

FEATURED WEED – COMMON RAGWEED CONTROLLING COMMON RAGWEED IN FIELDS PLANTED TO SUGARBEET

Thomas J. Peters¹ and Aaron L. Carlson²

¹Extension Sugarbeet Agronomist and Weed Control Specialist and ²Research Specialist
North Dakota State University and the University of Minnesota, Fargo, ND

Summary

1. For common ragweed control in fields with biotypes that are moderately resistant to glyphosate and are less than one-inch tall, spray glyphosate at 0.98 lb ae/A (equivalent to Roundup PowerMax at 28 fl oz/A) plus Stinger at 2 fl oz/A. Make a repeat application approximately 14 days following the first application.
2. For common ragweed control in fields with biotypes that are moderately resistant to glyphosate and are less than two-inches tall, spray glyphosate at 0.98 lb ae/A plus Stinger at 3 fl oz/A. Make a repeat application approximately 14 days following the first application.
3. For common ragweed control in fields with moderate level infestations or in fields with glyphosate resistant biotypes that are up to four-inches tall, spray glyphosate at 0.98 lb ae/A plus Stinger at 4 fl oz/A or glyphosate at 0.98 lb ae/A plus Stinger at 2 oz/A plus either ethofumesate at 4 fl oz/A, UpBeet at 0.5 oz/A or Betamix at 12 fl oz/A plus a high surfactant methylated seed oil concentrate (HSMOC) at 1.5 pt/A. Make a repeat application approximately 14 days following the first application.
4. Stinger at 2 fl oz/A followed by Stinger at 2 fl oz/A will not cause significant injury to cotyledon to two-leaf sugarbeet. However, there will be visual injury from Stinger at 4 fl oz/A followed Stinger at 4 fl oz/A, especially when the first application is over cotyledon to 2-leaf sugarbeet.
5. Stinger will not antagonize control of foxtail species, redroot pigweed, or common lambsquarters but may antagonize control of waterhemp from glyphosate.

Introduction

Common ragweed is a summer annual broadleaf weed in the composite family. Common ragweed germinates and emerges from April through May on or very near the soil surface and returns to dormancy once hot temperatures arrive during late June, July and August. Common ragweed is frequently found in pastures and along ditches or waterways but is also common in corn and soybean fields in the upper Midwest, especially in fields where reduced-tillage or no-tillage systems are practiced. Common ragweed is synonymous with allergies including 'hay fever' due to the great amount of pollen it produces, as many as one billion grains of pollen per plant during the year.

Common ragweed cotyledons are spoon shaped or nearly round and are somewhat thickened. The true leaves have a very distinct shape, that tell-tale phenotype we have observed on so many occasions in fields. Leaves have one or two deep clefts, forming lobes in each margin that are slightly pointed at the tips. Short, whitish hairs cover the leaves and stem and are most dense on the lower leaf surfaces. Male and female flowers are in separate heads on the same plant. Plants produce between 30,000 and 60,000 seeds per plants that range from three to six feet in height.

Common ragweed is found in all factory districts in Minnesota and North Dakota. Proper control requires a prolonged strategy that includes cultural, mechanical and chemical control options. Mowing can be effective in ditches and grass waterways provided mowing is done on a regular basis. Two-inch common ragweed can grow back if cut above the seed leaves, and ragweed mowed in midsummer can grow new stems and flower only ten days later than plants that are not mowed. Seeds are extremely long-lived in soils, potentially remaining viable for over 30 years. The longevity of common ragweed seeds enables the weed to counteract the effects of tillage, which decreases but does not eradicate the ragweed population. Small grains are an excellent crop in soils infested with ragweed as early planted and emerging crops have a competitive advantage over ragweed. In addition, many cereals herbicides are effective on common ragweed. Several soil-applied herbicides have activity on common ragweed in corn and soybean production.

