

# **Weed Control in Sugarbeet**

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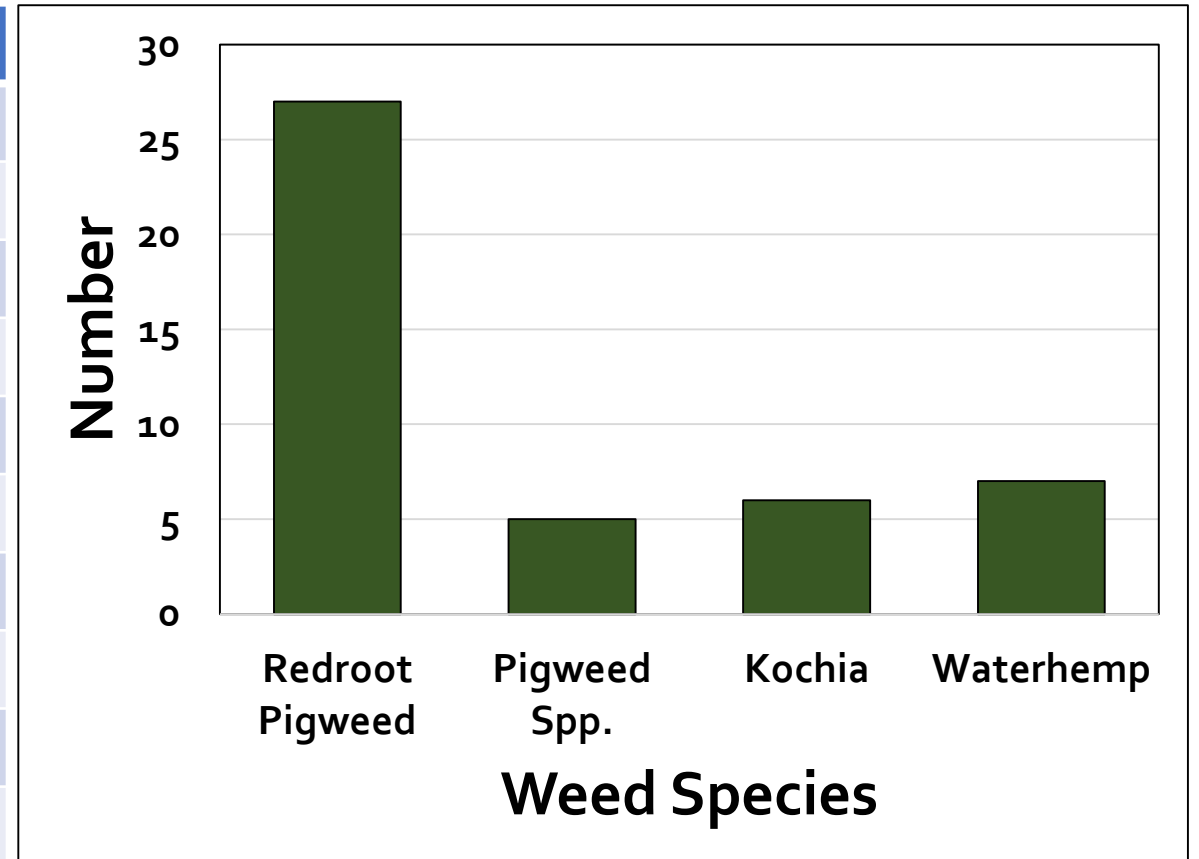
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# Most important weed problem in sugarbeet, 1975 to 2020, annual survey.<sup>a</sup>

Year	Most important weed
1975	Redroot pigweed
1980	Redroot pigweed
1985	Redroot pigweed
1990	Redroot pigweed
1995	Redroot pigweed
2000	Kochia
2005	Pigweed spp.
2010	Kochia
2015	Waterhemp
2020	Waterhemp



<sup>a</sup>Annual herbicide use survey was mailed to sugarbeet producers (farm units) in eastern ND and MN from 1968 to 2016. Survey has been conducted at Grower Seminars since 2017.

