

REINVENTING COMMON RAGWEED CONTROL WITH STINGER HL IN SUGARBEET

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Summary

1. Apply Stinger HL at 1.8 to 2.4 fl oz/A for control of common ragweed less than 2-inches.
2. Repeat Stinger HL applications at 1.8 followed by (fb) 1.8 fl oz/A on common ragweed less than 2-inches.
3. Apply Stinger HL at 2.4 fl oz/A for control of common ragweed greater than 2-inches but less than 4-inches.
4. Repeat Stinger HL applications at 1.8 fb 1.8 fl oz/A or 2.1 fb 2.1 fl oz/A on common ragweed greater than 2-inches but less than 4-inches.
5. Stinger HL maybe applied in mixtures with glyphosate, ethofumesate, and a chloroacetamide herbicide.

Introduction

Common ragweed is a troublesome summer annual broadleaf weed in sugarbeet in Minnesota and North Dakota. Growers attending the 2022 sugarbeet growers' seminars reported common ragweed as their second most troublesome weed following waterhemp. Past experiments investigating chemical control options reported targeting common ragweed less than 2-inches with repeat glyphosate plus clopyralid applications at 28 fl oz/A plus 4 fl oz/A, respectively, provided 92% control. Repeat applications of clopyralid plus glyphosate were more effective on both small (≤ 2 inches) and larger (≤ 4 inches) common ragweed; however, common ragweed 6-inches or greater were too large for POST control in sugarbeet. Recent greenhouse evaluation of common ragweed sourced from fields with weed control failures confirmed that the application of glyphosate alone is no longer an effective mode of action for common ragweed control. In addition, certain common ragweed populations from 2021 also demonstrated alarming tolerance to clopyralid; however, clopyralid eventually provided common ragweed suppression at 6 fl oz/A.

The objectives of this experiment were to 1) continue research focused on applications timed to common ragweed stage of growth and 2) identify appropriate Stinger HL use rates to improve common ragweed control.

Materials and Methods

Experiments were conducted on natural populations of common ragweed near Ada, MN in 2022. Plot area was located in a commercial sugarbeet field under conventional tillage. Sugarbeet was seeded 1.25 inches deep in 22-inch spaced rows at 62,000 seeds per acre on May 26. Herbicide treatments were applied June 9, 17, 22, and 27 (Table 1). All 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 40 feet in length in a field with moderate levels of glyphosate-resistant common ragweed.

Table 1. Application Information.

Application Code	A	B	C	D
Date	June 9	June 17	June 22	June 27
Time of Day	11:00 AM	2:00 PM	12:30 PM	9:45 AM
Air Temperature (F)	73	82	77	72
Relative Humidity (%)	32	36	50	53
Wind Velocity (mph)	2	3	6	4
Wind Direction	NNE	NNW	SW	SW
Soil Temp. (F at 6")	60	70	66	60
Soil Moisture	Dry	Dry	Fair	Fair
Cloud Cover (%)	0	100	80	0
Sugarbeet stage (avg)	2 lf	2-4 lf	6-8 lf	8 lf
Common Ragweed (avg)	1"	2"	3"	4"

Sugarbeet injury and weed control were evaluated on June 22 and 28 and July 8 and 16 with one additional weed control evaluation on July 26. All evaluations were a visual estimate of percent fresh weight reduction (0 to 100% control, 0% indicating no control, and 100% indicating complete control) in the four treated rows compared with the adjacent untreated strip. Experimental design was randomized complete block with 4 replications. Data were analyzed with the ANOVA procedure of ARM, version 2022.5 software package.

Results

Sugarbeet injury was negligible across the experiment; however, injury tended to be greater when herbicide treatments were applied to 6-8 or 8 leaf sugarbeet compared with applications made to 2- or 2-4 leaf sugarbeet (Table 2). Of the treatments applied to 2-leaf sugarbeet, repeat applications of Roundup PowerMax3 plus Stinger HL at 1.8 fl oz/A had the greatest injury at 11%. Likewise, sugarbeet injury was 15% and 13% from repeat applications of Roundup PowerMax3 plus Stinger HL at 1.5 and 1.8 fl oz/A at the 2-4 and 8-leaf sugarbeet stage, respectively.

