Indian Journal of Weed Science 41(3&4) : 197-200, 2009 **Short Communication**

Bioefficacy of pyroxsulam for weed control in wheat

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ABSTRACT

Fifteen treatments with different doses and concentrations of pyroxsulam (12, 15, 18 and 30 g/ha of 3.0% and 3.6% OD both) along with 2,4-D ethyl ester 190 g/ha and aminopyralid 7.5 g/ha were taken in the experimental plot. Treatments having sulfosulfuron 25 g/ha, clodinafop 60 g/ha and isoproturon 1000 g/ha, weed free and weedy plot were also included as standard check. Application of pyroxsulam at 12 and 15 g, recorded significantly lower weed density of *Phalaris minor* at their lower concentration (3.0% OD) as compared to their higher concentration (3.6% O.D.). However, pyroxsulam at their higher doses (18 and 30 g) recorded similar density of *Phalaris minor* at both the concentrations at 30 days after herbicide application.

Key words : Bioefficacy, Pyroxsulam, Chemical control, Wheat

The acute problem of both grassy and broad leaf weeds are becoming very common in wheat growing areas of north-western zone of India, which often results in huge yield losses and makes the weed control more complex (Singh *et al.* 2002). Several herbicides have been used from time to time to control weeds in wheat. Continuous use of the same herbicide or herbicides having the same mode of action may result in shift in weed flora, development of resistance in weeds (Moss and Rubin, 1993) as well as build up of residue in soil. Therefore, a new herbicide molecule pyroxsulam (XDE-742) was used in the present experiment during *rabi* (2005-06). Pyroxsulam is a broad spectrum herbicide which control grassy as well as broad leaf weeds in wheat.

The present study was carried out at Crop Research Centre of G.B. Pant University of Agriculture and Technology, Pantnagar in a randomized block design with three replications. Fifteen treatments with different doses and concentrations of pyroxsulam (12, 15, 18 and 30 g/ha of 3.0% and 3.6% O.D. both) along with 2,4-D ethyl ester 190 g/ha and aminopyralid 7.5 g/ha were taken in the experimental plot. Treatments having sulfosulfuron 25 g/ha, clodinafop 60 g/ha and isoproturon 1000 g/ha, weed free and weedy plot were also included as standard check. The soil of the experimental field was silty clay loam, high in organic carbon (0.76 %), medium in available phosphorus (19 kg/ha) and potassium (225 kg/ha) with pH 7.1. The recommended doses of fertilizer i.e., 120: 60: 40 kg NPK/ha were applied in the experimental plot. Wheat variety *PBW 343* was sown on 12.12.2005. Half of nitrogen and full doses of P and K were applied as basal dressing before sowing. The remaining half dose of nitrogen was top-dressed into two equal split at tillering and heading stage of wheat. Herbicides were applied 30 days after sowing through knapsack sprayer using 600 lit/ha water. Weed count were recorded at 30 days after herbicide application by taking the observation with the help of quadrate of 0.25 m^2 from each plot and weed dry weight was recorded by keeping the sample in oven at 70 ± 1°C for 48 hours.

The experimental plot was mainly infested with *Phalaris minor, Melilotus indica, Coronopus didymus, Lathyrus aphaca* and *Chenopodium album* which account for 26, 22, 20, 10 and 7 %, respectively in weedy plot at 30 days after sowing (Table 1). As the dose increased from 12 to 30 g, significant reduction in weed density of *Phalaris minor* was observed with pyroxsulam. Application of pyroxsulam at 12 and 15g, recorded significantly lower weed density of *Phalaris minor* at their lower concentration (3.0% OD) as compared to their higher concentration (3.6% OD). However, pyroxsulam at their higher doses (18 and 30 g) recorded similar density of *Phalaris minor* at both the concentrations at 30 days after herbicide application. Clodinafop-propargyl was found effective against *Phalaris minor* but not against other weeds. The density of *L. aphaca* and *M. indica* reduced due to increase in doses of pyroxsulam. The efficacy of pyroxsulam increased against these weeds when applied with aminopyralid at 7.5 g/ha. Isoproturon at 1.0 kg/ha also provided good control of *Lathyrus aphaca* and *Melilotus indica* but its efficacy was poor on *P. minor*, *Coronopus didymus* and *Chenopodium album*. Pyroxsulam was found effective to control the *C. didymus*, *C. album* and *M. denticulata* which was evident from their zero weed density by pyroxsulam over the standard herbicide check *viz.,* sulfosulfuron, clodinofop-propargyl and isoproturon. With increase in the dose of herbicide, there was decrease in the total weed dry weight at 30 days after herbicide application at both the concentration. Highest weed control efficiency was observed in weed