# Presentation Outline

- ① Kochia control in sugarbeet and crops in the sequence
- ② Sugarbeet tolerance to herbicides for waterhemp control
- ③ Ultra Blazer sugarbeet tolerance and waterhemp control
- ④ Herbicide carryover, when does it occur?
- ⑤ Common ragweed control
- ⑥ Palmer amaranth update

Waterhemp emergence, May 2,  
2020, Mapleton, ND Greg Krause,  
Minn-Dak Farmers Coop













# Kochia control in the cropping sequence

## corn/wheat>soybean/dry bean>wheat>sugarbeet rotation

### Soybean

- Valor/Metribuzin combination, e.g. Valor + Metribuzin, Fierce MTZ, etc.
- POST application of Liberty, Dicamba, or Flexstar (1 or 2 apps as needed/appropriate) depending on the soybean trait.
- Dicamba PRE.

### Soybean Postharvest

- Valor 3 oz late fall prior to freeze-up. Advise not to till after Valor application.
- Seed wheat direct in the spring.

### Wheat

- 2 oz ai fluroxypyr where possible. 1.5 oz ai is cut rate, less than 4" kochia.
- Kochiavore or Cleansweep D (products with at least 2 modes of action).
- Check the 2022 ND Weed Control Guide for additional products.

### Postharvest wheat

- Tillage or Gramoxone to control kochia escapes.

# Kochia control with Roundup, Liberty, and Enlist

May 29  
65 F  
37% RH  
0.25-2"

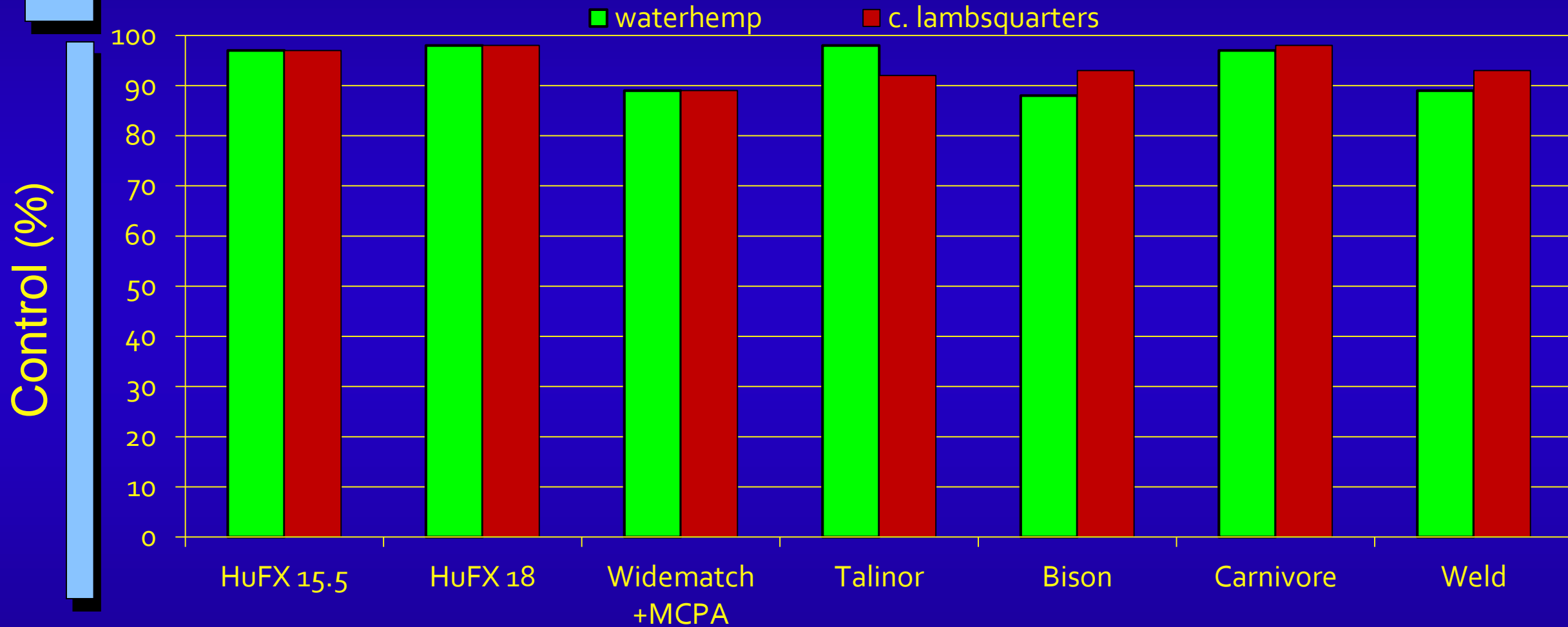
Treatment <sup>a</sup>	Rate	% Kochia control	
		Jun-13	Jun-26
Untreated		0	0
Liberty	32 oz	99	98
Roundup PM	28 oz	81	79
Liberty + Roundup PM	32 oz + 28 oz	99	99
Liberty + Roundup PM	32 oz + 21 oz	99	98
Liberty + Roundup PM	43 oz + 21 oz	99	99
Liberty + Enlist Duo	32 oz + 4.75 pt	99	98
Liberty + Enlist One	32 oz + 2 pt	97	95
Enlist Duo	4.75 pt	93	94
Enlist One	2 pt	61	58
Liberty	43 oz	98	97
Roundup PM	21 oz	73	70

