

CONTROLLING COMMON RAGWEED IN FIELDS PLANTED TO SUGARBEET

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Summary

1. For common ragweed that is 0- to 2-inches tall, make a single application of Stinger at 3 fl oz/A plus glyphosate at 0.98 lb ae/A (equivalent to Roundup PowerMax at 28 fl oz/A). A second application of Stinger at 2 fl oz/A plus glyphosate may be needed 14 days after the first application. Herbicide application to small common ragweed provides the greatest control.
2. For common ragweed 2- to 4-inches tall, make a single application of Stinger at 4 fl oz/A plus glyphosate at 0.98 lb ae/A. A second application of Stinger at 3 fl oz/A plus glyphosate may be needed 14 days after the first application.
3. For common ragweed 4- to 6-inches tall, apply Stinger at 4 fl oz/A plus glyphosate. A second application of Stinger at 4 fl oz/A plus glyphosate may be needed 14 days after the first application.
4. Glyphosate resistant common ragweed greater than 6-inches tall can only be partially controlled with POST herbicides in sugarbeet. For maximum control, apply Stinger at 4 fl oz/A plus glyphosate followed by Stinger at 4 fl oz/A plus glyphosate plus high surfactant methylated seed oil concentrate (HSMOC) 14 days after the first application. While this herbicide combination will only provide partial control of common ragweed greater than 6-inches, maximizing spray coverage through increased spray volume and droplet quality may improve control.

Introduction

Common ragweed is a troublesome weed found in both Minnesota and North Dakota. Integrated strategies of cultural, mechanical, and chemical control options are required for controlling this species. Mowing can be an effective strategy, especially in ditches and grass waterways, if done on a regular basis. Two-inch common ragweed is very resilient, especially if only damaged above the seed leaves. Mowed common ragweed can grow new stems and flower just ten days later than plants not mowed. Longevity of common ragweed seed makes managing flushes or complete eradication of this species very difficult. Several soil-applied herbicides labeled for corn and soybean use have activity on common ragweed, however, few herbicides are labeled in sugarbeet that control this species.

Experiments were conducted on natural populations of common ragweed within a sugarbeet field near Mayville, North Dakota in 2014 (Peters and Carlson 2014). The field contained some glyphosate resistant common ragweed biotypes. Treatments included herbicide applications on June 10, 18, 24, and 26, and July 7 and 18, targeting 0-1, ≤2, and 4-inch common ragweed.

Negligible sugarbeet injury was observed in the 2014 experiment. Greatest injury occurred when treatments were applied to 4-inch common ragweed, however, injury was more likely from weed competition than herbicide treatments. Visual sugarbeet injury was greatest after sequential applications of Roundup PowerMax (glyphosate) at 28 fl oz/A plus Stinger at 4 fl oz/A. Visual sugarbeet injury in this experiment, as well as similar trials from 2009 and 2010, was commonly observed when Stinger was applied to cotyledon or 2-leaf sugarbeet at rates of 4 fl oz/A or greater. Sugarbeet injury was inconsistent among treatments and decreased over time.

Weed control in the 2014 study was greatest when treatments were applied to one-inch common ragweed compared to two- or four-inch common ragweed. Treatments containing Stinger averaged 95% ragweed control when applications were made to one-inch or smaller ragweed, 92% control when applications were made to ragweed up to 2-inches tall, and 86% control when applications were made on ragweed up to 4-inches tall. Treatments containing Stinger gave greater common ragweed control, regardless of weed height at time of application, compared to treatments containing only glyphosate.

Materials and Methods

Experiments were conducted on natural populations of common ragweed near Doran, Minnesota in 2018. Plot area was located in a commercial sugarbeet field under conventional tillage. “ACH 830” sugarbeet was seeded 1.25 inches deep in 22-inch spaced rows at 61,500 seeds per acre on May 6. Herbicide treatments were applied May 31, and June 13 and 27. All treatments were applied with a bicycle sprayer in 17 gpa spray solution through 8002 XR flat fan nozzles pressurized with CO₂ at 42 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. Ammonium sulfate in all treatments was a liquid formulation from Winfield United called N-Pak AMS.

Sugarbeet injury was evaluated on June 21 and 28. Weed control was evaluated June 21 and 28, and July 11. All 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. Data were analyzed with the ANOVA procedure of ARM, version 2018.4 software package.

