

COMPARING HERBICIDES FOR BROADLEAF WEED CONTROL IN SUGARBEET

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The objective of this study was to evaluate broadleaf weed control from single applications of individual herbicides currently registered for use in Roundup Ready (RR) sugarbeet.

MATERIALS AND METHODS

An experiment was conducted near Hickson, ND in 2017. Fertilizer was spread April 11 and incorporated the same day with a field cultivator equipped with a spring tooth harrow. The trial site was prepared using a Kongskilde ‘s-tine’ field cultivator with rolling baskets on May 13, 2017. Four-foot-wide strips of bioassay species including canola, amaranth, quinoa, and flax were seeded perpendicular to sugarbeet on May 13. Seedex ‘Winchester’ sugarbeet, treated with NipsIt Suite, Tachigaren at 45g per unit, and Kabina at 7g per unit, were then seeded in 22-inch rows at 60,560 seeds per acre on May 13 with a John Deere 1700XP 6-row planter. Post emergence (POST) treatments were applied June 9. All herbicide treatments were applied with a bicycle sprayer in 17 gpa spray solution through 8002 XR flat fan nozzles pressurized with CO₂ at 40 psi to the center four rows of six row plots 35 feet in length.

All sugarbeet injury and weed control evaluations were a visual estimate of percent fresh weight reduction in the four treated rows compared to the adjacent untreated strip. Experimental design was randomized complete block with 4 replications for each trial. Data were analyzed with the ANOVA procedure of ARM, version 2017.4 software package.

Table 1. Application Information – Hickson, ND 2017

Date	June 9
Time of Day	12:30 PM
Air Temperature (F)	82
Relative Humidity (%)	42
Wind Velocity (mph)	9
Wind Direction	SE
Soil Temp. (F at 6")	69
Soil Moisture	Fair
Cloud Cover (%)	30
Next Rainfall (amount)	June 11 (0.11")
Sugarbeet Stage	4 leaf
Amaranth (and natural redroot pigweed)	2-6 lf / avg 4 lf
RR canola	2-4 lf/ avg 3 lf (2" tall)
Flax	2-4 inch / avg 3 inch
Quinoa (and natural common lambsquarters)	2-3 inch/ avg 3 inch
Yellow Foxtail	2-3 inch/ avg 3 inch

SUMMARY

UpBeet (triflurosulfuron) is the only ALS (group 2) herbicide registered for use in sugarbeet. No sugarbeet injury was observed in this trial from either 0.5 or 1.0 oz/A of UpBeet (Table 2). UpBeet provided the greatest Roundup Ready canola control of all herbicides evaluated. Canola control increased from 73% to 90% at 13 DAT as rate increased from 0.5 to 1.0 oz/A. UpBeet gave 70 to 78% pigweed control and provided some suppression of lambsquarters, flax, and yellow foxtail.

Table 2. Sugarbeet injury and weed control from herbicides at Hickson, ND in 2017.

Herbicide	Rate	Rate Unit	16 Jun		-----22 Jun-----				
			Sgbt	Sgbt	rrpw ³	colq ⁴	cano ⁵	flax	yefx ⁶
			----% inj----		-----% cntl-----				
UpBeet ¹	0.5	oz/A	0	0	70	45	73	45	55
UpBeet ¹	1	oz/A	0	0	78	38	90	65	58
Nortron ¹	12	fl oz/A	5	0	25	25	20	45	0
Nortron ¹	16	fl oz/A	0	0	35	38	25	45	0
Nortron ¹	32	fl oz/A	13	0	50	50	35	48	0
Nortron ¹	64	fl oz/A	3	0	60	58	53	73	0
Stinger ¹	2	fl oz/A	20	- ⁷	3	23	0	0	0
Stinger ¹	4	fl oz/A	20	-	3	20	0	0	0
Roundup PowerMax ²	22	fl oz/A	0	0	99	91	0	100	100
Roundup PowerMax ²	28	fl oz/A	0	0	100	92	0	100	100
Roundup PowerMax ²	32	fl oz/A	3	0	100	95	0	100	100
Betamix ¹	12	fl oz/A	25	0	35	40	20	25	0
Betamix ¹	16	fl oz/A	40	10	48	53	18	30	5
Betamix ¹	24	fl oz/A	45	30	60	65	40	35	0
Spin-Aid ¹	12	fl oz/A	20	-	10	53	13	23	0
Spin-Aid ¹	24	fl oz/A	33	-	13	50	23	18	0
Spin-Aid ¹	36	fl oz/A	45	-	23	68	40	35	0
LSD (0.05)			15	-	14	19	11	18	5

¹Herbicide applied with MSO from Loveland at 2 pt/A + AMS at 8.5 lb/100 gal

²Herbicide applied with Prefer 90 NIS from West Central at 0.25% v/v + AMS at 8.5 lb/100 gal

³rrpw=redroot pigweed + tame amaranth

⁴colq=common lambsquarters + quinoa

⁵cano=Roundup Ready (RR) canola

⁶yefx=yellow foxtail

⁷- = no injury data was recorded due to weed competition. No LSD was calculated due to the missing data.

