

Effect of tralkoxydim and its combination with other new herbicides on the control of weeds in wheat (*Triticum aestivum*)

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ABSTRACT

A field experiment was conducted during the winter season of 1991–92 and 1992–93 at Hisar. In both the years tralkoxydim or metsulfuron each applied alone at 300 q/ha and 4.0 q/ha significantly reduced the population and dry weight of total weeds compared with the weedy check. Their combination at same rate resulted in the excellent control of weeds like *Phalaris minor* Retz., *Chenopodium album* (L.) and *Melilotus indica* All. Number of tillers/m in the weedy check reduced from 94 to 58 in 1991–92 and from 92 to 62 in 1992–93 compared with weed-free check. Similarly, the grain yield of wheat in the weedy check ranged from 3,005 to 3,241 kg/ha compared with 4,728 to 5,260 kg/ha in the weed-free check. Tank mixture of tralkoxydim + tribenuron at 300 + 7.5 g/ha, tralkoxydim + metsulfuron at 300 + 4.0 g/ha or tralkoxydim + fluroxypyr at 300 + 200 q/ha gave significantly higher grain yield of wheat than weedy check.

Wild canary grass (*Phalaris minor* Retz.) is most serious weed of wheat (*Triticum aestivum* L. emend. Fiori & Paol.) in rice–wheat sequence. The problem of wild oat is more widespread in all crop sequences. *Chenopodium album* L. dominates in pearl-millet–wheat rotation (Malik *et al.*, 1984). Besides these *Lathyrus aphaca* L., *Vicia sativa* L. and *Melilotus indica* All. are also posing serious problem (AICRPWC, 1990). Isoproturon has been frequently used to control annual grasses (Balyan *et al.*, 1987). The acceptable control of broad-leaf weeds except *Chenopodium album* is not possible with this herbicide, and with its continuous use, there is a possibility of shift in the weed flora in favour of wild oat (Gupta *et al.*, 1990). Hence present investigation was carried out.

MATERIALS AND METHODS

A field experiment was conducted during the winter season of 1991–92 and 1992–93 at the CCS HAU, Hisar. In both the years, the experiment was conducted on sandy-loam soil with pH 8.4 and an organic matter content 0.4%. Treatments consisted of tralkoxydim at 300 g/ha, tribenuron at 5.0 g/ha, metsulfuron at 4.0 g/ha and mixture of tralkoxydim + tribenuron at 250 + 5.0, 250 + 7.5, 300 + 5.0 and 300 + 7.5 g/ha, tralkoxydim + metsulfuron at 250 + 2.0, 250 + 4.0, 300 + 2.0 and 300 + 4.0 g/ha, tralkoxydim + 2,4-D at 300 + 250 g/ha and tralkoxydim + fluroxypyr at 300 + 200 g/ha. These treatments were compared with the weedy and weed free in randomized block design, each replicated 3 times. All the

Table 1. Effect of tralkoxydim and its combination with other herbicides on the weed density of different weeds

Herbicide	Dose (g/ha)	Weed density/m ² (60 DAS)					
		<i>P. minor</i>		<i>C. album</i>		<i>M. indica</i>	
		1991	1992	1991	1992	1991	1992
Tralkoxydim	300	4.2 (17)*	4.4 (19)	7.1 (51)	6.7 (43)	5.7 (33)	5.6 (31)
Tribenuron	5.0	7.9 (63)	7.7 (59)	4.7 (21)	4.2 (19)	4.2 (17)	4.6 (21)
Metsulfuron	4.0	3.6 (12)	2.6 (7)	1.0 (0)	1.0 (0)	1.0 (0)	1.2 (1)
Tralkoxydim + tribenuron	250 + 5.00	5.2 (27)	4.9 (23)	4.7 (21)	4.8 (18)	5.3 (28)	5.4 (29)
Tralkoxydim + tribenuron	250 + 7.5	3.6 (12)	3.7 (14)	3.1 (10)	3.0 (8)	4.0 (17)	4.0 (15)
Tralkoxydim + tribenuron	300 + 5.0	4.0 (15)	3.2 (12)	4.9 (23)	4.6 (21)	4.3 (23)	4.5 (20)
Tralkoxydim + tribenuron	300 + 7.5	3.0 (8)	2.9 (10)	3.0 (9)	3.3 (10)	3.5 (16)	3.8 (14)
Tralkoxydim + metsulfuron	250 + 2.0	4.4 (19)	4.4 (20)	1.0 (0)	1.2 (1)	1.0 (0)	1.0 (0)
Tralkoxydim + metsulfuron	250 + 4.0	3.4 (11)	3.0 (9)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)
Tralkoxydim + metsulfuron	300 + 2.0	3.6 (13)	3.6 (13)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)
Tralkoxydim + metsulfuron	300 + 4.0	3.0 (8)	3.0 (9)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)
Tralkoxydim + 2, 4-D	300 + 250	4.2 (17)	4.4 (20)	2.2 (6)	3.0 (8)	1.0 (0)	1.0 (0)
Tralkoxydim + fluroxypyr	300 + 200	3.8 (14)	4.3 (18)	2.5 (7)	3.1 (9)	1.0 (0)	1.7 (30)
Weed check		8.0 (65)	7.4 (55)	8.0 (64)	7.4 (54)	6.0 (35)	5.3 (28)
Weedy-free check		1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)
CD (P = 0.05)		2.2	2.1	1.3	1.0	1.7	1.4

*Actual counts are in parentheses, transformed to $\frac{x}{n+1}$
 DAS, Days after sowing

treatments were applied 20-day stage with a knapsack sprayer using 650 litres water/ha. Wheat ('WH 283') was sown at 100 kg seed/ha in rows 22.5 cm apart on 16 and 27 November in 1991 and 1992 respectively. Recommended practices were followed. First irrigation with canal water during both years was applied 20 days after sowing. Weed population (no/m²) and dry weight of total weeds (g/m²) were recorded 60 and 90 days with quadrat or size 0.5 m x 0.5 m.

