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Performance of Ready Mix Formulation of Fenoxaprop+Metribuzin for the Control of Grass and Broadleaf Weeds in Wheat

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ABSTRACT

An experiment was conducted for three years at the Research Farm of Department of Agronomy, Punjab Agricultural University, Ludhiana during **rabi** seasons of 2007-08 to 2009-10. The experimental field was heavily infested with *Phalaris minor* and broadleaf weeds. A new herbicide i. e. AEF 04 6360-8%+DIC 1468-14%-22% EC (fenoxaprop-P-ethyl+metribuzin) was applied at 165, 220, 275, 330 and 550 g/ha as post-emergence (30-35 DAS). The results of three years revealed that application of this herbicide at 275 and 330 g/ha provided effective control of *P. minor* and broadleaf weeds in wheat crop and were found statistically at par with Atlantis 3.6 WDG (mesosulfuron 3.0%+iodosulfuron 0.6% at 12+2.24 g) on dry matter accumulation by *P. minor* and broadleaf weeds. On an average of three years, post-emergence application of AEF 046360-8%+DIC 1468-14%-22% EC at 275 and 330 g/ha as well as Atlantis 3.6 WDG at 14.4 g/ha increased wheat grain yield by 58.8, 64.2 and 67.3% as compared to unweeded (control) treatment, respectively.

Key words : Wheat, AEF+DIC, grassy, broadleaf weeds

INTRODUCTION

Wheat is the main cereal crop of the Punjab state grown on an area of 34.88 lakh hectare which is infested with grassy as well as broadleaf weeds. Weeds substantially reduce the productivity and production of wheat due to competition for various inputs. The reduction in productivity depends upon the type of weed flora and weed density (Balyan and Malik, 1989; Afentouli and Eleftherohorinos, 1996). The yield potential of high yielding dwarf varieies can be fully achieved only when all production practices including best weed management practices are adopted. Severe competition from *P. minor* caused 30-80% reduction in grain yield of wheat (Brar and Walia, 1993). To increase wheat productivity, herbicides are being effectively used as a reliable economical tool to combat the problem of weed infestation, particularly grassy weeds. *P. minor* has developed resistance to isoproturon (Malik and Singh, 1995) and, moreover, the alternative recommended herbicides i. e. fenoxaprop, clodinafop, sulfosulfuron, etc. are also not providing satisfactory control of this weed in the Punjab state under certain situations. Keeping all this in view, the performance of a new formulated herbicide i. e. AEF 04 6360-8%+DIC 1468-14%-22% EC at variable rates was evaluated against *P. minor* and broadleaf weeds in wheat.

MATERIALS AND METHODS

A field experiment was conducted for three years i. e. 2007-08, 2008-09 and 2009-10 at the Experimental Farm of the Department of Agronomy, Punjab Agriculural University, Ludhiana in randomized block design by keeping nine treatments and four replications. The experimental field was loamy sand in texture with 80.2, 3.9 and 15.1% sand, silt and clay, respectively, which was under rice-wheat rotation since the last 10 years. Sowing of wheat variety PBW 343 was done on 4 November, 2007, PBW 502 on 12 November 2008 and PBW 343 on 10 November 2009 with single row drill by keeping row to row spacing of 22.5 cm. A constant seed rate of 100 kg/ha was used during all the years of investigation. Recommended doses of fertilizers i. e. 125 kg nitrogen, 62.5 kg P_2O_5 and 30 kg K_2O/ha were applied to raise the crop. Whole of phosphorus and potassium and half of nitrogen was applied at the time of sowing and remaining nitrogen with the first irrigation. Spray of formulated herbicide i. e. AEF 046360-8%+DIC 1468-14%-22% EC (fenoxaprop-P-ethyl+metribuzin) was done 30-35 days after sowing the crop with knapsack sprayer fitted with flat fan nozzle. This herbicide was applied at 165, 220, 275, 330 and 550 g/ha and it was compared with the recommended herbicide i. e. Atlantis 3.6 WDG

(mesosulfuron 3.0 WDG +iodosulfuron 0.6 WDG) at 14.4 g/ha alongwith AEF 046360-10% EC at 80 g/ha, DIC 1468 70% WP at 35 g/ha and unweeded control. Data on dry matter of *P. minor* and broadleaf weeds were recorded separately at the time of crop harvest by using 50 x 50 cm quadrat. Net plot harvested during all the years of investigations was 7.9 m^2. The crop was raised with recommended agronomic and plant protection practices.

RESULTS AND DISCUSSION

The experimental field had enough population of *P. minor* and broadleaf weeds and the data pertaining to dry matter accumulation by weeds are presented in Table 1. Post-emergence application of AEF 046360-8%+DIC 1468-14%-22% EC at 275, 330 and 550 g/ha provided nearly cent per cent control of *P. minor* during all the three years of investigation and all these treatments were found to be at par with the recommended herbicide i. e. Atlantis 14.4 g/ha. The performance of lower doses of this new herbicide i. e. 165 and 220 g/ha was found to be less against *P. minor*. However, all the tried treatments of this new formulated herbicide produced significantly less dry matter of *P. minor* as compared to unweeded (control) treatment. Similar trend was attained for the control of broadleaf weeds. Similarly, Singh *et al*. (2005) reported that tank mix application of fenoxaprop+metribuzin at 90+140 g/ha recorded lowest weed biomass. Application of alone AEF 046360-10% EC at 80 g/ha provided very effective control of *P. minor* only, whereas the alone application of DIC 1468-70 WP 35 g/ha was found very effective against broadleaf weeds only.

