

EVALUATION OF PREEMERGENCE AND POSTEMERGENCE HERBICIDE APPLICATIONS ON SUGAR BEETS, 1999

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Abstract

Evaluation of preemergence and postemergence herbicide applications on sugar beets was conducted in two commercial fields near Prineville and Culver, Oregon. The most effective control of spring germinating annual weeds was provided by preemergence application of Nortron (ethofumesate), followed by Betamix (desmedipham + phenmedipham) plus Upbeet (triflusaluron methyl) applied at the cotyledon stage and 2- to 4-leaf stages. Half rates of Nortron applied preemergence provided similar control to the full rate. Microrates of postemergence herbicides provided similar to slightly less control than standard postemergence treatments. Rescue treatments where no herbicides were applied until the 2- to 4-leaf stage provided similar control to the standard postemergence treatments.

Introduction

This is the fifth year of both commercial sugar beet production and herbicide trials conducted in the Prineville and Culver areas of central Oregon. The objective of this research was to compare standard and reduced rates of Nortron applied preemergence, evaluating applications of Betamix plus Upbeet following Nortron at standard and micro rates with and without Stinger, and a single rescue treatment where no herbicides were applied until the 2- to 4-leaf stage. Roundup Ready and Liberty Linked varieties were evaluated, including the effect on weed control and yield of applying Roundup or Liberty compared to the tradition herbicide program.

Methods and Materials

Treatments applied preemergence were made on April 26 at Culver and May 6 at Prineville. Treatments applied postemergence were made at the cotyledon stage on May 28 at Culver and June 4 in Prineville. The second postemergence treatments were made at the four-leaf stage on June 4 at Culver and June 11 at Prineville. A third postemergence application was made at the 6-leaf stage at Prineville on June 18. Roundup and Liberty were applied on June 9 and July 2 at Culver and on June 10 and July 6 at Prineville.

Treatments were applied with a CO₂-pressurized, hand-held boom sprayer at 40 psi and 20 gal/a water. Plots 10 ft x 25 ft were replicated four times in a randomized complete block design. The number of plants per plot of kochia, common groundsel, redroot pigweed, common lambsquarters, and hairy nightshade were counted at the Culver location on June 16. At the Prineville location, the number of plants per plot of kochia, common groundsel, common lambsquarters, and hairy nightshade were counted on June 30.

The center row of plots planted with the transgenic varieties HM 118RR Roundup Ready and Beta 8757LL and Crystal 9903LL Liberty Linked were harvested on October 25. Plots receiving either

Roundup or Liberty were compared with plots treated with the traditional herbicide program for tons/a, percent sugar, and total sugar.

Results and Discussion

Treatment with Nortron at 3 pt/a followed by two applications of Upbeet at 1.5 pt/a and 2.0 pt/a plus Betamix at 0.5 oz/a was the most effective at controlling weeds at both locations (Tables 1 and 2). Reducing the rate of Nortron to 2 pt/a provided slightly less (5.5 compared to 0.3 and 13.5 compared to 8.3 plants/plot) weed control at both locations. When Nortron at 3 pt/a was followed by two micro-rate applications at Culver, weed control was substantially less (58 compared to 8.3 plants/plot). However, when Nortron was followed by three micro-rate applications at Prineville, weed control was only slightly less (6.8 compared to 0.3 plants/plot). Addition of Stinger to the micro rates had mixed results on weed control between the two areas. Removing MSO from micro-rates with Stinger decreased weed control from 38 to 63 plants/plot at Prineville. The rescue treatment with high rates (4 oz/a) of Stinger and MSO at 2 percent caused unacceptable crop injury.

Yields from Roundup Ready and Liberty Linked plots were no different, whether they were treated with Roundup or Liberty or the standard herbicide program. Beta 8757 produced a higher yield than either Crystal 9903LL or HM 118RR under either herbicide programs.

Table 1. Effect of herbicide application on sugar beets near Culver, OR evaluated June 4, 1999.