Table 2. Sugarbeet injury across herbicide treatments, Ada, MN, 2022.^a

Herbicide Treatment ^b	Rate	Common Ragweed ---inches---	Sugarbeet ---lvs---	Sugarbeet Injury -----%-----	
				June 30	July 16
Stinger HL + Roundup PowerMax3	1.2 + 25	<2	2	0 a	0
Stinger HL + Roundup PowerMax3	1.8 + 25	<2	2	0 a	0
Stinger HL + Roundup PowerMax3	2.4 + 25	<2	2	0 a	0
Stinger HL + Roundup PowerMax3 / Stinger HL + Roundup PowerMax3	1.5 + 25 / 1.5 + 25	<2 / 10 days	2 / 6-8	4 ab	0
Stinger HL + Roundup PowerMax3 / Stinger HL + Roundup PowerMax3	1.8 + 25 / 1.8 + 25	<2 / 10 days	2 / 6-8	11 cd	0
Stinger HL + Roundup PowerMax3	1.2 + 25	2-4	2-4	6 abc	0
Stinger HL + Roundup PowerMax3	1.8 + 25	2-4	2-4	8 bc	0
Stinger HL + Roundup PowerMax3	2.4 + 25	2-4	2-4	11 cd	3
Stinger HL + Roundup PowerMax3 / Stinger HL + Roundup PowerMax3	1.5 + 25 / 1.5 + 25	2-4 / 10 days	2-4 / 8	15 d	0
Stinger HL + Roundup PowerMax3 / Stinger HL + Roundup PowerMax3	1.8 + 25 / 1.8 + 25	2-4 / 10 days	2-4 / 8	13 cd	0
LSD (0.05)				7	NS

^aMeans within a rating timing that do not share any letter are significantly different by the LSD at the 5% level of significance.

^bRoundup PowerMax3 plus Stinger HL treatments were applied with Amsol AMS at 2.5% v/v and Prefer 90 NIS at 0.25% v/v.

Trials conducted in 2014 (Peters and Carlson 2014) and 2018 (Peters and Lystad 2018) had greater sugarbeet injury from Stinger at 2 to 4 fl oz/A plus glyphosate when applied to 4-8 leaf sugarbeet compared with 2-4 leaf sugarbeet (data not presented). Additional trials conducted in 2009 and 2010 had greater sugarbeet injury from two sequential applications of Stinger at 4 fl oz/A compared with a single application of Stinger at 8 fl oz/A (data not presented).

The 2022 trial was similar in both regards with sugarbeet injury tending to be greater from two applications of Stinger HL compared with a single application and greater injury when applications were made to larger sugarbeet compared with smaller sugarbeet. However, there were no differences in sugarbeet injury across treatments at 19 days after the last application.

Common ragweed size impacted control from Stinger HL plus Roundup Powermax3. Herbicide treatments applied to less than 2-inch common ragweed provided greater control than the same treatments applied to 2-4-inch common ragweed (Table 3). On less than 2-inch common ragweed, sequential applications of Stinger HL at 1.8 fl oz/A + Roundup PowerMax3 provided up to 94% common ragweed control compared with a single application at up to 80%, 28 DAT (days after treatment). Similarly, a single application of Stinger HL at 1.8 fl oz/A + Roundup PowerMax3 to 2-4-inch common ragweed gave 63% control while two applications of Stinger HL at 1.8 fl oz/A + Roundup PowerMax3 gave 79% control, 28 DAT.