Table 1. Application Information

Application Code	A	B	C	D
Date	May 31	June 13	June 13	June 27
Time of Day	4:30 PM	12:00 PM	12:15 PM	2:00 PM
Air Temperature (F)	82	74	75	85
Relative Humidity (%)	36	36	38	53
Wind Velocity (mph)	8	6	6	3
Wind Direction	N	S	S	SW
Soil Temp. (F at 6")	68	68	68	76
Soil Moisture	Fair	Good	Good	Good
Cloud Cover (%)	0	20	20	60
Sugarbeet stage (avg)	2-4 leaf	6-8 leaf	6-8 leaf	12-14 leaf
Ragweed (avg)	2"	6"	6"	10"

Results and Discussion

Sugarbeet Injury- Sugarbeet injury evaluation was difficult due to heavy common ragweed competition. Sugarbeet injury was generally greater when herbicide treatments were applied to 6-8 leaf sugarbeet and 6-inch common ragweed compared to applications made to 2-4 leaf sugarbeet and 2-inch common ragweed (Table 2). Of the treatments applied to 2-4 leaf sugarbeet, ethofumesate plus glyphosate gave the greatest injury at 15 to 18%. Sugarbeet injury was 10% or less from Stinger at 2 or 4 fl oz/A applied in either a single or repeat application and could be considered negligible. Sugarbeet injury was greatest when Stinger was applied with glyphosate to 6-8 leaf sugarbeet and 6-inch common ragweed. Two applications of Stinger at 4 fl oz/A plus glyphosate showed the greatest amount of injury at 23% to 28%.

Trials conducted in 2014 (Peters and Carlson 2014) had greater sugarbeet injury from Stinger at 2 to 4 fl oz/A plus glyphosate when applied to 4-8 leaf sugarbeet compared to 2-4 leaf sugarbeet (data not presented). Trials conducted in 2009 and 2010 had greater sugarbeet injury from two sequential applications of Stinger at 4 fl oz/A compared to a single application of Stinger at 8 fl oz/A (data not presented). The 2018 trial was similar in both regards with sugarbeet injury tending to be greater from two applications of Stinger compared to a single application and greater injury when applications were made to larger sugarbeet compared to smaller sugarbeet.

Common Ragweed Control- Common ragweed size impacted control from Stinger plus glyphosate. Herbicide treatments applied to 2-inch common ragweed generally provided greater control than the same treatments applied to 6-inch common ragweed (Table 2). On 2-inch common ragweed, sequential applications of Stinger + glyphosate tended to improve common ragweed control compared to a single application. A single application of Stinger at 4 fl oz/A + glyphosate to 2-inch common ragweed gave 93% control while two applications of Stinger at 4 fl oz/A plus glyphosate gave 100% control. Similarly, a single application of Stinger at 4 fl oz/A + glyphosate to 6-inch common ragweed gave 73% control while two applications of Stinger at 4 fl oz/A plus glyphosate gave 91% control.

Herbicide treatments containing Stinger usually improved common ragweed control compared to glyphosate alone (Table 2). Glyphosate alone gave 73% ragweed control compared to Stinger at 4 fl oz/A plus glyphosate showing 95% control. These results indicated the common ragweed biotype had some glyphosate resistance. The addition of ethofumesate to glyphosate did not improve control of 2-inch common ragweed.

Acceptable control can be achieved when herbicide applications are made to small common ragweed. Stinger rates should be 3-4 fl oz/A, plus glyphosate, to ensure greater than 90% control. Sequential application increases the likelihood of 100% control, even on small common ragweed. Two sequential applications of Stinger at 4 fl oz/A plus glyphosate will provide the greatest control on common ragweed, however, common ragweed that is 6-inches or greater is too big for a POST herbicide program in sugarbeet to provide acceptable control.

Table 1. Sugarbeet injury and common ragweed control near Doran, MN in 2018.

Treatment	Rate fl oz/A	Application Code ¹	June 21	June 28	June 21	June 28	July 11
			sgbt injury	sgbt injury	cora cntrl	cora cntrl	cora cntrl
			-----%				
2" common ragweed							
PMax ^{2,3}	28	A	8	8	73	55	58
PMax+Etho ⁴	28+4	A	18	15	73	55	53
PMax+Stinger	28+2	A	5	10	88	85	74
PMax+Stinger	28+4	A	8	5	95	94	93
2" + 14 days							
PMax+Stinger/ PMax+Stinger	28+2/ 28+2	A / B	10	5	99	98	100
PMax+Stinger/ PMax+Stinger	28+4/ 28+4	A / B	8	10	100	100	100
6" common ragweed							
PMax	28	C	5	15	71	78	66
PMax+Etho	28+4	C	18	15	76	71	65
PMax+Stinger	28+2	C	13	25	65	76	72
PMax+Stinger	28+4	C	23	23	65	75	73
6" + 14 days							
PMax+Stinger/PMax+Stinger	28+2/ 28+2	C / D	15	25	78	81	82
PMax+Stinger/ PMax+Stinger	28+4/ 28+4	C / D	28	23	70	76	91
LSD (0.05)			13	14	11	13	15

¹Application information is listed in Table 1

²PMax=Roundup PowerMax

³PMax alone and PMax+Stinger treatments were applied with N-Pak AMS at 2.5% v/v and Prefer 90 NIS at 0.25% v/v.

⁴PMax+Etho treatments were applied with N-Pak AMS at 2.5% v/v and high surfactant methylated oil concentrate (HSMOC) at 1.5 pt/A.

Other Weeds- Common lambsquarters was also evaluated in this trial. Treatments applied to 2-inch common lambsquarters provided 95% control while treatments applied to 8-inch common lambsquarters gave 80% control when evaluated 21 days after application (data not shown). No differences were observed when evaluated 28 days after application.

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.