<sup>a</sup>All treatments applied with AMS (3 lb)

Slide courtesy of Dr. Brian Jenks

Minot, 2020

# Broadleaf Weed Control



Slide courtesy of Dr. Kirk Howatt



# Kochia was NOT a focus of the 2021 Emergency Exemption and control from UB has been inconsistent across experiments

- Producers, especially in Sidney Sugars Coop, are interested in kochia control from UB
- Control has been inconsistent in experiments in 2020 and 2021, mostly because of kochia size
- Kochia must be less than 3-inch tall
- Prefer application with glyphosate and adjuvants

Treatment	Horace, 2020	Manvel, 2020	Horace, 2021	Manvel, 2021
	%	%	%	%
Etho (6-7.5 pt) / PowerMax	75 a	85 a	98 a	82 a
Ultra Blazer	25 c	83 a	45 b	33 b
UB + PowerMax	86 a	96 a	97 a	66 a

<sup>a</sup> Ultra Blazer with non-ionic surfactant at 0.125%; Ultra Blazer + PowerMax with NIS and Amsol liquid AMS at 0.125% and 2.5% v/v

# Why were *Pigweed* Spp. frequently named most important weed?

- Sugarbeet is a member of the Betoidae subfamily within amaranthaceae and includes approximately 2,500 species
- *Amaranthus* Spp. are both common and troublesome weeds in MN and ND
- Germinate and emerge in response to moisture and light (cultivation)
- Germination and emergence from May through August
- Prolific seed producers
- Seed is viable up to six years