Materials and Methods

Experiments were conducted on natural populations of common ragweed near Mayville, North Dakota in 2014. Plot area was worked with a Kongskilde 's-tine' field cultivator equipped with rolling baskets on May 21, 2014. 'SES

36272RR' sugarbeet was seeded 1.25 inches deep in 22 inch rows at 60,825 seeds per acre on May 21. Sugarbeet was treated with Tachigaren, Kabina, and NipsIt Suite at 20 grams product, 7 grams ai, and 3.4619 fl oz product, respectively, per 100,000 seeds. Herbicide treatments were applied June 10, 18, 24 and 26, and July 7 and 18. 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 30 feet in length in a field with moderate to heavy levels of glyphosate-resistant common ragweed. Ammonium sulfate in all treatments was a liquid formulation from Winfield Solutions called N-Pak AMS.

Sugarbeet injury was evaluated on June 17 and 25 and July 7 and 14. Weed control was evaluated June 17 and 25, July 7, 14 and 25. 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 9.2014.2 software package.

Table 1. Application Information

Application code	A	B	C	D	E	F
Date	June 10	June 18	June 24	June 26	July 7	July 18
Time of Day	12:20 PM	9:00 AM	9:30 AM	12:00 PM	9:15 AM	1:00 PM
Air Temperature (F)	77	66	60	66	73	79
Relative Humidity (%)	32	61	79	71	56	53
Wind Velocity (mph)	6	8	10	4	7	10
Wind Direction	SW	E	N	SE	NW	S
Soil Temp. (F at 6")	72	63	68	65	70	76
Soil Moisture	Good	Good	Good	Good	Good	Good
Cloud Cover (%)	60	75	100	90	10	5
Sugarbeet stage (avg)	cot-2lf	2-4 lf	4-6 lf	4-7 lf	4-8 lf	7-11 lf
Ragweed (untreated avg)	¾"	2"	4"	4"	6"	10"

Results and Discussion

Sugarbeet Injury - Visual sugarbeet injury from herbicide treatments was generally negligible in this experiment (Table 2). Visual injury was greatest when herbicide treatments were applied to 4-inch common ragweed. However, visual injury likely was caused by weed competition rather than herbicides. The experimental area was a sandy loam soil with a low water holding capacity. A heavy green foxtail infestation caused competition damage to sugarbeet which likely caused the visual growth reduction.

There were minor differences in sugarbeet injury among treatments within application timings (i.e. 1", 2", and 4"). Sugarbeet injury tended to be greatest from sequential applications of Roundup PowerMax (glyphosate) plus Stinger at 4 fl oz/A. Stinger caused noteworthy injury when applied to cotyledon to 2-leaf sugarbeet and common ragweed less than one inch tall. Trials were conducted in 2009 and 2010 where Stinger was applied up to 8 fl oz/A to 2-leaf sugarbeet. Sugarbeet injury in those trials tended to be greatest from sequential 4 fl oz applications or from a single 8 fl oz/A application (data not presented). However, injury was not consistent and tended to decrease over time. Yield results from the 2010 experiments were inconsistent but indicated there was no loss of sugarbeet yield.

Common Ragweed Control - Herbicide treatments applied to one-inch common ragweed tended to provide better control than treatments applied to two-inch or four-inch common ragweed (Table 2). Herbicide treatments containing Stinger improved common ragweed control compared to glyphosate alone. Improved ragweed control was most dramatic when Stinger was applied to common ragweed up to one-inch tall. When applied to these small weeds, glyphosate alone, averaged across rates and timings, gave 68% common ragweed control compared to 95% control from glyphosate plus Stinger. These results indicate the field contained some glyphosate resistant common ragweed biotypes. The magnitude of common ragweed control between glyphosate alone and glyphosate plus Stinger decreased as common ragweed size increased. When treatments were applied to common ragweed up to two- and four-inches tall, averaged across treatments, glyphosate plus Stinger improved common ragweed control by 24% on two-inch ragweed and 7% on four-inch ragweed compared to glyphosate alone.

Table 2. Sugarbeet injury and common ragweed control near Mayville, ND in 2014.

