maximum (80.4%) in the treatment 2,4-D 0.75 kg/ha + isoproturon 1.0 kg at 50 DAS, followed by isoproturon 1.0 kg/ha at 50 DAS (49.6%) and the 2, 4-D 0.75 kg/ha (32.64%). This observation was in agreement of Upadhyaya *et al.* 2003.

Effect on crop yield

All the herbicide treatments significantly influenced

Table 1. Effect of 2,4-D and isoproturon alone and in combination on density and matter of weeds and weed control efficiency in wheat (mean of two years : 2005-06 - 2006-207)

Treatment	Doses (kg/ha)	Number of weeds (m ²)	Dry weight of weeds (g/m ²)	Weed control efficiency (%)
2,4-D	0.75	286.2	165.40	32.64
Isoproturon	1.00	150.5	110.91	49.62
2,4-D + isoproturon	0.75+1.00	86.8	63.60	80.42
Unwedded check	-	345.3	215.54	-
LSD (P= 0.05)	-	18.4	16.65	-

Table 2. Effect of 2,4-D and isoproturon alone and in combination on yield attributes and grain of yield of wheat (mean of 2 years)

Treatment	Doses (kg/ha)	Effective tillers (m ²)	Length of spike (cm)	Grains (No.)	1000 grain weight (g)	Grain yield (kg/ha)
2,4-D	0.75	246	8.9	49.6	41.1	2910
Isoproturon	1.00	285	9.2	53.4	41.2	3222
2,4-D + Isoproturon	0.75+1.00	320	9.4	56.1	42.5	3646
Farmers practice (unwedded check)	-	163	8.2	43.3	40.2	2357
LSD (P= 0.05)	-	29.1	0.6	1.3	1.0	191

the number of tillers, length of spike, grains/ear and 1000 grain weight (Table 2) compared with weedy check. The pronounced effect of increased yield (3646 kg/ha) observed with application of 2,4-D 0.75 kg/ha + isoproturon 1.0 kg/ha at 25-30 DAS followed by isoproturon 1.0 kg/ha at 25-30 (3222 kg/ha) and 2,4-D 0.75 kg/ha at 25-30 DAS (2910 kg/ha). Higher grain yield in T₂ over T₁ may be due to significantly superior yield attributing characters in spite of higher number of weeds and their dry weight. Thus the application of 2,4-D 0.75 kg/ha + isoproturon 1.0 kg/ha at 25-30 days after sowing proved more effective.

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