Waterhemp



Image credit: Cody Walstrom, Minn-Dak Farms Coop

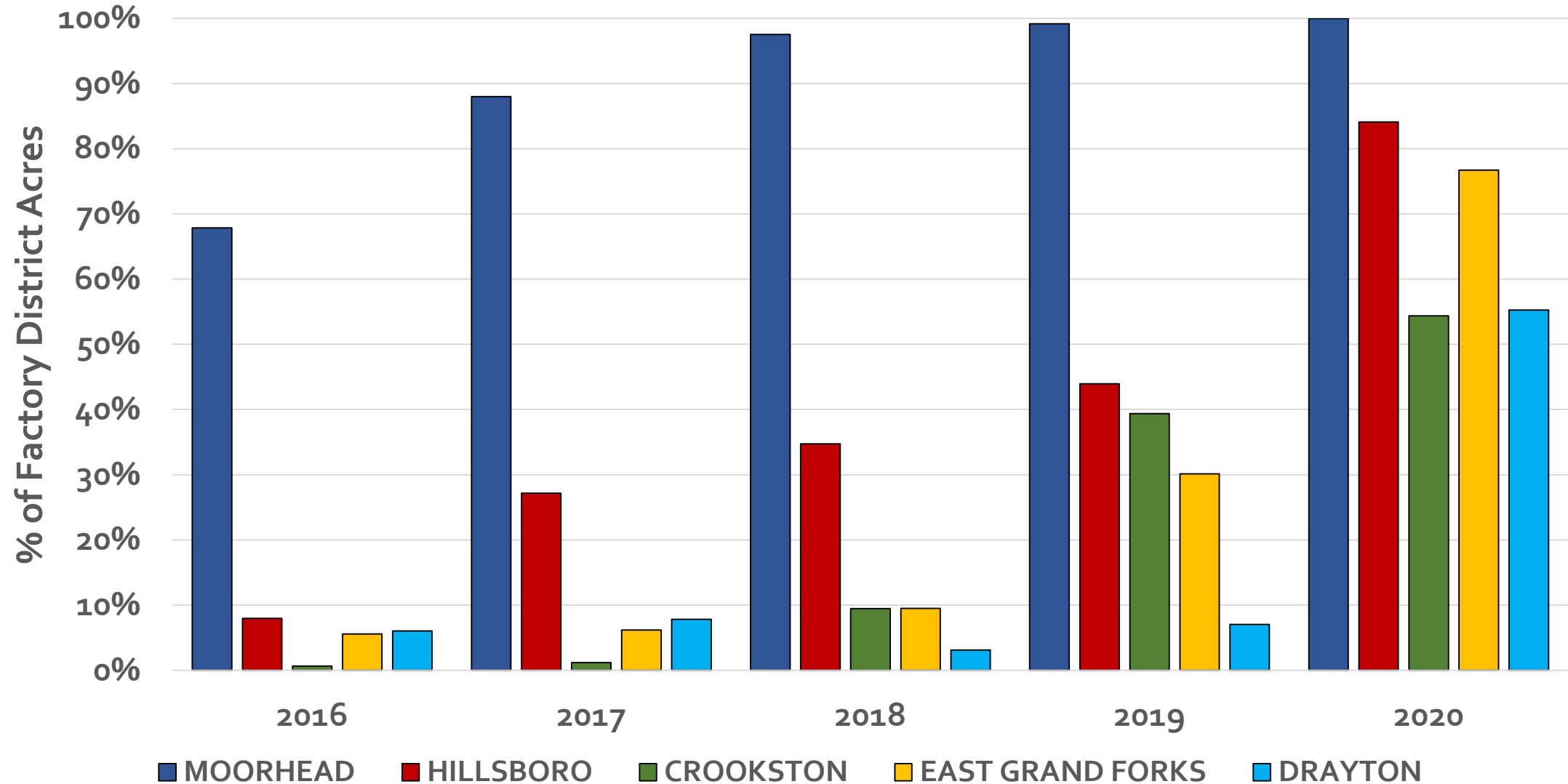
Redroot pigweed



Image credit: Bruce Ackley, The Ohio State University, Bugwood.org



# Percent factory district acres reporting waterhemp, 2016 to 2020



# Waterhemp Control Program in Sugarbeet

Planting Date	Recommendation
<b>Sugarbeet plant in April or May</b>	PRE. Dual Magnum at 0.5 to 0.75 pt/A, ethofumesate at 2 to 5 pt/A or Dual Magnum at 0.5 pt/A plus ethofumesate at 2 pt/A
	Split lay-by application (early postemergence / postemergence). Chloroacetamide herbicides applied at 2-lf sugarbeet fb 6 to 8-lf sugarbeet
<b>June</b>	Continue to scout fields for waterhemp. Control escapes with Ultra Blazer (Section 18), Liberty with the Redball™ 915 hooded sprayer (24c), or inter-row cultivation
<b>July</b>	Electric Discharge Systems (WeedZapper™)
<b>August / September</b>	Hand remove waterhemp



# S-metolachlor mixed with glyphosate and ethofumesate reduced sugarbeet stature, 7 and 14 but not 21 DAT, average of four locations, 2021.<sup>a</sup>

Factor A PRE Treatment	Factor B POST Treatment	% Sugarbeet Injury		
		7 DAT <sup>b</sup>	14 DAT	21 DAT
No	PowerMax + etho / PowerMax + etho <sup>c</sup>	3 a	2 a	3
No	S-metolachlor + PowerMax + etho / S-metolachlor + PowerMax + etho	11 b	9 b	6
Etho + Dual Magnum	PowerMax + etho / PowerMax + etho	4 a	1 a	2
Etho + Dual Magnum	S-metolachlor + PowerMax + etho / S-metolachlor + PowerMax + etho	13 b	8 b	7
	LSD (0.05)	6	5	NS

<sup>a</sup>Means within a main effect not sharing any letter are significantly different by the LSD at the 5% level of significance.

<sup>b</sup>DAT = days after treatment.