Treatment ¹	Rate fl oz/A	Application code ²	June 25	July 7	July 7	July 14	July 25
			sgbt inj	sgbt inj	cora cntl	cora cntl	cora cntl
			-----%-----				
Up to 1" common ragweed							
PMax ³ / PMax	28 / 28	A / D	3	1	80	70	64
PMax / PMax	32 / 24	A / D	8	3	79	67	63
PMax / PMax / PMax	28 / 28 / 22	A / C / E	4	1	74	74	76
PMax+Stinger / PMax+Stinger / PMax	28+2 / 28+2 / 22	A / C / E	0	3	89	88	92
PMax+Stinger / PMax+Stinger / PMax	28+4 / 28+4 / 22	A / C / E	9	9	95	95	95
PMax+Stinger / PMax+Stinger / PMax+Stinger	28+4 / 28+2 / 22+2	A / C / E	6	1	93	92	97
Up to 2" common ragweed							
PMax / PMax	28 / 28	B / D	8	13	87	79	69
PMax / PMax	32 / 24	B / D	15	15	75	67	61
PMax / PMax / PMax	28 / 28 / 22	B / D / F	8	11	81	76	75
PMax+Stinger / PMax+Stinger / PMax	28+2 / 28+2 / 22	B / D / F	13	14	84	83	89
PMax+Stinger / PMax+Stinger / PMax	28+4 / 28+4 / 22	B / D / F	3	13	84	84	93
PMax+Stinger / PMax+Stinger / PMax+Stinger	28+4 / 28+2 / 22+2	B / D / F	8	11	90	87	93
Up to 4" common ragweed							
PMax / PMax	28 / 28	D / E		34	63	66	79
PMax / PMax	32 / 24	D / E		35	66	66	78
PMax / PMax / PMax	28 / 28 / 22	D / E / F		24	64	68	82
PMax+Stinger / PMax+Stinger / PMax	28+2 / 28+2 / 22	D / E / F		24	59	72	84
PMax+Stinger / PMax+Stinger / PMax	28+4 / 28+4 / 22	D / E / F		29	63	76	91
PMax+Stinger / PMax+Stinger / PMax+Stinger	28+4 / 28+2 / 22+2	D / E / F		36	61	67	84
LSD (0.05)			NS	10	14	14	11

¹All treatments were applied with N-Pak AMS at 2.5% v/v and Prefer 90 NIS at 0.25% v/v

²Application information is listed in Table 1

³PMax=Roundup PowerMax

1" Or Smaller Common Ragweed - There were no differences in common ragweed control among treatments containing Stinger when applied in combination with glyphosate to one inch common ragweed (Table 2). Even though control tended to be best from glyphosate plus Stinger at 4 fl oz/A, this combination showed a tendency toward increased sugarbeet injury. There was no difference in common ragweed control from Roundup PowerMax at 28 fl oz/A followed by 28 fl oz/A compared to Roundup PowerMax at 32 fl oz/A followed by 24 fl oz/A at any application timings. Our recommendations are to use the greatest glyphosate rate based on weed species and weed size in the field. Since most sugarbeet growers use at least a two-spray weed control program in sugarbeet, it seems logical to apply equal rates of glyphosate in both the first and second applications.

The three-spray glyphosate alone program tended to improve common ragweed control compared to the two-spray program, especially at the late evaluation timing. We attributed this to the low moisture holding content of the soil and the overall slow growth of sugarbeet at this location.

2" Or Smaller Common Ragweed - Ragweed control tended to be greater when combinations of glyphosate and Stinger at 4 fl oz/A were followed by either Stinger at 4 fl oz/A or sequential applications of Stinger at 2 fl oz/A and applied to two-inch ragweed compared to glyphosate alone or glyphosate plus Stinger at 2 fl oz/A (Table 2). However, control was not statistically significant or consistent across herbicide treatments. Overall, as ragweed size at the initial application increased, control decreased.

4" Common Ragweed - Common ragweed control ranged from 78% to 91% control when herbicide treatments were initiated on common ragweed up to four inches in size (Table 2). In addition, there was a small response to rate

between glyphosate alone and glyphosate plus Stinger treatments. Glyphosate plus Stinger at 4 fl oz/A applied twice gave the greatest numeric control of common ragweed.

