EVALUATION OF PREEMERGENCE AND POSTEMERGENCE HERBICIDE APPLICATIONS ON SUGAR BEETS, 1996

Marvin Butler

Abstract

Evaluation of preemergence and postemergence herbicide applications on sugar beets was conducted in two commercial fields near Prineville and Culver, Oregon. Herbicides applied preemergence included ethofumesate (Nortron, AgrEvo), pyrazon (Pyramin, BASF), and cycloate (Ro-Neet, Zeneca). Herbicides applied postemergence were triflusulfuron (Upbeet, Du Pont), phenmedipham plus desmedipham (Betamix, AgrEvo), phenmedipham plus desmedipham plus ethofumesate (Betamix Progress, AgrEvo), and clopyralid (Stinger, DowElanco). At the Prineville location, 100 percent weed control was provided by preemergence application of Pyramin alone or with Nortron, followed by postemergence application of Betamix Progress and Upbeet. Preemergence application of Nortron, followed by postemergence application of Betamix and Upbeet provided 99 percent control. Plots treated with a combination of preemergence and postemergence applications had less weeds than those receiving only postemergence applications. Betamix plus Upbeet performed better than Betamix Progress plus Upbeet. Yields were not affected by slight stunting from Nortron or moderate stunting from Pyramin applied preemergence. Percent sugar and parts per million nitrate in sugar beets was unaffected by treatments.

Introduction

Herbicide trials were conducted at three locations during the 1995 season, the first year sugar beets were grown commercially in central Oregon. The objective of this project was to evaluate Nortron, Pyramin, and Ro-Neet applied preemergence, and Betamix, Betamix Progress, Upbeet, and Stinger applied postemergence to commercially grown sugar beets near Prineville and Culver, Oregon.

Methods and Materials

Treatments were applied with a CO, 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. Crop oil concentrate was added to Upbeet treatments at 1 percent of spray volume.

Treatments applied preemergence at Prineville were made April 15 except Ro-Neet, which was applied April 22 between rain showers. Treatments applied postemergence were made at the cotyledon stage May 28, the four-leaf stage June 3, and the six-leaf stage June 10. Treatments were evaluated for crop injury and percent control of lambsquarters, pigweed, nightshade, filaree, buttonweed, and mustard species June 27. The center 25-foot row of each plot was harvested October 9. Samples were weighed and 10 beet sub-samples evaluated for percent sugar and parts per million nitrate by Spreckles Sugar, Woodland, California.

Preemergence treatments at Culver were applied April 25, except Ro-Neet applied May 2 just prior to irrigation. Postemergence treatments were applied May 16, May 23, and May 30. Treatments were evaluated for crop injury and percent control of pigweed, kochia, nightshade, groundsel, lambsquarters and bindweed June 27.

Results and Discussion

At the Prineville location, plots treated preemergence with Pyramin alone, or in combination with Nortron, followed by postemergence treatments of Betamix Progress plus Upbeet provided the best weed control, with 100 percent control of lambsquarters, pigweed, nightshade, filaree, buttonweed, and mustard species. Plots treated with a combination of preemergence and postemergence herbicides recorded at least 93 to 100 percent total weed control, compared to 83 percent total weed control with postemergence applications only. Preemergence application of Nortron followed by postemergence applications of Betamix plus Upbeet provided 99 percent total weed control compared to 93 percent for Betamix Progress plus Upbeet.

At the Culver location there was greater variability and less weed control, which may have been caused by the stage of development during the spring freezing events. Because of the inability to insure adequate, timely incorporation of Ro-Neet, judgment concerning its performance should be reserved.

There was no reduction in yields following slight stunting in plots treated preemergence with Nortron, or

moderate stunting in plots treatment with Pyramin or Pyramin plus Nortron. In general, the better the weed control, the higher the yield. Treated plots had yields ranging from 25.2 to 28.1 tons/a compared to 13.0 tons/a for untreated plots. There were no significant differences among treatments when evaluated for sugar content, which ranged from 18.3 to 18.8 percent, and nitrate, which ranged from 14 to 31 parts per million.

Table 1. Effect of herbicides applied to sugar beets near Prineville, Oregon, evaluated June 27, 1996.

