

ULTRA BLAZER SECTION 18 EMERGENCY EXEMPTION AND SUPPORTING EXPERIMENTS

Thomas Peters¹, Emma Burt², Alexa Lystad³, and David Mettler⁴

¹Extension Sugarbeet Agronomist and Weed Control Specialist, ²Graduate Student and Research Agronomist, NDSU and Minn-Dak Farmers Cooperative, ³Research Specialist, North Dakota State University & University of Minnesota, Fargo, ND, and ⁴Research Agronomist, Southern Minnesota Beet Sugar Cooperative, Renville, MN

Summary

1. Ninety-five percent of respondents indicated the emergency exemption was beneficial for sugarbeet producers in Minnesota and North Dakota and contributed to overall weed management in 2021.
2. Ninety-two percent of respondents indicated they would willingly support application for a 2022 emergency exemption in sugarbeet.
3. Control from Ultra Blazer decreases as waterhemp size increases from 1-inch to greater than 6-inches.
4. Spray volume (gpa), ground speed (mph), and waterhemp size influenced control and regrowth. Further research and training is needed to optimize waterhemp control.

Introduction

The Environmental Protection Agency (EPA) approved a request for a Section 18 emergency exemption for Ultra Blazer (acifluorfen) which provided Minnesota and eastern North Dakota sugarbeet growers a postemergence herbicide to control glyphosate-resistant waterhemp in sugarbeet in 2021. Less than normal rainfall in April and May reduced the efficacy of preemergence (PRE), early postemergence (EPOST), and postemergence (POST) applied soil-residual herbicides. With the discontinuance of Betamix, there are currently no registered POST herbicides for effective waterhemp control that survives soil residual herbicide treatments.

The exemption allowed a single Ultra Blazer application at 16 fluid ounces per acre per year. A Section 18 exemption under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) authorizes EPA to allow an unregistered use of a pesticide for a limited time if EPA determines that an emergency condition exists. This paper summarizes the Ultra Blazer Section 18 emergency exemption including application parameters and results of a survey of sugarbeet growers who applied Ultra Blazer. The report contains three 2021 program objectives: a) summarize results and user experiences from the 2021 Section 18 emergency exemption for use of Ultra Blazer in sugarbeet; b) summarize an experiment developed to provide producers and agriculturalists with scientific insight as to what Ultra Blazer delivers in sugarbeet production; c) determine reduction in control from Ultra Blazer as waterhemp height increases from 2- to 8-inches.

Materials and Methods

Section 18 Emergency Exemption

Ultra Blazer was applied at 16 fl oz/A alone or with glyphosate and non-ionic surfactant (NIS) plus ammonium sulfate (AMS). One Ultra Blazer application was made per season using ground application equipment and targeted waterhemp less than 4-inches tall and sugarbeet greater than the 6-lf stage. Pre-harvest interval (PHI) was 45 days and Ultra Blazer was applied from June 2 through July 31, 2021.

Application of Ultra Blazer was targeted to air temperatures less than 85°F to reduce injury in sugarbeet. Likewise, producers were informed that sugarbeet injury may be greater following sudden changes from a cool, cloudy environment to a hot, sunny environment. On days when air temperature was greater than 85°F, we recommended delaying application until late afternoon or early evening or when air temperatures began to decrease.

Producers and agriculturalists at Southern Minnesota Beet Sugar Coop, Minn-Dak Farmers Coop, and American Crystal Sugar Coop were surveyed by electronic mail to learn about producer experiences with Ultra Blazer (Appendix).

Sugarbeet Tolerance

Demonstrations plots were established near Casselton, ND and near Crookston, Hendrum, Foxhome and Benson, MN to train producers and agriculturalists on the plant response from Ultra Blazer alone, with glyphosate, and/or with adjuvants (Table 1).

Table 1. Herbicide treatment, rate, and application timing to Ultra Blazer demonstration plots in sugarbeet fields, 2021.

