

SUGAR BEET HERBICIDE EVALUATION IN CENTRAL OREGON, 1995

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Abstract

Herbicide trials were conducted on three commercial sugar beet fields in central Oregon during 1995. Post-plant, pre-emergence (PPP) applications included ethofumesate (Nortron, AgrEvo) alone and in combination with pyrazon (Pyramin, BASF). Post-emergence applications included phenmedipham and desmeditham (Betamix, AgrEvo), phenmedipham and desmeditham and ethofumesate (Betamix Progress, AgrEvo), clopyralid (Stinger, DowElanco), ethofumesate (Nortron, AgrEvo), and triflurosulfuron (Upbeet, Du Pont) alone and in combination. Treatments, which included Nortron applied PPP, provided the greatest weed control. Common lambsquarters was best controlled with Betamix, redroot pigweed with Betamix or Nortron, hairy nightshade with Nortron or Stinger, redstem filaree with Nortron, and prostrate knotweed with Nortron or Upbeet. Slight to moderate stunting from PPP applications did not adversely affect yields, but inadequate weed control from application of Upbeet alone or in untreated plots significantly reduced yields.

Introduction

The 1995 season is the first year sugar beets have been grown in central Oregon commercially, with 1,600 acres grown under contract with Holly Sugar in Crook, Jefferson and Deschutes Counties. Herbicide trials were conducted at three locations to evaluate Nortron, Betamix, Betamix Progress, Stinger, Upbeet, and Pyramin alone or in combination for control of the weed spectrum found in central Oregon sugar beet fields.

Methods and Materials

Two trials were conducted in the Prineville area, and one near Metolius. Sugar beet varieties were WS 91 at the Mc Phetridge location, Chinook at the Craig location, and Beta 8422 at the Graves location.

Nortron alone, and in combination with Pyramin, was applied post-plant, pre-emergence (PPP). Post-emergence applications were made at the cotyledon stage and followed by a second application a week later at the two-leaf stage. A third application was made to the non-PPP treatments when the sugar beets were at about the six-leaf stage. Herbicides were applied with a CO₂ pressurized, hand-held, boom sprayer at 40 psi and 20 gal/a of water. The 10 ft x 25 ft plots were replicated three times in a randomized complete block design. The crop oil, Scoil, was added at a rate of 1 percent to Upbeet treatments, and LI 700 at 4 oz/100 gal with Betamix Progress applications.

Dates for PPP applications were April 19 at the Graves and Mc Phetridge locations, and April 27 at the Craig location. Post-emergence treatments at the Mc Phetridge location were made on May 5, May 12, and June 19, with exception of the third Upbeet application, which was made on

May 26. The Craig location received post-emergence applications on May 12, May 19, and June 3, while applications at the Graves location were on May 10, May 19, and June 3.

The major weed species at the Mc Phetridge location were common lambsquarters and prostrate knotweed, followed by redstem filaree, hairy nightshade and redroot pigweed. At the Craig location redroot pigweed and hairy nightshade were followed by common lambsquarters in order of importance. Redroot pigweed was the major weed species at the Graves location, followed by common lambsquarters, hairy nightshade, mustards, and prostrate knotweed. Formal evaluations were made at the Craig and Graves locations June 29, and at the Mc Phetridge location on July 5, by rating the percent control of each major weed species.

A 20 ft sample was harvested from the center row of each plot at the Craig location on October 16. This location was chosen because of stunting from both the PPP applications of Nortron and Nortron plus Pyramin. Plot samples were weighed and sub-sampled for evaluation of percent sugar and parts per million nitrate by Holly Sugar.

Results and Discussion

Plots that received Nortron PPP applications had significantly less weeds than those receiving only post-emergence applications. Only two post-emergence applications were necessary following the PPP treatments.