Table 1 Effect of different treatments on weed species (no./m^2) and total weed dry wt (g/m^2) at 30 days after transplanting

Treatment	Dose (g/ha)	*Phalaris miner*	*Cornopus didymos*	*Laythyrus aphaca*	*Chinopodium album*	*Metilotus indica*	*Medicago sativa*	*Vicia sativa*	*Polygonum plebejum*	Total weed dry weight (g/m^2)	Weed control efficiency (%) (WCE)
XDE 742 3% OD + intron	12 + 300	3.6 (36.7)	0.0 (0.0)	2.6 (14.0)	0.0 (0.0)	2.4 (10.0)	0.0 (0.0)	1.4 (3.3)	1.6 (4.0)	12.1	75.2
XDE 742 3% OD + intron	15 +300	3.3 (27.3)	0.0 (0.0)	2.5 (11.3)	0.0 (0.0)	1.7 (5.3)	0.0 (0.0)	0.7 (1.3)	0.4 (0.7)	8.5	82.5
XDE 742 3% OD + intron	18 +300	3.2 (24.0)	0.0 (0.0)	2.3 (8.7)	0.0 (0.0)	1.5 (4.0)	0.0 (0.0)	0.0 (0.0)	0.4 (0.7)	7.7	84.2
XDE 742 3% OD + intron	30 +300	3.0 (20.7)	0.0 (0.0)	1.8 (5.3)	0.0 (0.0)	0.9 (2.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	6.2	87.3
XDE 742 3.6% OD + intron	12 + 300	4.1 (59.3)	0.0 (0.0)	2.6 (13.3)	0.0 (0.0)	2.7 (14.7)	0.0 (0.0)	1.6 (4.7)	0.9 (2.0)	21.6	55.7
XDE 742 3.6% OD + intron	15 +300	3.7 (38.7)	0.0 (0.0)	2.5 (12.0)	0.0 (0.0)	2.4 (11.3)	0.0 (0.0)	1.5 (4.0)	0.9 (2.0)	16.5	66.2
XDE 742 3.6% OD + intron	18 +300	3.4 (28.7)	0.0 (0.0)	2.4 (10.7)	0.0 (0.0)	1.3 (4.0)	0.0 (0.0)	1.4 (3.3)	0.0 (0.0)	9.2	81.1
XDE 742 3.6% OD + intron	30 +300	3.0 (20.0)	0.0 (0.0)	2.2 (8.7)	0.0 (0.0)	0.7 (2.7)	0.0 (0.0)	1.3 (2.7)	0.0 (0.0)	6.5	86.7
XDE 742 3% OD + 2, 4-D38 EC	15 + 190	3.2 (24.0)	0.0 (0.0)	2.0 (14.0)	0.0 (0.0)	0.9 (2.0)	0.0 (0.0)	0.4 (0.7)	0.5 (1.3)	7.3	85.0
XDE 742 3% OD + aminopyralid + intron	15 +7.5 + 300	3.3 (26.7)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	6.1	87.5
Sulfosulfuron 75 WDG + safener	25	3.1 (23.3)	2.9 (19.3)	1.7 (9.3)	0.9 (2.0)	2.2 (8.7)	0.0 (0.0)	1.7 (4.7)	0.4 (0.7)	16.9	65.4
Clodinafop- propargyl 15 WP	60	0.0 (0.0)	3.4 (30.7)	3.1 (22.7)	3.2 (24.7)	3.6 (38.7)	2.3 (8.7)	2.3 (9.3)	2.4 (11.3)	25.3	48.2
Isoproturon	1000	3.3 (26.7)	2.8 (15.3)	1.3 (4.0)	2.6 (13.3)	1.4 (5.3)	2.1 (7.3)	1.0 (2.7)	2.4 (10.7)	18.7	61.7
Weed-free		0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0..0 (0.0)	0.0	100.0
Weedy		4.1 (62.67)	3.8 (48.7)	2.8 (17.3)	3.1 (24.0)	3.8 (52.7)	2.4 (10.0)	2.5 (14.7)	2.5 (12.0)	48.8	
LSD (P=0.0 5)		0.4	0.2	1.2	0.4	1.0	0.1	0.8	0.8	5.12	