Num	Treatment	Rate (fl oz/A)	Sugarbeet Stage (lvs)
1	Ultra Blazer	16	>6
2	Ultra Blazer + Prefer 90 NIS	16 + 0.125% v/v	>6
3	Ultra Blazer + Prefer 90 NIS	16 + 0.25% v/v	>6
4	Ultra Blazer + Roundup PowerMax + Amsol Liquid AMS	16 + 28 + 2.5 % v/v	>6
5	Ultra Blazer + Roundup PowerMax + Prefer 90 NIS + Amsol Liquid AMS	16 + 28 + 0.25% v/v + 2.5 % v/v	>6

Visible sugarbeet necrosis, malformation, and growth reduction were observed as injury symptoms and evaluated using a 0 to 100% injury scale with 0% denoting no sugarbeet injury and 100% denoting complete loss of sugarbeet stature. All evaluations were a visual estimate of injury in the four treated rows compared to the adjacent, two-row, untreated strip. Experimental design was randomized complete block with four replications. Data were analyzed with the ANOVA procedure of ARM, version 2021.2 software package.

Waterhemp Control as Influenced by Height

PRE, EPOST, and POST treatments (Table 2) created waterhemp size and density differences in plots. Late postemergence (LPOST) treatments were applied to evaluate control of waterhemp escapes. Treatments were applied to the center four rows of six row plots 40 feet in length using a bicycle sprayer. Herbicides were applied in 17 gpa spray solution through 8002 XR flat fan nozzles pressurized with CO₂ at 40 psi. Visible sugarbeet necrosis, malformation, and growth reduction were observed as injury symptoms and evaluated using a 0 to 100% injury scale with 0% denoting no sugarbeet injury and 100% denoting complete loss of sugarbeet stature. All evaluations were a visual estimate of injury in the four treated rows compared to the adjacent, two-row, untreated strip. Experimental design was randomized complete block with four replications. Data were analyzed with the ANOVA procedure of ARM, version 2021.2 software package.

Table 2. Herbicide treatment, rate, and application timing in waterhemp control trials, 2021.

Herbicide Treatment	Rate (fl oz/A)	Application timing (SGBT leaf stage)
Ethofumesate (broadcast) / Roundup PowerMax + ethofumesate ¹ / Roundup PowerMax + ethofumesate / Roundup PowerMax + ethofumesate	96 / 28 + 4 / 28 + 4 / 22 + 4	PRE / 4 lf / 6 lf / 8-10 lf
Ethofumesate ² / Roundup PowerMax + ethofumesate ¹ / Roundup PowerMax + ethofumesate / Roundup PowerMax + ethofumesate	48 / 28 + 4 / 28 + 4 / 22 + 4	PRE / 4 lf / 6 lf / 8-10 lf
Dual Magnum + Roundup PowerMax + ethofumesate / Ultra Blazer + Roundup PowerMax ³	16 + 32 + 12 / 16 + 22	4 lf / 8-10 lf
Dual Magnum + Roundup PowerMax + ethofumesate / Ultra Blazer + Roundup PowerMax	16 + 32 + 12 / 16 + 22	6 lf / 8-10 lf
Dual Magnum + Roundup PowerMax + ethofumesate / Dual Magnum + Roundup PowerMax + ethofumesate / Ultra Blazer + Roundup PowerMax	16 + 28 + 6 / 16 + 28 + 6 / 16 + 22	4 lf / 6 lf / 8-10 lf
Ethofumesate ² / Dual Magnum + Roundup PowerMax + ethofumesate / Ultra Blazer + Roundup PowerMax	48 / 16 + 32 + 12 / 16 + 22	PRE / 4 lf / 8-10 lf
Ethofumesate ² / Dual Magnum + Roundup PowerMax + ethofumesate / Ultra Blazer + Roundup PowerMax	48 / 16 + 32 + 12 / 16 + 22	PRE / 6 lf / 8-10 lf
Ethofumesate ² / Dual Magnum + Roundup PowerMax + ethofumesate / Dual Magnum + Roundup PowerMax + ethofumesate / Ultra Blazer + Roundup PowerMax	48 / 16 + 32 + 12 / 16 + 32 + 12 / 16 + 22	PRE / 4 lf / 6 lf / 8-10 lf

¹Roundup PowerMax + ethofumesate applied with Destiny HC @ 1.5 pt/A + Amsol AMS at 2.5% v/v.

