

AN EVALUATION OF FOLIAR ACTIVE GRASS HERBICIDES TANK-MIXED WITH BROADLEAF HERBICIDES FOR WEED CONTROL IN SEEDLING SUGAR BEETS

Charles E. Stanger and Joey Ishida
Malheur Experiment Station
Oregon State University
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Purpose

New grass herbicides with foliar activity and different surfactants were evaluated for control of annual grasses in seedling sugar beets. The herbicides were applied as single and repeat applications beginning when sugar beets had cotyledon leaves. Grass herbicides were evaluated for compatibility when tank-mixed with broadleaf foliar active herbicides including Betamix Progress and Pyramin DF.

Procedures

Sugar beet variety MonoHy WS-PM9 and seed of barnyardgrass and green foxtail were planted on June 14. Sugar beet seed was planted with a Beck planter equipped with shoe openers. Grass seed was planted in the sugar beet row using an Ezee flow granular insecticide applicator. Grass seed was dropped through a tube, falling in a 1-inch wide band over the top of the planted sugar beet seed. The trial area was watered by furrow irrigation the same day of planting to furnish soil moisture for seed germination and emergence.

Stephens winter wheat had been grown during 1994. Bronate herbicide had been applied at the rate of 1 quart per acre to control weeds in the wheat. Following wheat harvest, the straw stubble was shredded with a flail beater and the field was disked and irrigated. In October, the field was mold-board plowed and bedded. One hundred lb/ac of phosphate and 60 lb/ac of nitrogen per acre were applied broadcast before plowing.

The herbicide treatments were applied to fully expanded cotyledon leaf sugar beets on June 23. Grass population was 15 plants/ sq ft and individual grass plants had 1 to 3 leaves. Broadleaf weeds varied in size from cotyledon leaf to 4 true leaves and about 1 inch tall. Broadleaf weed species included redroot pigweed, hairy nightshade, common lambsquarters, and kochia. Air temperature when spraying was 76°F. The wind was calm and the skies clear.

On June 29, herbicide treatments were applied to true-leaf sugar beets on plots previously treated June 23. Sugar beets had two fully developed true leaves with the third and fourth leaves about the size of a dime. Broadleaf species of weeds were 3 to 4 inches tall, and the larger grass plants had 1 to 2 tillers. On June 29, air temperature was 72°F, the skies were clear, and the wind was calm.

All herbicide treatments were applied using a single bicycle wheel plot sprayer. Four Teejet 6502 fan nozzles were mounted 22 inches apart on the spray boom. A spray nozzle was centered over each row of the 4-row plots. Spray pressure was 42 psi, and water as the herbicide carrier applied at a volume of 19.5 gallons per acre. Each treatment was replicated three times using a randomized complete block experimental design.

Results

Poast and Ultima 160 at a rate of 0.1 lb ai per acre and Prism at 0.06 lb ai per acre gave 100 percent control of barnyardgrass and green foxtail when applied to cotyledon-leaf sugar beets when the grass had 1 to 3 leaves. These same herbicides also controlled 100 percent of the grasses when applied at higher rates of 0.3 lb ai per acre and 0.09 lb ai per acre to sugar beets with 2 true leaves and the grass plants were tillering. Differences between surfactants, Atplus 411 or Dash, in activating the grass herbicides were not noted. Both were effective with the herbicides.

The broadleaf herbicides Betamix, Betamix Progress, and Pyramin DF controlled about 75 percent of the grasses when the sugar beets had cotyledon leaves and 30 percent when applied to 2-leaf sugar beets when the grass plants were tillering. The tank-mix combinations which included Pyramin DF and Ultima 160 did not control grass as well as Ultima 160 with Betamix Progress. There appeared to be some antagonism between Ultima 160 and Pyramin DF. Progress applied at 0.73 lb ai per acre to 2-leaf sugar beets caused more injury to sugar beets than lower rates (0.25 lb ai per acre) applied as repeat applications to cotyledon-leaf sugar beets.

The best treatments for both grass and broadleaf weed control and sugar beet tolerance included foliar active grass herbicides tank-mixed with Betamix Progress and applied as repeat applications at low rates to cotyledon-leaf sugar beets. Injury ratings were zero, and weed control ratings were 100 percent. These herbicide combinations applied 2 or 3 times as new weeds emerge gave complete weed control.

Table 1. Sugar beet tolerance and percent weed control from foliar active herbicides applied to seedling sugar beets to control annual grasses and broadleaf weeds. Malheur Experiment Station, Oregon State University, Ontario, Oregon, 1995.

Herbicides	Rate	Applied	Percent weed control																	
			Crop injury			Pigweed			H. nightshade			Lambquarters			Barnyardgrass			Green foxtail		
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
	lb ai/ac		%			%														
Poast + Aplus 411	0.1 + 1.25%	cotyledon + 2lf	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100
Ultima 160 + Dash	0.1 + 1.25%	cotyledon + 2lf	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100
Progress	0.25	cotyledon + 2lf	0	0	0	100	100	100	100	100	100	100	100	100	80	70	70	85	75	75
Prism + Aplus 411	0.06 + 1.25%	cotyledon + 2lf	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100
Progress + Ultima 160	0.25 + 0.1	cotyledon + 2lf	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Betamix + Pyramin DF	0.25 + 0.33	cotyledon + 2lf	0	0	0	100	100	100	98	100	100	100	100	100	70	80	70	75	80	70
Betamix + Pyramin DF + Ultima 160	0.25 + 0.33 + 0.1	cotyledon + 2lf	0	0	0	100	95	98	100	95	95	100	98	98	98	98	98	100	100	99
Betamix + Ultima 160	0.25 + 0.1	cotyledon + 2lf	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Progress + Pyramin DF	0.25 + 0.33	cotyledon + 2lf	0	0	0	98	100	100	95	100	100	98	100	100	70	70	70	70	70	70
Ultima 160 + MorAct	0.1 + 1.25%	cotyledon + 2lf	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100
Poast + Aplus 411	0.3 + 1.25%	2 leaf	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100
Ultima 160 + Dash	0.3 + 1.25%	2 leaf	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100
Progress	0.73	2 leaf	10	20	25	90	95	95	80	85	85	80	90	95	80	85	80	80	85	80
Prism + Aplus 411	0.09 + 1.25%	2 leaf	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100
Progress + Ultima 160	0.73 + 0.1	2 leaf	20	25	25	90	75	95	90	75	95	90	80	95	100	100	100	100	100	100
Betamix + Pyramin DF	0.73 + 1.0	2 leaf	10	25	20	85	90	95	70	85	90	90	95	95	30	30	30	30	30	30
Betamix + Pyramin DF + Ultima 160	0.73 + 1.0 + 0.1	2 leaf	5	10	10	95	98	98	90	95	98	95	90	80	80	80	80	80	85	85
Betamix + Ultima 160	0.73 + 0.3	2 leaf	5	25	25	98	85	80	95	80	80	95	80	80	98	95	98	99	95	98
Progress + Pyramin DF	0.73 + 1.0	2 leaf	5	15	15	90	95	90	85	90	90	85	90	90	40	40	30	40	40	30
Ultima 160 + MorAct	0.3 + 1.25%	2 leaf	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100
Untreated	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Evaluated July 10. Ratings: 0 = no herbicide effect. 100 = all plants killed.

Plot size = 4 rows x 15 feet, 3 replications

Dates of application: -cotyledon leaf sugar beets, June 23 first application; repeat application June 29.

-single application to 2-leaf sugar beets June 29.

Air temperature was 78°F at spraying time with a high of 88°F forecast. Skies were clear with no wind.