A summary of treatment results at the three locations is provided in Table 1, with specific data for each location in Tables 2-4. Yield data from the Craig location is included in Table 3. Nortron applied PPP followed by Betamix and Upbeet provided the best weed control. Treatments with Betamix appear to provide the greatest control of common lambsquarters. Redroot pigweed was best controlled with treatments containing Betamix or Nortron, while Nortron or Stinger appeared to provide control of hairy nightshade. Nortron appears to be the only material that was consistently effective against redstem filaree. Betamix Progress was not effective against prostrate knotweed, while treatments with Nortron and Upbeet provided control. Although not listed in the tables, Upbeet appears to be important for kochia control.

Nortron applied PPP produced slight stunting of the sugar beets only on the sandy soil at the Craig location. When Pyramin was added to the Nortron PPP application, moderate stunting resulted. Some leaf distortion was found following Stinger applications.

Yield data indicate no adverse effect from slight stunting from Nortron PPP applications, or moderate stunting following the Nortron plus Pyramin PPP applications. The application of Upbeet alone did not provide adequate weed control and significantly reduced yield from the 32 to 35 ton/a range of the other treatments to 21 tons/a, while the untreated plots produced only 7 ton/a. Evaluation of percent sugar and nitrate content revealed no significant differences between treatments. Percent sugar varied from 18.3 to 19.1 and nitrate ranged from 71 to 133 ppm.

Table 1. Summary of sugar beet herbicide trials conducted in central Oregon during 1995 at the Jim Mc Phetridge, Bonnie Craig and Corey Graves farms.

Herbicide Treatments	Application			Percent Control				
	PPP	Post 1,2	Post 3	Lambsquarters	Pigweed	Nightshade	Filaree	Knotweed
Nortron PPP followed by	3 pts			99 a	99 a	95 ab	99 a	97 a
Upbeet + Betamix		1/2 oz 11/2 pts						
Nortron PPP followed by	3 pts			91 a	97 a	94 ab	99 a	100 a
Upbeet + Stinger		1/2 oz 3 fl oz						
Nortron	3 pts			98 a	98 a	99 a	100 a	96 a
+ Pyramin PPP followed by Betamix Progress	4 lbs	1.2 pts						
Betamix Progress followed by		1.2 pts		92 a	95 a	93 ab	80 ab	39 b
Betamix Progress + Stinger			1.2 pts 2 oz					
Upbeet + Betamix		1/2 oz 11/2 pts	1/2 oz 2 pts	95 a	96 a	78 ab	22 ab	95 a
Upbeet + Stinger		1/2 oz 3 fl oz	1/2 oz 3 fl oz	43 b	75 a	99 a	74 ab	98 a
Upbeet + Stinger + Nortron		1/2 oz 3 fl oz 4 11 oz	1/2 oz 3 fl oz 8 fl oz	89 a	76 a	100 a	92 a	100 a
Upbeet		0.5 oz	0.5 oz	18 c	61 a	51 b	73 ab	93 a
Untreated				0 c	0 b	0 c	0 b	0 b

Mean separation with the T-method at P . 0.05

Table 2. Results of sugar beet herbicide trials conducted during 1995 on the Jim Mc Phetridge farm near Prineville, Oregon.

Herbicide Treatments	Application			Percent Control				
	PPP	Post 1,2	Post 3	Lambsquarters	Pigweed	Nightshade	Filaree	Knotweed
Nortron PPP followed by	3 pts			98 a	100 a	93 ab	97 a	93 a
Upbeet + Betamix		1/2 oz 11/2 pts						
Nortron PPP followed by	3 pts			82 a	100 a	93 ab	98 a	100 a
Upbeet + Stinger		1/2 oz 3 fl oz						
Nortron	3 pts			95 a	100 a	97 a	100 a	93 a
+ Pyramin PPP followed by	4 lbs							
Betamix Progress		1.2 pts						
Betamix Progress followed by		1.2 pts		80 a	97 a	85 ab	60 ab	57 b
Betamix Progress			1.2 pts					
+ Stinger			2 oz					
Upbeet + Betamix		1/2 oz 11/2 pts	1/2 oz 2 pts	87 a	100 a	90 ab	43 ab	93 a
Upbeet + Stinger		1/2 oz 3 fl oz	1/2 oz 3 fl oz	33 b	98 a	100 a	47 ab	95 a
Upbeet + Stinger + Nortron		1/2 oz 3 fl oz 4 fl oz	1/2 oz 3 fl oz 8 fl oz	85 a	100 a	100 a	83 a	100 a
Upbeet		0.5 oz	0.5 oz	13 b	93 a	73 b	50 ab	85 ab
Untreated				0 b	0 b	0 c	0 b	0 b