²Ethofumesate applied using a banded application.

³Roundup PowerMax + Ultra Blazer applied with Prefer 90 NIS @ 0.25% v/v and NPak AMS at 2.5% v/v.

Results

According to a survey of sugarbeet growers and agriculturalists, Ultra Blazer at 16 fl oz/A was applied to 32,005 sugarbeet acres in 2021 (totaling 4,001 gallons of Ultra Blazer). Ninety percent or 28,711 acres were applied in Minnesota and 10% or 3,294 acres were applied in North Dakota.

The air temperature at application and variability in sugarbeet growth stage complicated Ultra Blazer application, especially applications made in early June, 2021. The maximum daily air temperature in much of the sugarbeet growing area was 80 to 102°F from June 2 through at least June 15, 2021 (Figure 1). In the five years (2016 to 2020) leading up to the section 18 application for Ultra Blazer, air temperature at application had not been greater than 85°F in any of our research trials.

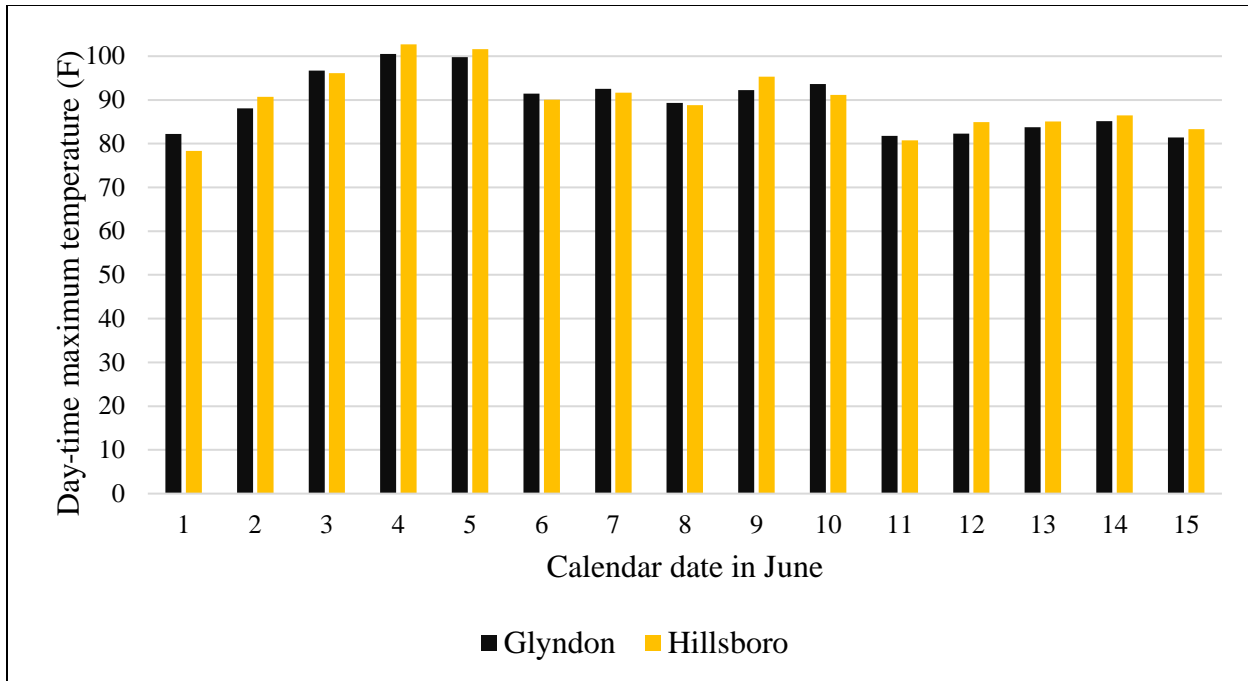


Figure 1. Day time maximum air temperature, June 1 to June 15, Hillsboro, ND and Blomkest, MN, 2021.