Values in parentheses were original, and transformed to log (x+1) for analysis.

Table 2 Effect of different treatments on yield and yield attributing characteristics of wheat

Treatment	Dose (g/ha)	Panicles (no./m)	Number of grains/panicle	1000-grain weight (g)	Grain yield (kg/ha)	Straw yield (kg/ha)
XDE 742 3% OD + intron	12 +300	403	38.4	38.6	4330	7750
XDE 742 3% OD + intron	15 +300	424	41.6	40.3	4420	8170
XDE 742 3% OD + intron	18 +300	423	36.4	37.8	4470	8960
XDE 742 3 % OD + intron	30 +300	463	39.2	37.4	4630	8900
XDE 742 3.6% OD + intron	12 +300	406	37.8	40.3	4110	7500
XDE 742 3.6% OD + intron	15 +300	423	34.4	42.7	4210	7690
XDE 742 3.6% OD + intron	18 +300	423	36.4	40.2	4270	7690
XDE 742 3.6% OD + intron	30 +300	438	34.7	40.1	4310	7920
XDE 742 3% OD + 2,4-D 38 EC	15 +190	461	37.5	42.0	4920	8710
XDE 742 3% OD + aminopyralid + intron	15 +7.5 +300	467	39.0	41.7	4850	8590
Sulfosulfuron 75 WDG + safener	25	479	30.8	41.0	4780	9480
Clodinafop-propargyl 15 WP	60	407	36.5	37.6	3880	6190
Isoproturon	1000	413	35.0	37.6	3860	6750
Weed - free		415	35.0	38.8	4920	8940
Weedy		335	36.5	34.3	3430	5670
LSD (P=0.05)		65.6	NS	NS	510	1260

free situation. It was followed by pyroxsulam supplemented with aminopyralid (87.5) which recorded similar weed control efficiency as that of pyroxsulam at 30 g/ha at both the concentrations.

Application of pyroxsulam (12 to 30 g) increased the grain yield in both the concentration (3.0 and 3.6% O.D.), however, the differences among the doses were non-significant. pyroxsulam without intron along with 2, 4-D gave similar grain yield (4817kg/ha) as with weed free (4818kg/ha) situation. Lower yield at higher concentration (3.6%) of pyroxsulam were mainly attributed to their higher weed dry matter at 30 days after herbicide application. The highest reduction (30%) of grain yield was recorded in weedy plot over the weed free situation. Among the yield attributes, significant differences were obtained in number of panicles/m, however, the number of grains/panicle and 1000-grain weight had non-significant difference with application of herbicide either applied as alone or in combination. Sulfosulfuron at 25 g/ha recorded the highest number of panicles/m (479). It was followed by pyroxsulam at 15 g/ha followed by aminopyralid (467) which recorded the higher grain yield (4848kg/ha) as compared to sulfosulfuron mainly due to more number of grains/per panicle (Table 2). Thus, it was concluded that pyroxsulam was found effective against most of the weeds. Pyroxsulam along with 2,4-D recorded the similar yield in weed free situation followed by application of pyroxsulam 3% + aminopyralid + intron.

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