Table 3. Common ragweed control across herbicide treatments, Ada, MN, 2022.^a

Herbicide Treatment ^b	Rate	Common Ragweed	Common Ragweed Control		
			July 8 8 DAT ^c	July 16 18 DAT	July 26 28 DAT
		---inches---	-----%-----		
Stinger HL + Roundup PowerMax3	1.2 + 25	<2	75 b	61 cd	60 cd
Stinger HL + Roundup PowerMax3	1.8 + 25	<2	91 a	83 b	80 b
Stinger HL + Roundup PowerMax3	2.4 + 25	<2	91 a	87 ab	88 a
Stinger HL + Roundup PowerMax3 / Stinger HL + Roundup PowerMax3	1.5 + 25 / 1.5 + 25	<2 / 10 days	91 a	91 ab	89 a
Stinger HL + Roundup PowerMax3 / Stinger HL + Roundup PowerMax3	1.8 + 25 / 1.8 + 25	<2 / 10 days	95 a	92 a	94 a
Stinger HL + Roundup PowerMax3	1.2 + 25	2-4	65 c	59 cd	54 c
Stinger HL + Roundup PowerMax3	1.8 + 25	2-4	68 bc	61 cd	63 c
Stinger HL + Roundup PowerMax3	2.4 + 25	2-4	71 c	67 c	65 c
Stinger HL + Roundup PowerMax3 / Stinger HL + Roundup PowerMax3	1.5 + 25 / 1.5 + 25	2-4 / 10 days	69 c	69 c	77 b
Stinger HL + Roundup PowerMax3 / Stinger HL + Roundup PowerMax3	1.8 + 25 / 1.8 + 25	2-4 / 10 days	70 bc	69 c	79 b
LSD (0.05)			6	8	6

^aMeans within a rating timing that do not share any letter are significantly different by the LSD at the 5% level of significance.

^bRoundup PowerMax3 plus Stinger HL treatments were applied with Amsol AMS at 2.5% v/v and Prefer 90 NIS at 0.25% v/v.

^cDAT=Days after treatment.

Common ragweed control tended to increase as Stinger HL rate increased in both single and sequential applications across all common ragweed sizes. Single applications of Stinger HL at 1.8 fl oz/A or 2.4 fl oz/A plus Roundup PowerMax3 provided 80% and 88% control, respectively, on less than 2-inch common ragweed as compared with Stinger HL at 1.8 fl oz/A or 2.4 fl oz/A plus Roundup PowerMax3 at 63% or 65% control, respectively, on 2-4-inch common ragweed. Stinger HL at 1.2 fl oz/A plus Roundup PowerMax3 did not provide acceptable control, or greater than 90%, across all common ragweed sizes.

Acceptable control was achieved when herbicide applications were made on small common ragweed. Stinger HL rates should be 1.8 to 2.4 fl oz/A plus Roundup PowerMax3, applied to less than 2-inch common ragweed, to provide the best opportunity for greater than 90% control. Sequential applications increase the length of control across small and large common ragweed; however, two sequential applications of Stinger HL at 1.8 fl oz/A plus Roundup PowerMax3 on less than 2-inch common ragweed provided the greatest control. Common ragweed that is 2-4-inches or greater is too big for a POST herbicide program in sugarbeet to provide acceptable control.

Conclusion

Throughout the common ragweed experiments over the years, one message has stayed consistent, which is: Greatest common ragweed control is achieved when sprayed small. We must time our Stinger HL applications to ragweed size rather than sugarbeet stage for optimal common ragweed control. We recommend Stinger HL at 1.8 fl oz/A as the lowest rate applied for common ragweed control. For a single application, we recommend Stinger HL at 2.4 fl oz/A plus Roundup PowerMax3. For sequential applications, we recommend Stinger HL at 1.8 fl oz/A plus Roundup PowerMax3. It is difficult to achieve acceptable control when common ragweed is 2-4-inches. There are no herbicide options that will provide acceptable control for common ragweed that is 6-inches or greater.

If nurse crops are a concern, glyphosate and Stinger HL applications may need to be separated in order to control early emerged common ragweed while maintaining the nurse crop. Stinger HL may be tank-mixed with glyphosate, ethofumesate, and a chloroacetamide, while preserving sugarbeet tolerance.

Literature Cited

1. Peters, TJ and Carlson, AL (2014) Featured weed-common ragweed controlling common ragweed in fields planted to sugarbeet. Sugarbeet Research and Extension Reports.
2. Peters, TJ and Lystad, AL (2018) Controlling common ragweed in fields planted to sugarbeet. Sugarbeet Research and Extension Reports.