The variability of sugarbeet growth stage at application further complicated Ultra Blazer application. Our recommendation was for application to sugarbeet greater than the 6-lf stage. However, dry planting conditions in April and May caused variable emergence and sugarbeet stands ranged from cotyledon to 8-lf at application.

Sugarbeet producers and agriculturalists were asked in a survey to evaluate sugarbeet injury and waterhemp control from Ultra Blazer. When compiling sugarbeet injury responses, no injury = 1, slight = 2, moderate = 3, and severe injury = 4. When compiling waterhemp control responses, excellent =1, good = 2, fair = 3, and poor control =4. When averaged across all responses, sugarbeet injury was reported as slight to moderate (2.6) and waterhemp control as good to fair (Figure 2). Only one respondent categorized sugarbeet injury as severe. Respondents from the northern Red River Valley (RRV) graded injury greater (2.8) than respondents from the southern RRV (2.4) or respondents from west central Minnesota (2.6) suggesting their lack of familiarity with or tolerance for sugarbeet injury. Waterhemp control was rated good to fair with negligible differences in responses across the growing regions. Although no unintended effects such as increased susceptibility to disease or reduced % sucrose content were reported by producers or agriculturalists, there were inconsistent results in regard to sugarbeet tolerance and waterhemp control. This indicates a need for application method refinements if Ultra Blazer is used on sugarbeet in the future. Agriculturalists and producers were asked if they found the Section 18 Emergency Exemption useful and if they supported applying for a 2022 Emergency Exemption. Ninety-five percent of the respondents found the Section 18 Emergency Exemption beneficial for sugarbeet growers and 92% supported reapplication for the Emergency Exemption in 2022.

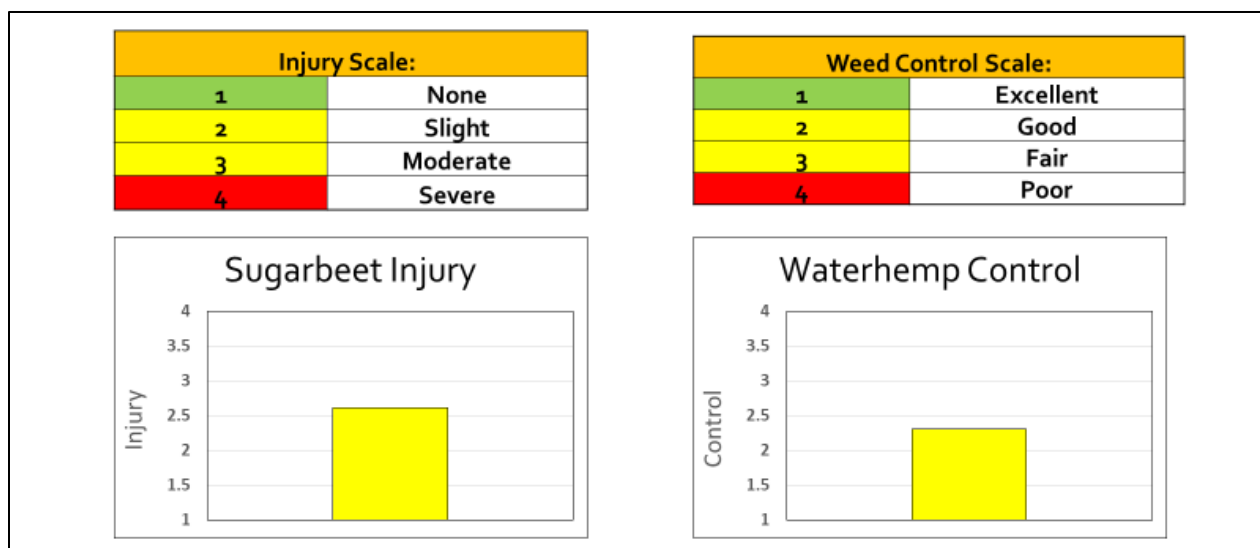


Figure 2. Results of producer and agriculturalist survey of sugarbeet injury and waterhemp control from Ultra Blazer Section 18 Emergency Exemption, Minnesota and North Dakota, 2021.