Nortron (ethofumesate) is the only herbicide found in group 16 and can be applied pre-plant incorporated (PPI), pre-emergence (PRE) or POST in sugarbeet. Current labeling allows for POST application of up to only 12 fl oz/A of Nortron per season. Nortron rates in this trial ranged from 12 to 64 fl oz/A. Very little sugarbeet injury was observed from any rate of Nortron evaluated in this trial at 7 DAT (0 to 13%) and no injury was observed at 13 DAT. At 12 fl oz/A, Nortron provided little control or suppression of any weed species evaluated. Control of all species increased as rate increased, but never above 75%. Nortron did not control yellow foxtail when applied POST at any rate. Though not tested in this trial, data from other trials demonstrates that Nortron improves weed control, including waterhemp or pigweed, when tank-mixed with other herbicides.

Stinger (clopypalid) is the only group 4 (growth regulator) herbicide currently labeled in sugarbeet. Stinger caused 20% sugarbeet leaf curling injury at both 2 and 4 fl oz/A at 7 DAT. This level of injury is generally tolerable early in the season. Stinger provided little to no control of any of the weeds found in this trial. Stinger is an effective herbicide to use in controlling thistle, common ragweed, and giant ragweed, but it has very little if any efficacy against amaranthus species (pigweeds and waterhemp), lambsquarters, or canola. Stinger has no grass activity.

Roundup PowerMax (glyphosate) is a group 9 herbicide and may be applied in Roundup Ready sugarbeet. Roundup is very safe in RR sugarbeet and no notable sugarbeet injury was observed in this trail at any rate tested. Roundup provided the greatest and most consistent control of all species in this trial, with the exception of RR canola. Common lambsquarters was the most difficult weed to control with Roundup, and control varied from 91 to 95% 13 DAT.

Betamix (phenmedipham + desmedipham) is a group 5 (photosynthesis inhibitor) herbicide labeled for use in sugarbeet. Betamix gave moderate sugarbeet injury at all rates tested. Injury ranged from 25 to 45% 7 DAT and 0 to

30% 13 DAT and increased as rate increased. Injury symptoms were leaf burn and some plant height reduction. Betamix provided poor to fair control of pigweed (35 to 60%) and common lambsquarters (40 to 65%), but control improved as rate increased. Weeds were 3 to 4 inches tall at time of application and Betamix is generally considered most effective when applied to cotyledon pigweed or lambsquarters. Betamix provided some suppression of RR canola and flax, but no control of yellow foxtail.

Spin-Aid (phenmedipham) is a group 5 (photosynthesis inhibitor) herbicide labeled for use in sugarbeet. Spin-Aid gave moderate sugarbeet injury at all rates tested. Injury ranged from 20 to 45% 7 DAT and increased as rate increased. Injury symptoms were leaf burn and some plant height reduction. Compared to Betamix (phenmedipham + desmedipham) Spin-Aid (phenmedipham) gave less control of pigweed (10 to 23%) and similar common lambsquarters control (50 to 68%), and control tended to improve as rate increased. Similar to Betamix, Spin-Aid is generally considered most effective when applied to cotyledon pigweed or lambsquarters. Spin-Aid provided some suppression of RR canola and flax, but no control of yellow foxtail.

CONCLUSIONS

Only six herbicide options exist for controlling broadleaf weeds POST in sugarbeet. In this trial, only Roundup PowerMax (glyphosate) gave greater than 90% control of any weeds present. UpBeet at 1 oz/A gave the greatest control of RR canola at 90%. Using UpBeet, Nortron, Stinger, Betamix, or Spin-Aid alone will not provide adequate control of pigweeds, common lambsquarters, or yellow foxtail. Using the appropriate herbicide, however, in conjunction with glyphosate, may improve control of difficult to control weeds, such as waterhemp, lambsquarters, and common ragweed and delay the selection of glyphosate resistant weeds.