<sup>c</sup>etho = ethofumesate.

# S-metolachlor mixed with glyphosate and ethofumesate did not reduce sugarbeet yield or quality.<sup>a</sup>

Factor A PRE Treatment	Factor B POST Treatment	Root Yield	% Sucrose	Recov Sucrose
		--Ton/A--	--%--	--lb/A--
No	PowerMax + etho / PowerMax + etho <sup>b</sup>	37.9	15.9	10,415
No	S-metolachlor + PowerMax + etho / S-metolachlor + PowerMax + etho	36.0	15.8	10,033
Etho + Dual Magnum	PowerMax + etho / PowerMax + etho	37.9	15.7	10,215
Etho + Dual Magnum	S-metolachlor + PowerMax + etho / S-metolachlor + PowerMax + etho	36.9	15.7	10,133
	LSD (0.05)	NS	NS	NS

<sup>a</sup>Means within a main effect not sharing any letter are significantly different by the LSD at the 5% level of significance.

<sup>b</sup>etho = ethofumesate



**Sugarbeet tolerance from Ultra  
Blazer and waterhemp control**

# EPA approved Ultra Blazer for waterhemp control in sugarbeet on June 1, 2021

- Use UPL Ultra Blazer only
- Apply at 16 fl oz/A alone or with glyphosate
- One Ultra Blazer application can be made per season
- Can only be applied by ground equipment. Aerial application is prohibited.
- Target waterhemp less than 4" tall, control is reduced as waterhemp becomes larger
- Pre-Harvest Interval (PHI) = 45 days
- Do not apply Ultra Blazer after August 1st

## NORTH DAKOTA DEPARTMENT OF AGRICULTURE

June 2, 2021  
For immediate release

### EPA approves herbicide for resistant waterhemp in sugarbeets

BISMARCK – The Environmental Protection Agency (EPA) has approved a request for a Section 18 emergency exemption for Ultra Blazer®, enabling North Dakota growers a new tool to combat glyphosate-resistant waterhemp in sugarbeets.

“With the discontinuance of Betamix, there are currently no registered postemergence products available to control waterhemp that survives preemergence treatments,” Agriculture Commissioner Doug Goehring said. “This exemption gives growers a new product when early treatments are ineffective.”

The exemption allows application of Ultra Blazer on sugarbeet fields in Barnes, Cass, Cavalier, Grand Forks, Pembina, Ransom, Richland, Sargent, Steele, Traill and Walsh counties. Ultra Blazer is to be applied one time at 16 fluid ounces per acre per year.

Users must follow all applicable directions, restrictions and precautions on the container label, as well as the Section 18 use directions.

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.

MEDIA: For more information, please contact Michelle Mielke at (701) 328-2233 or [mmielke@nd.gov](mailto:mmielke@nd.gov).