Ultra Blazer is a contact herbicide PPO inhibitor that is applied POST and is light activated. When activated, this product forms highly reactive compounds in the plants that rupture cell membranes causing fluids to leak. Injury symptoms can occur as soon as 1 to 2 hours after application. Environmental conditions will affect Ultra Blazer injury to sugarbeet. Symptoms are most apparent with bright, sunny conditions and increased humidity at application.

Efficacy is best when Ultra Blazer is used at high water volumes (15 to 25 gpa water volume) with flat fan nozzles producing a fine droplet spectrum to ‘paint the plant’ ensuring good coverage. Oil-based adjuvants with Ultra Blazer increase waterhemp control and sugarbeet injury as compared with non-ionic surfactants. Likewise, herbicide mixtures, including glyphosate, will potentially increase sugarbeet injury.

Sugarbeet Tolerance

Sugarbeet visual percent injury was evaluated 3 to 16 days after treatment (DAT) across locations. Sugarbeet injury ranged from 8% to 40% depending on herbicide treatment and location (Table 3). Sugarbeet injury tended to be less with Ultra Blazer alone and increased with addition of adjuvant and/or adjuvant rate. Sugarbeet injury increased when Roundup PowerMax was mixed with Ultra Blazer as compared with Ultra Blazer alone or with adjuvants. Sugarbeet injury was greatest at Benson, MN. The air temperature at Benson at 11:00AM was 95°F. Air temperature was 88°F, 79°F, 88°F, and 86°F at application at Casselton, Crookston, Foxhome and Hendrum, respectively. Root yield, % sucrose, and recoverable sucrose was collected at Hendrum, MN. Yield parameters were collected by hand from a 37 square foot area. This is approximately 1/3 of our normal mechanically harvested area. Data was variable but suggested reduced yield when adjuvant or Roundup PowerMax was mixed with Ultra Blazer compared with applying Ultra Blazer alone. Percent sucrose was the same across treatments.

Table 3. Visual percent sugarbeet injury in response to herbicide treatment, 3 to 16 DAT at multiple locations, 2021^a.

Herbicide Treatment	Adj. Rate ^b	Casselton	Crookston	Foxhome	Hendrum	Benson
	--pt/100 gal--	-----%-----				
Ultra Blazer ^c	-	9 d	9 c	10 c	8 d	-
Ultra Blazer + Prefer 90 NIS	1	14 c	10 bc	11 bc	10 cd	-
Ultra Blazer + Prefer 90 NIS	2	15 bc	15 ab	18 b	15 c	-
Ultra Blazer + Prefer 90 NIS + Amsol liquid AMS	2 + 20	-	-	-	-	35
RUPM ^d + Ultra Blazer + Amsol liquid AMS	20	19 b	20 a	25 a	21 b	-
RUPM ^d + Ultra Blazer + Prefer 90 NIS + Amsol liquid AMS	2 + 20	28 a	-	26 a	30 a	40
LSD (0.10)		4	5	6	6	NS

^aMeans within a location not sharing any letter are significantly different by the LSD at the 10% level of significance.

^bAdj. Rate=Adjuvant Rate.

^cUltra Blazer applied at 16 fl oz/A in all treatments.

^dRUPM= Roundup PowerMax applied at 28 fl oz/A in respective treatments.

Table 4. Visual percent sugarbeet injury and sugarbeet yield parameters in response to herbicide treatment, Hendrum, MN, 2021^a.