Treatments	Application			Number of plants					Total
	Pre	Cot	2-leaf	Kochia	Common groundsel	Redroot pigweed	Common lambsquarters	Hairy nightshade	
	(product/a)								
Nortron	3 pt			0	1	0	3 b	4	8.3
Betamix		1.5 pt	2.0 pt						
Upbeet		0.5 oz	0.5 oz						
Nortron	2 pt			1	5	0	2 b	7	13.5
Betamix		1.5 pt	2.0 pt						
Upbeet		0.5 oz	0.5 oz						
Nortron	3 pt			0	4	1	56 a	27	57.8
Betamix		0.5 pt	0.5 pt						
Upbeet		0.2 oz	0.2 oz						
MSO		1.5%	1.5%						
Betamix		0.5 pt	0.5 pt	4	6	6	28 a	4	46.5
Upbeet		0.2 oz	0.2 oz						
MSO		1.5 %	1.5 %						
Betamix		0.5 pt	0.5 pt	1	3	14	30 a	14	60.3
Upbeet		0.2 oz	0.2 oz						
Stinger		1.3 oz	1.3 oz						
MSO		1.5%	1.5%						
Untreated				0	16	16	24 a	34	90.0
				ns	ns	ns		ns	

Table 2. Effect of herbicide application on sugar beets near Prineville, OR evaluated June 30, 1999.

Treatments	Application				Number of plants				
	Pre	Cot	2-leaf	4-leaf	Kochia	Common groundsel	Common lambsquarters	Hairy nightshade	Total
	(product/a)								
Nortron	3 pt				0 b	0	0 b	0.3 c	0.3
Betamix		1.5 pt	2.0 pt						
Upbeet		0.5 oz	0.5 oz						
Nortron	2 pt				1 b	1	0.3 b	4 c	6
Betamix		1.5 pt	2.0 pt						
Upbeet		0.5 oz	0.5 oz						
Nortron	3 pt				1 b	1	1 b	4 c	7
Betamix		0.5 pt	0.5 pt						
Upbeet		0.2 oz	0.2 oz						
MSO		1.5 %	1.5 %						
Betamix		0.5 pt	0.5 pt	0.5 pt	3 b	2	3 b	43 a	50
Upbeet		0.2 oz	0.2 oz	0.2 oz					
MSO		1.5%	1.5%	1.5%					
Betamix		0.5 pt	0.5 pt	0.5 pt	2 b	16	2 b	43 a	63
Upbeet		0.2 oz	0.2 oz	0.2 oz					
Stinger		1.3 oz	1.3 oz	1.3 oz					
Betamix		0.5 pt	0.5 pt	0.5 pt	4 b	1	2 b	32 ab	38
Upbeet		0.2 oz	0.2 oz	0.2 oz					
Stinger		1.3 oz	1.3 oz	1.3 oz					
MSO		1.5 %	1.5%	1.5%					
Betamix			2.0 pt	2.0 pt	5 b	5	8 b	6	23
Upbeet			0.5 oz	0.5 oz					
Stinger			4.0 oz	4.0 oz					
MSO			2.0 %	2.0 %					
Untreated					24 a	22 ns	24 a	20 c	89

Table 3. Effect of herbicide application on transgenic sugar beet varieties near Culver, OR harvested October 25, 1999.

Treatments	Application timing					Sugar --(%)--	Yield --(ton/a)--	Total sugar --(lb/a)--	
	Pre	Cot	2-leaf	4-leaf	4 wks				
HM 118RR	Roundup				1 qt	1 qt	18.9	29.9	11,314
HM 118RR	Nortron	3 pt					19.0	29.8	11,321
	Betamix		1.5 pt	2.0 pt					
	Upbeet		0.5 oz	0.5 oz					
Beta 8757LL	Liberty				34 oz	34 oz	18.7	32.7	12,159
Beta 8757LL	Nortron	3 pt					19.2	33.4	12,783
	Betamix		1.5 pt	2.0 pt					
	Upbeet		0.5 oz	0.5 oz					
Crys 9903LL	Liberty				34 oz	34 oz	19.5	28.9	11,258
Crys 9903LL	Nortron	3 pt					19.8	30.8	12,136
	Betamix		1.5 pt	2.0 pt					
	Upbeet		0.5 oz	0.5 oz					