	Treatments'	Preemergence	Cotyledon	Four-leaf	Six-leaf	Percent Weed Control'						Yield
						Lambsquarters	Pigweed	Nightshade	Filaree	Buttonweed	Mustards	Tons/ acre
1	Nortron	3 pt				96	99	83	99	63	96	25.7
	Betamix Progress		1.2 pt	1.7 pt								
2	Nortron	3 pt				98	100	71	96	95	100	25.2
	Betamix Progress		1.2 pt	1.7 pt								
	Upbeet		0.5 oz	0.5 oz								
3	Nortron	3 pt				97	100	73	71	96	96	25.2
	Betamix Progress		1.2 pt	1.7 pt								
	Stinger			4 fl oz								
4	Nortron	3 pt				100	100	96	100	83	99	26.4
	Betamix Progress		1.2 pt	1.7 pt	2.25 pt							
5	Nortron	3 pt				99	100	99	99	98	98	25.2
	Betamix		1.5 pt	2.0 pt								
	Upbeet		0.5 oz	0.5 oz								
6	Nortron	3 pt				100	100	100	100	100	100	26.6
	Pyramin	4 lb										
	Betamix Progress		1.2 pt	1.7 pt								
	Upbeet		0.5 oz	0.5 oz								
7.	Pyramin	4.6 lb				100	100	100	100	100	100	28.1
	Betamix Progress		1.2 pt	1.7 pt								
	Upbeet		0.5 oz	0.5 oz								
8.	Ro-Neet	0.5 gal				96	95	70	30	100	85	26.0
	Betamix Progress		1.2 pt	1.7 pt								
	Upbeet		0.5 oz	0.5 oz								
9.	Betamix Progress		1.2 pt	1.7 pt	2.2 pt	95	95	88	58	65	96	25.2
	Upbeet		0.5 oz	0.5 oz	0.5 oz							
10.	Untreated					0	0	0	0	0	0	13.0

Visual evaluation was conducted June 27, 1996.

[2] Treatments were applied April 15, May 28, June 3, and June 10, 1996.

Table 2. Effect of herbicide applications on sugar beets near Culver, Oregon, evaluated June 27, 1996.

	Treatments'	Preemergence	Cotyledon	Four-leaf	Six-leaf	Percent Weed Control'					
						Pigweed	Kochia	Nightshade	Lambsquarters	Groundsel	Bindweed
1	Nortron	3 pt				91	23	75	97	100	43
	Betamix Progress		1.2 pt	1.7 pt							
2	Nortron	3 pt				92	79	75	75	65	15
	Betamix Progress		1.2 pt	1.7 pt							
	Upbeet		0.5 oz	0.5 oz							
3	Nortron	3 pt				96	23	100	100	100	25
	Betamix Progress		1.2 pt	1.7 pt							
	Stinger			4 fl oz							
4	Nortron	3 pt				97	63	100	75	100	25
	Betamix Progress		1.2 pt	1.7 pt	2.25 pt						
5	Nortron	3 pt				96	68	75	75	75	30
	Betamix		1.5 pt	2.0 pt							
	Upbeet		0.5 oz	0.5 oz							
6	Nortron	3 pt				97	65	100	100	100	74
	Pyramin	4 lb									
	Betamix Progress		1.2 pt	1.7 pt							
	Upbeet		0.5 oz	0.5 oz							
7.	Pyramin	4.6 lb				99	35	100	100	100	43
	Betamix Progress		1.2 pt	1.7 pt							
	Upbeet		0.5 oz	0.5 oz							
8.	Ro-Neet	0.5 gal				98	55	100	100	93	43
	Betamix Progress		1.2 pt	1.7 pt							
	Upbeet		0.5 oz	0.5 oz							
9.	Betamix Progress		1.2 pt	1.7 pt	2.2 pt	95	25	95	100	100	28
	Upbeet		0.5 oz	0.5 oz	0.5 oz						
10.	Untreated					0	0	0	0	0	0

[1] Visual evaluation was conducted June 27, 1996.

' Treatments were applied April 25, May 16, May 23, and May 30, 1996.