Herbicide Treatment	Adj. Rate ^b	Sgbt inj ^c	Sgbt inj	Yield	Sucrose	Rec Suc ^d
	--pt/100 gal--	-----%-----		-Ton/A-	--%--	--lb/A--
Ultra Blazer ^c	-	8 d	0 b	27.1 a	17.8	9,002 a
Ultra Blazer + Prefer 90 NIS	1	10 cd	0 b	24.7 b	17.6	8,091 ab
Ultra Blazer + Prefer 90 NIS	2	15 c	3 b	24.4 b	17.9	8,163 ab
RUPM ^f + Ultra Blazer + Amsol liquid AMS	20	21 b	10 a	24.1 b	17.6	7,864 b
RUPM ^f + Ultra Blazer + Prefer 90 NIS + Amsol liquid AMS	2 + 20	30 a	10 a	25.2 ab	18.1	8,514 ab
LSD (0.10)		6	4	2.4	NS	944

^aMeans within a main effect not sharing any letter are significantly different by the LSD at the 10% level of significance.

^bAdj. Rate=Adjuvant Rate.

^cSgbt inj.=Sugarbeet Injury.

^dRec. Suc.=Recoverable Sucrose.

^eUltra Blazer applied at 16 fl oz/A in all treatments.

^fRUPM = Roundup PowerMax applied at 28 fl oz/A in respective treatments.

Waterhemp Control as Influenced by Height

Waterhemp control decreased as waterhemp size increased at Blomkest and Moorhead (Figure 3). The negative slope of the line was greater at Moorhead than Blomkest indicating waterhemp control decreased more rapidly at Moorhead than at Blomkest in response to waterhemp height. Air temperature was 75°F at application at Moorhead and Blomkest. Sugarbeet size and growth stage was greater at Moorhead, which may have reduced herbicide coverage on waterhemp as compared with the Blomkest location.

