DUAL MAGNUM® APPLICATIONS FOR WEED CONTROL IN SUGAR BEET

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Introduction

Dual Magnum (s-metolachlor) was labeled in the spring of 2003 for pre-plant incorporated (PPI), preemergence (PRE), and postemergence (POST) applications to sugar beet. Presently, because of injury from PPI and PRE applications to sugar beet this past season in the Red River Valley of North Dakota and Minnesota, the future label status of these application methods is uncertain. The objective of this trial was to evaluate weed control and crop response with PPI, PRE, and POST Dual Magnum applications in sugar beet.

Methods

This trial was conducted in a furrow-irrigated field near Nampa, Idaho. Dual Magnum was applied PPI, PRE, or POST to two-leaf beets at 1.27 or 1.59 lb ai/acre. Nortron (ethofumesate) was applied PPI and PRE at 1.6 lb ai/acre for comparison. Herbicide treatments were broadcast-applied with a CO_2-pressurized backpack sprayer calibrated to deliver 20 gal/acre at 30 psi. Plots were four rows wide and 27 ft long and treatments were arranged in a randomized complete block design with four replicates. PPI, PRE, and POST treatments were applied on April 17, April 29, and May 23, respectively. PPI treatments were incorporated immediately after application with an Alloway field cultivator equipped with s-tines and rolling baskets. Sugar beets were planted following incorporation. The timing of the PRE applications was not ideal as approximately 20 percent of the sugar beets had already begun to emerge. A standard rate herbicide program consisting of three POST applications of Progress (ethofumesate + desmedipham + phenmedipham), UpBeet (triflusulfuron), and Stinger (clopyralid) was broadcast over the entire experimental area independent of Dual Magnum and Nortron applications. Sugar beet injury and weed control were evaluated throughout the season. Sugar beet stand populations/20 ft of row were recorded on May 23 following PPI and PRE applications. Data were analyzed using analysis of variance procedures and means were separated using protected LSD at the 95 percent confidence interval (P = 0.05). The trial was not harvested.

Results and Discussion

Sugar beet stand populations on May 23 ranged from 32 to 36 plants/20 ft of row and were not different among treatments (Table 1). Sugar beet injury on May 23 was greatest with the PRE treatments. This injury was most likely enhanced because the PRE treatments were applied late and approximately 20 percent of the beets were

beginning to emerge, allowing for direct herbicide contact. Sugar beet injury with Nortron was less than with Dual Magnum applied at 1.59 lb ai/acre on May 23 and June 13 and when applied at 1.27 lb ai/acre on June 13. Injury was not different between the PPI treatments and the standard rate program alone. There were no differences in weed control among the PPI treatments (Table 1). The PRE treatments gave similar control of all evaluated weed species. Redroot pigweed control was less with POST Dual Magnum applications than with PPI or PRE treatments of Dual Magnum or Nortron. POST applications of Dual Magnum were applied after many of the weeds had emerged and therefore they were considerably less effective. POST Dual Magnum at either application rate did not improve control of the evaluated weeds when compared to the standard rate alone. Control of kochia, hairy nightshade, and common lambsquarters were similar with Dual Magnum applied POST at 1.59 lb ai/acre and with all PRE treatments. However, when Dual Magnum was applied POST at 1.27 lb ai/acre, control of these weeds was less than with the PRE treatments. Similar control of kochia, hairy nightshade, and common lambsquarters was achieved with all PPI and PRE treatments.

Table 1. Weed control and crop response with Dual Magnum applications in sugar beet, Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

			Sugar beet			Weed control[§]			
			Stand	Injury[‡]		Redroot pigweed	Kochia	Hairy nightshade	C. Lambs-quarters
Treatment*	Rate	Timing[†]	5-23	5-23	6-13	8-14	8-14	8-14	8-14
	lb ai/acre		No./20 ft	%		%			
Standard rate w/out soil-active	--	--	36	12	1	41	87 b	91 c	61
Nortron	1.6	PPI	34	18	16	76	95 ab	98 ab	95
Dual Magnum	1.27	PPI	33	15	14	86	100 a	89 a	99
Dual Magnum	1.59	PPI	32	19	16	82	94 ab	93 a	99
Nortron	1.6	PRE	36	30	12	85	100 a	100 ab	98
Dual Magnum	1.27	PRE	32	38	23	93	100 a	100 a	96
Dual Magnum	1.59	PRE	33	44	21	97	100 a	100 a	99
Dual Magnum	1.27	POST	36	11	5	25	75 b	80 c	63
Dual Magnum	1.59	POST	36	13	14	28	93 ab	88 bc	74
LSD (0.05)	--	--	NS	8	8	17	--	--	25

*A standard rate herbicide program was blanketed over the entire plot area independent of Dual Magnum and Nortron applications.
[†]PPI applications were made on April 17, PRE on April 29, and POST on May 23, 2003.
[‡]PRE treatments were applied when approximately 20 percent of the sugar beets had just emerged and most likely increased injury with these treatments. POST treatments had not yet been applied at the May 23 evaluation.
[§]In columns where letter designations appear the ANOVA was performed on arcsine square root percent transformed data. Mean separations were applied to non-transformed data. Values with the same letter designations are similar (P = 0.05).