Number of effective tillers per metre row length was found to be significantly higher in all the herbicidal treatments as compared to unweeded control during all the years of investigation (Table 2). The differences for

Table 1. Effect of weed control treatments on dry matter of weeds

Treatments	Dose (g/ha)	Dry matter of weeds (q/ha)					
		Phalaris minor			Broadleaf weeds		
		2007-08	2008-09	2009-10	2007-08	2008-09	2009-10
AEF 046360-8% + DIC 1468-14%-22% EC	165	3.9 (15.1)	4.1 (17.5)	5.0 (25.7)	1.9 (3.7)	2.0 (4.1)	2.3 (5.6)
AEF 046360-8% + DIC 1468-14%-22% EC	220	2.1 (4.2)	2.3 (6.4)	1.8 (3.7)	1.4 (1.5)	1.5 (2.1)	1.0 (0)
AEF 046360-8% + DIC 1468-14%-22% EC	275	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)
AEF 046360-8% + DIC 1468-14%-22% EC	330	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)
AEF 046360-8% + DIC 1468-14%-22% EC	550	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)
AEF 046360-10% EC	80	1.0 (0)	1.0 (0)	1.0 (0)	1.6 (3.3)	1.7 (3.5)	2.2 (5.1)
DIC 1468 70 WP	35	5.1 (25.7)	5.9 (34.7)	5.9 (35.0)	1.0 (0)	1.0 (0)	1.0 (0)
Atlantis 3.6 WDG	12	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)	1.0 (0)
Unweeded (Control)		5.8 (34.7)	6.2 (38.1)	6.7 (41.7)	2.4 (7.0)	2.3 (6.5)	2.9 (8.7)
LSD (P=0.05)		1.14	0.97	1.21	0.51	0.32	0.43

Table 2. Effect of weed control treatments on effective tillers and grain yield of wheat

Treatments	Dose (g/ha)	Effective tillers/m row length				Grain yield (q/ha)			
		2007-08	2008-09	2009-10	Mean	2007-08	2008-09	2009-10	Mean
AEF 046360-8% + DIC 1468-14%-22% EC	165	70.4	71.3	66.8	69.5	47.4	42.4	41.2	43.6
AEF 046360-8% + DIC 1468-14%-22% EC	220	71.5	73.4	65.7	70.2	49.7	43.8	45.2	46.2
AEF 046360-8% + DIC 1468-14%-22% EC	275	71.9	72.7	68.5	71.0	53.5	49.9	50.5	51.3
AEF 046360-8% + DIC 1468-14%-22% EC	330	72.0	72.9	67.4	70.7	55.1	48.7	50.8	51.5
AEF 046360-8% + DIC 1468-14%-22% EC	550	71.9	73.0	68.1	71.0	55.4	51.4	51.4	52.7
AEF 046360-10% EC	80	71.5	73.4	67.5	70.8	50.7	49.7	48.4	49.6
DIC 1468 70 WP	35	69.8	72.4	66.9	69.7	45.7	38.4	35.4	39.8
Atlantis 3.6 WDG	12	70.4	74.3	68.3	71.0	56.7	51.7	52.7	53.7
Unweeded (Control)		48.7	55.1	50.3	51.4	32.4	33.7	30.1	32.1
LSD (P=0.05)		12.1	8.7	10.4	7.3	8.4	7.5	7.9	8.1

effective tillers amongst herbicidal treatments were found to be non-significant. Grain yield of wheat during 2007-08, 2008-09 and 2009-10 was found to be significantly more in all the herbicidal treatments as compared to unweeded control. During all the three years, lowest dose i. e. 165 g/ha of the new herbicide i. e. AEF 046360-8%+DIC 1468-14%-22% EC produced significantly less yield than the recommended herbicide i. e. Atlantis. Among the herbicidal treatments, application of AEF 046360-8%+DIC 1468-14%-22% EC at 275, 330 and 550 g/ha produced significantly higher yield as compared to its lower rates and these values were found to be statistically at par with Atlantis (mesosulfuron+ iodosulfuron). Punia *et al.* (2005) reported that tank mix application of fenoxaprop and sulfosulfuron at 124 g/ha also produced maximum grain yield and effective control of *P. minor* and broadleaf weeds. On an average of three years, application of AEF 046360-8%+DIC 1468-14%-22% EC at 275 and 330 g/ha and Atlantis 14.4 g/ha increased wheat grain yield by 59.8, 64.2 and 67.3% as compared to unweeded (control) treatment, respectively.

It can be concluded that post-emergence application of formulated herbicide i. e. AEF 046360-8%+DIC 1468-14%-22% EC at 275 and 330 g/ha provided effective control of *P. minor* and broadleaf weeds in wheat and these treatments were found statistically at par with the recommended herbicide i. e. Atlantis at 14.4 g/ha with respect to dry matter accumulation by weeds (*P. minor* and broadleaf weeds) as well as production of grain yield by the wheat crop. No phyto-toxicity of AEF 046360-8%+DIC 1468-14%-22% EC even at higher rate i. e. 550 g/ha was recorded after spray upto the harvest of the wheat crop.

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