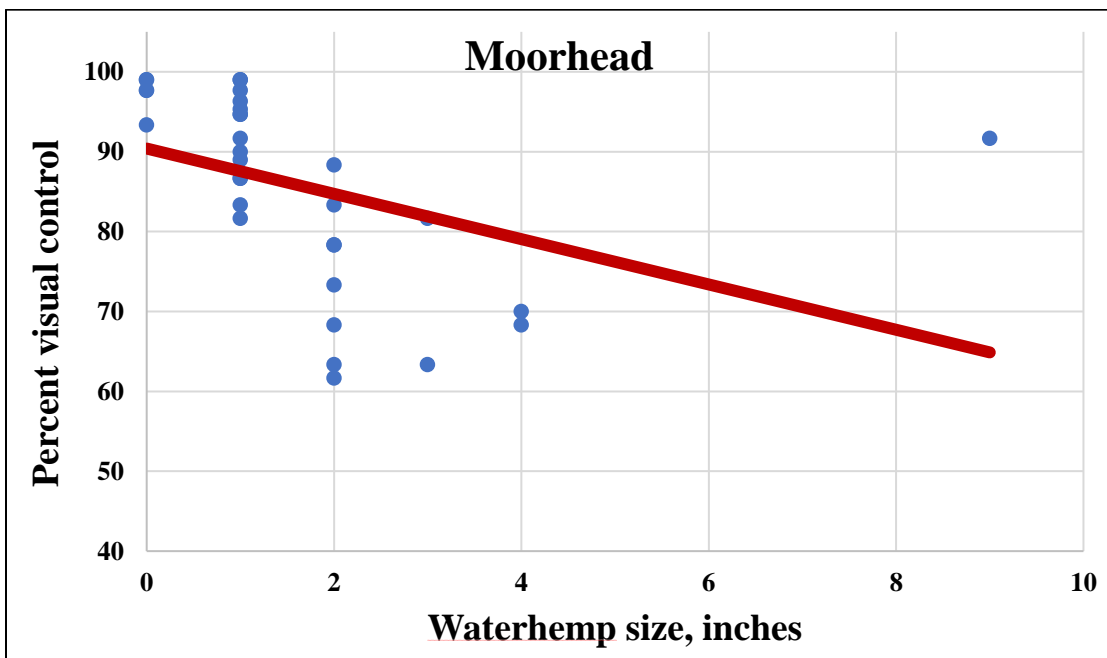
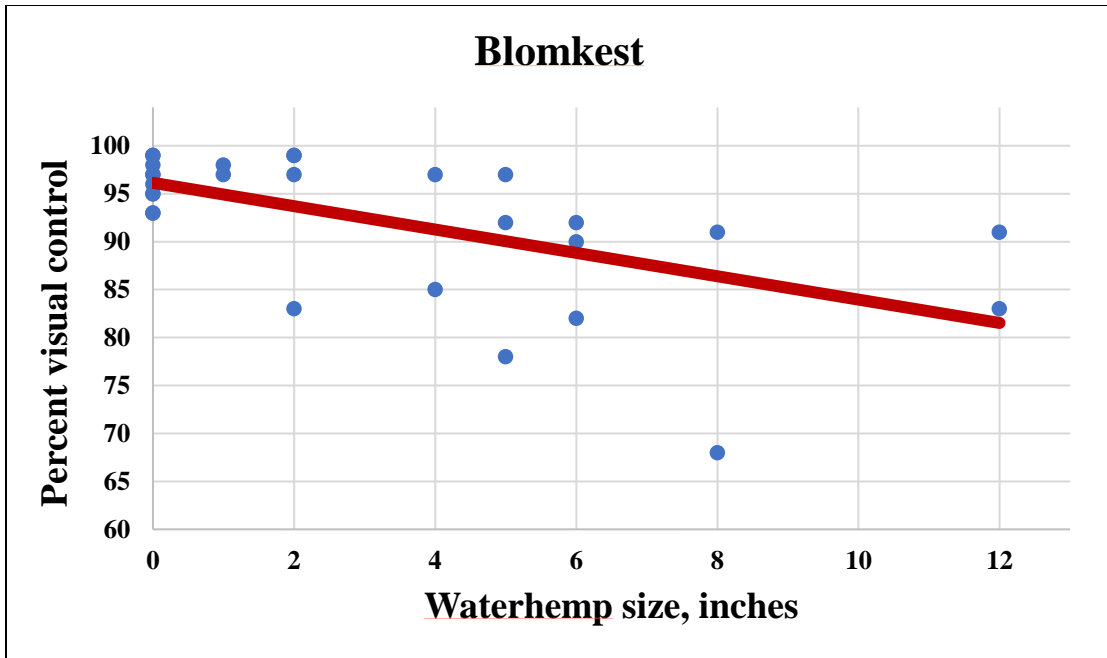


Figure 3. Visual percent waterhemp control in response to waterhemp size, Blomkest and Moorhead, MN, 2021.

Conclusion

Using Ultra Blazer will be a compromise between sugarbeet injury and weed control. Methods to improve control such as adjuvant selection and rate or herbicides tank-mixed with Ultra Blazer, as well as environmental conditions at application, must be considered as different combinations will increase sugarbeet injury. Application must be timed to sugarbeet greater than 6-1f sugarbeet with the prospect that weed escapes range from 2- to 4-inches. We learned in 2021 that producers are willing to sacrifice sugarbeet safety to control weed escapes. Further research is needed to improve spray quality including selection of nozzles and spray volume to optimize weed control.

Appendix.

2021 Ultra Blazer Section 18 Emergency Exemption

Please answer the following questions.

1. What county was Ultra Blazer used for weed control in sugarbeet? _____

2. How many acres were sugarbeet treated with Ultra Blazer for weed control?

3. Record sugarbeet injury from Ultra Blazer?

None Slight Moderate Severe

4. Record weed control from Ultra Blazer in sugarbeet?

Excellent Good Fair Poor

5. Did you observe any unexpected / adverse effects from using Ultra Blazer in sugarbeet?

YES NO

6. Did you find the Section 18 to be valuable/useful?

YES NO

7. Would you like to use Ultra Blazer again in 2022?

YES NO.

Write comments to provide additional details regarding your experiences.