Mean separation with the T-method at P 0.05

Table 3. Results of sugar beet herbicide trials conducted during 1995 on the Bonnie Craig farm near Prineville, Oregon.

Herbicide Treatments	Application			Percent Control					Yield		
	PPP	Post 1,2	Post 3	Lambsquarters	Pigweed	Nightshade			Tons/acre'		
Nortron PPP followed by	3 pts			100	a	99	a	96	ab	33	a
Upbeet + Betamix		1/2 oz 11/2 pts									
Nortron PPP followed by	3 pts			97	a	99	a	98	a	32	a
Upbeet + Stinger		1/2 oz 3 fl oz									
Nortron	3 pts			100	a	99	a	99	a	34	a
+ Pyramin PPP followed by	4 lbs										
Betamix Progress		1.2 pts									
Betamix Progress followed by		1.2 pts		97	a	94	a	94	a	35	a
Betamix Progress followed by			1.2 pts								
Betamix Progress + Stinger			2 oz								
Upbeet + Betamix		1/2 oz 11/2 pts	1/2 oz 2 pts	98	a	94	a	60	b	34	a
Upbeet + Stinger		1/2 oz 3 fl oz	1/2 oz 3 fl oz	43	b	67	b	100	a	34	a
Upbeet + Stinger + Nortron		1/2 oz 3 fl oz 4 fl oz	1/2 oz 3 fl oz 8 fl oz	83	a	92	a	100	a	35	a
Upbeet		0.5 oz	0.5 oz	0	c	57	b	0	c	21	b
Untreated				0	c	0	c	0	c	7	c

Tons/acre based on lbs per 20 ft of single row per plot

Table 4. Results of sugar beet herbicide trials conducted during 1995 on the Corey Graves farm near Metolius, Oregon.

Herbicide Treatments	Application			Percent Control				
	PPP	Post 1,2	Post 3	Lambsquarters	Pigweed	Nightshade	Filaree	Knotweed
Nortron PPP followed by	3 pts			100 a	98 a	96 a	100 a	100 a
Upbeet + Betamix		1/2 oz 11/2 pts						
Nortron PPP followed by	3 pts			95 a	93 a	92 a	100 a	100 a
Upbeet + Stinger		1/2 oz 3 fl oz						
Nortron	3 pts			98 a	96 a	100 a	100 a	98 a
+ Pyramin PPP followed by	4 lbs							
Betamix Progress		1.2 pts						
Betamix Progress followed by		1.2 pts		99 a	93 a	100 a	99 a	20 b
Betamix Progress			1.2 pts					
+ Stinger			2 oz					
Upbeet + Betamix		1/2 oz 11/2 pts	1/2 oz 2 pts	99 a	93 a	85 a	0 b	97 a
Upbeet + Stinger		1/2 oz 3 fl oz	1/2 oz 3 fl oz	53 b	60 b	98 a	100 a	100 a
Upbeet + Stinger + Nortron		1/2 oz 3 fl oz 4 fl oz	1/2 oz 3 fl oz 8 fl oz	99 a	37 b	100 a	100 a	100 a
Upbeet		0.5 oz	0.5 oz	40 b	33 b	80 a	95 a	100 a
Untreated				0 c	0 c	0 b	0 b	0 b

Mean separation with the T-method at P 0.05