RESULTS AND DISCUSSION

Effect on weeds

In both the years, field was infested with wild canary grass, common lambsquarter (*Chenopodium album* L.) and yellow sweet clover (*Melilotus indica* L.) during both the years. Tralkoxydim at 300 g/ha applied alone controlled wild canary grass but not common lambsquarter and yellow sweet clover. Similarly, metsulfuron applied alone at 4.0 g/ha significantly controlled all the weeds compared with weedy check during both the years at 60 days (Table 1). While tribenuron at 5.0 g/ha was not effective against wild canary grass. Combination of tralkoxydim at 250 or 300 g/ha with tribenuron at 5.0 or 7.5 g/ha or metsulfuron at 2.0 or 4.0 g/ha significantly reduced the population of weeds at 60 days compared with weedy check (Table 1). The effect of tralkoxydim + fluroxypyr at 300 + 200 g/ha on the population of common lambsquarter and yellow sweet clover was more than on wild canary grass during both the years. The minimum population of total weeds at 90 days during both the years were recorded in plots treated with tralkoxydim + metsulfuron at 300 + 4.0 g/ha or tralkoxydim + tribenuron at 300 + 7.5 g/ha or tralkoxydim + fluroxypyr at 300 + 200

g/ha (Table 2). The percentage control of wild canary grass recorded at 120 days in plots treated with tralkoxydim + metsulfuron at 300 + 4.0 g/ha was the maximum in both the years. Tribenuron at 5.0 g/ha did provide effective control of weeds. Like population, the maximum total dry weight of weeds was recorded in the weedy check treatment. All herbicides treatments except tribenuron alone significantly reduced the total dry weight of weeds compared with weeds check (Table 2) in both the years. Combination of tralkoxydim with tribenuron or metsulfuron or fluroxypyr may be effectively used for the control of complex weed-flora.

Effect on crop

All treatments except tribenuron and tralkoxydim + 2,4-D gave significantly higher grain yield of wheat compared to weedy check (Table 2). Grain yield was significantly more in tralkoxydim when it was applied in combination with tribenuron or metsulfuron or fluroxypyr. Herbicides combinations at higher rates resulted in higher grain yield owing to better control of weeds (Table 2). In both the years maximum number of effective tillers/meter row length were recorded in weed-free condition in both the years. The reduction in grain yield due to tralkoxydim + 2, 4-D combination might be on account of reduced efficiency of tralkoxydim by 2, 4-D and malformation of ears caused by 2, 4-D in 'WH 283' wheat. Similar results were also reported by Balyan *et al.* (1990) and Panwar *et al.* (1994). Next best yields were obtained by the combination of tralkoxydim + tribenuron at 300 + 7.5 g/ha or tralkoxydim + fluroxypyr at 300 + 200 g/ha in both the years. Based on 2 year data it can be concluded that in the presence of complex weed flora combination

Table 2. Effect of tralkoxydim and its combination with other herbicides on total dry weight and total weed population at 90 DAS, effective tillers and grain yield of wheat at harvest

Herbicide	Dose (g/ha)	Total dry weight (g/m ²)		Total weed popula- tion (no/m ²)		Grain yield (kg/ha)	
		1991	1992	1991	1992	1991	1992
Tralkoxydim	300	10.0	9.8	6.5 (42)	4.5 (19)	4,200	4,139
Tribenuron	5.0	31.8	26.5	7.5 (56)	7.2 (48)	3,811	3,743
Metsulfuron	4.0	8.4	4.7	3.3 (11)	2.0 (5)	4,282	4,197
Tralkoxydim + tribenuron	250 + 5.0	10.7	6.3	5.2 (27)	4.6 (20)	4,034	4,004
Tralkoxydim + tribenuron	250 + 7.5	8.3	4.5	4.6 (25)	4.2 (18)	4,117	4,167
Tralkoxydim + tribenuron	300 + 5.0	10.1	5.7	5.0 (26)	3.8 (14)	4,299	4,352
Tralkoxydim + tribenuron	300 + 7.5	7.7	3.3	3.5 (12)	2.0 (5)	4,487	4,510
Tralkoxydim + metsulfuron	250 + 2.0	10.0	3.1	4.6 (20)	3.4 (15)	4,200	4,004
Tralkoxydim + metsulfuron	250 + 4.0	6.5	1.7	3.4 (13)	2.7 (8)	4,470	4,282
Tralkoxydim + metsulfuron	300 + 2.0	9.0	2.1	3.9 (15)	2.2 (5)	4,376	4,110
Tralkoxydim + metsulfuron	300 + 4.0	6.0	1.5	3.3 (12)	1.0 (0)	4,505	4,332
Tralkoxydim + 2, 4-D	300 + 250	7.3	4.0	4.8 (23)	2.7 (8)	3,804	3,713
Tralkoxydim + fluroxypyr	300 + 200	6.5	3.8	4.4 (20)	3.0 (10)	4,652	4,452
Weedy check		35.6	28.9	8.5 (72)	7.4 (55)	3,005	3,241
Weedy-free check		0.0	0.0	1.0 (0)	1.0 (0)	5,269	4,723
CD (P = 0.05)		10.1	9.9	2.1	2.0	894	561

of tralkoxydim with other herbicides except 2, 4-D may be effectively used for obtaining higher yield in wheat.

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