There may be another approach to control common ragweed that has reached four inches in size. An experiment was conducted to evaluate ethofumesate, UpBeet, or Betamix applied in combination with glyphosate plus Stinger. Ragweed control was improved from these combinations compared to glyphosate plus Stinger at 2 fl oz/A. However, there was very little difference in numeric control among treatments (data not shown). Generally ethofumesate, UpBeet, or Betamix combinations caused greater sugarbeet injury than glyphosate plus Stinger. Injury tended to be greatest with UpBeet combinations and least with Betamix and decreased over time.

Other Weeds - The addition of Stinger to glyphosate did not antagonize green foxtail, redroot pigweed, or common lambsquarters control compared to glyphosate alone, regardless of weed size (Table 3). This observation is consistent with results from the 2009 and 2010 trials previously mentioned. However, control was not the same across all herbicide treatments or application timings. The three-spray program provided greater green foxtail and lambsquarters control than the two-spray program, presumably since there was an additional flush of weeds in an open canopy.

Table 3. Green foxtail, redroot pigweed and common lambsquarters control in sugarbeet near Mayville, ND in 2014.

Treatment ¹	Rate (oz/A) fl oz/A	Application code ²	grfx ³ control		rrpw control		colq control	
			June 25	July 25	June 25	July 25	June 25	July 25
Up to 1" common ragweed								
PMax ⁴ / PMax	28 / 28	A / D	94	74	98	95	99	80
PMax / PMax	32 / 24	A / D	94	75	99	93	98	71
PMax / PMax / PMax	28 / 28 / 22	A / C / E	89	93	98	100	99	100
PMax+Stinger / PMax+Stinger / PMax	28+2 / 28+2 / 22	A / C / E	95	95	98	100	99	100
PMax+Stinger / PMax+Stinger / PMax	28+4 / 28+4 / 22	A / C / E	96	91	99	100	100	100
PMax+Stinger / PMax+Stinger / PMax+Stinger	28+4 / 28+2 / 22+2	A / C / E	98	95	100	100	100	100
Up to 2" common ragweed								
PMax / PMax	28 / 28	B / D	100	84	100	78	100	73
PMax / PMax	32 / 24	B / D	100	86	100	86	98	85
PMax / PMax / PMax	28 / 28 / 22	B / D / F	100	100	100	100	100	100
PMax+Stinger / PMax+Stinger / PMax	28+2 / 28+2 / 22	B / D / F	100	99	100	100	100	99
PMax+Stinger / PMax+Stinger / PMax	28+4 / 28+4 / 22	B / D / F	100	98	99	100	100	100
PMax+Stinger / PMax+Stinger / PMax+Stinger	28+4 / 28+2 / 22+2	B / D / F	100	99	100	100	100	100
Up to 4" common ragweed								
PMax / PMax	28 / 28	D / E	- ⁵	93	-	99	-	99
PMax / PMax	32 / 24	D / E	-	94	-	99	-	98
PMax / PMax / PMax	28 / 28 / 22	D / E / F	-	100	-	100	-	100
PMax+Stinger / PMax+Stinger / PMax	28+2 / 28+2 / 22	D / E / F	-	100	-	100	-	100
PMax+Stinger / PMax+Stinger / PMax	28+4 / 28+4 / 22	D / E / F	-	100	-	100	-	100
PMax+Stinger / PMax+Stinger / PMax+Stinger	28+4 / 28+2 / 22+2	D / E / F	-	100	-	100	-	100
LSD (0.05)			4	5	NS	7	NS	8

¹All treatments were applied with N-Pak AMS at 2.5% v/v and Prefer 90 NIS at 0.25% v/v

²Application information is listed in Table 1

³grfx=green foxtail; rrpw=redroot pigweed; colq=common lambsquarters

⁴PMax=Roundup PowerMax

⁵- indicates treatments had not been applied at this evaluation and were not included in statistical analysis