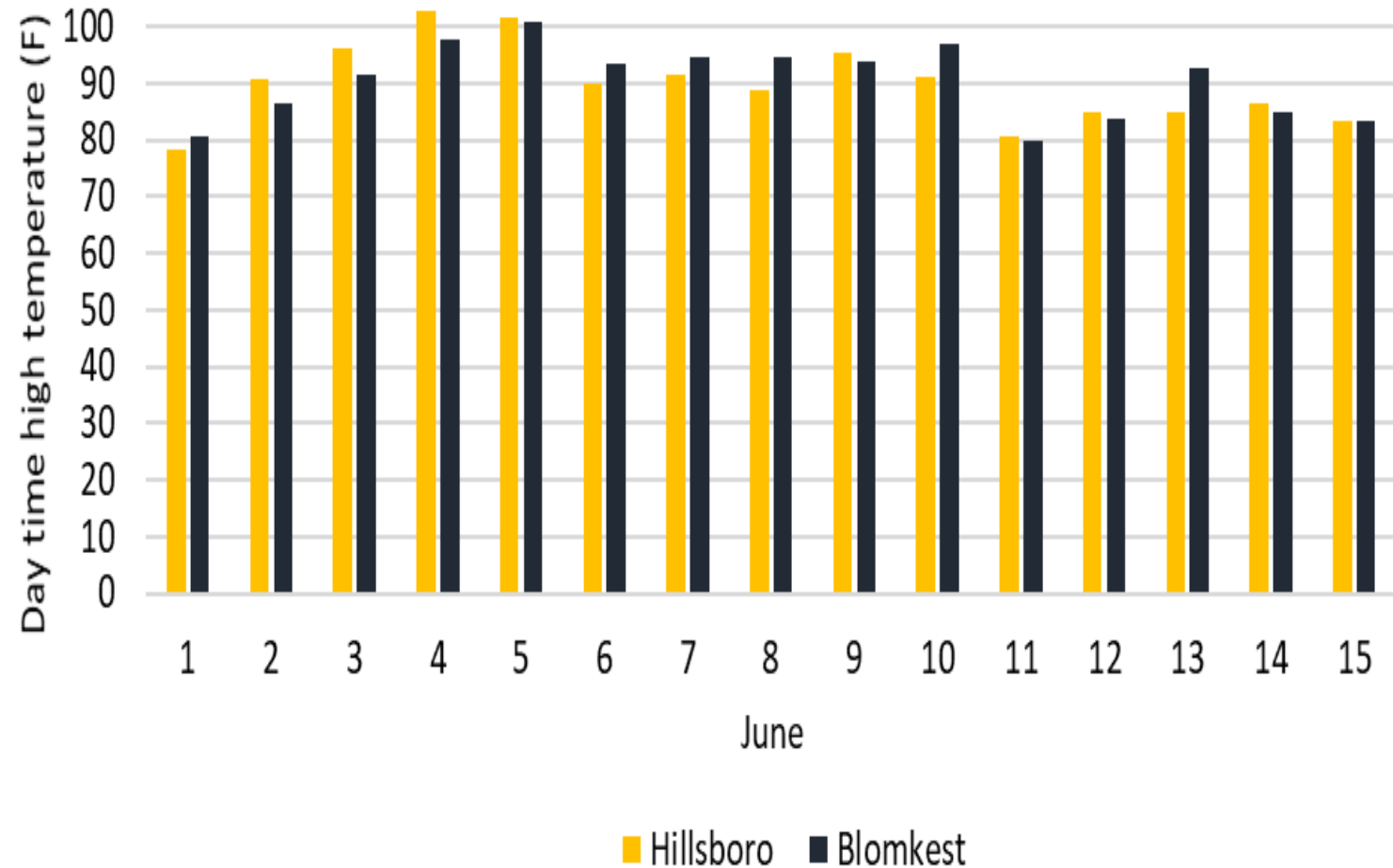


Michelle Mielke  
Public Information Specialist  
ND Department of Agriculture  
P: 701.328.2233  
[www.nd.gov/ndda](http://www.nd.gov/ndda)

*Disclaimer: This email and any attachments may be subject to disclosure to a third party upon request under North Dakota open records laws.*

# Ultra Blazer Section 18 was approved on June 1, 2021

- 32,005 acres or 4,001 gallon Ultra Blazer
  - Minnesota, 28,711 acres
  - North Dakota, 3,294 acres
- Air temperatures 90°F or greater, 8 consecutive days after approval
- Sugarbeet growth stage ranging from cotyledon to 8-lvs complicated application timing





# Recommendation was based on Producer and Agriculturalist tolerance to sugarbeet injury

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

- We conducted demonstration plots at Benson, Crookston, MN, Hendrum, and Foxhome, MN and Casselton, ND.
- We collected yield parameters from the Hendrum, MN experiment.

# Percent visual sugarbeet injury, 3 to 16 days following Ultra Blazer application, 2021

Treatment	Rate	Casselton	Crookston	Foxhome	Hendrum	Benson <sup>a</sup>
	pt/100 G	%	%	%	%	%
Ultra Blazer (UB)	-	9 d	9 c	10 c	8 d	-
UB + Prefer 90	1	14 c	10 bc	11 bc	10 cd	-
UB + Prefer 90	2	15 bc	15 ab	18 b	15 c	-
UB + Prefer 90 + Amsol liquid AMS	2 + 20 (2.5 G)	-	-	-	-	35 a
PM + UB + Amsol liquid AMS	20	19 b	20 a	25 a	21 b	-
PM + UB + Prefer 90 + Amsol liquid AMS	2 + 20	28 a	-	26 a	30 a	40 a

<sup>a</sup>Air temperature was 95F at application





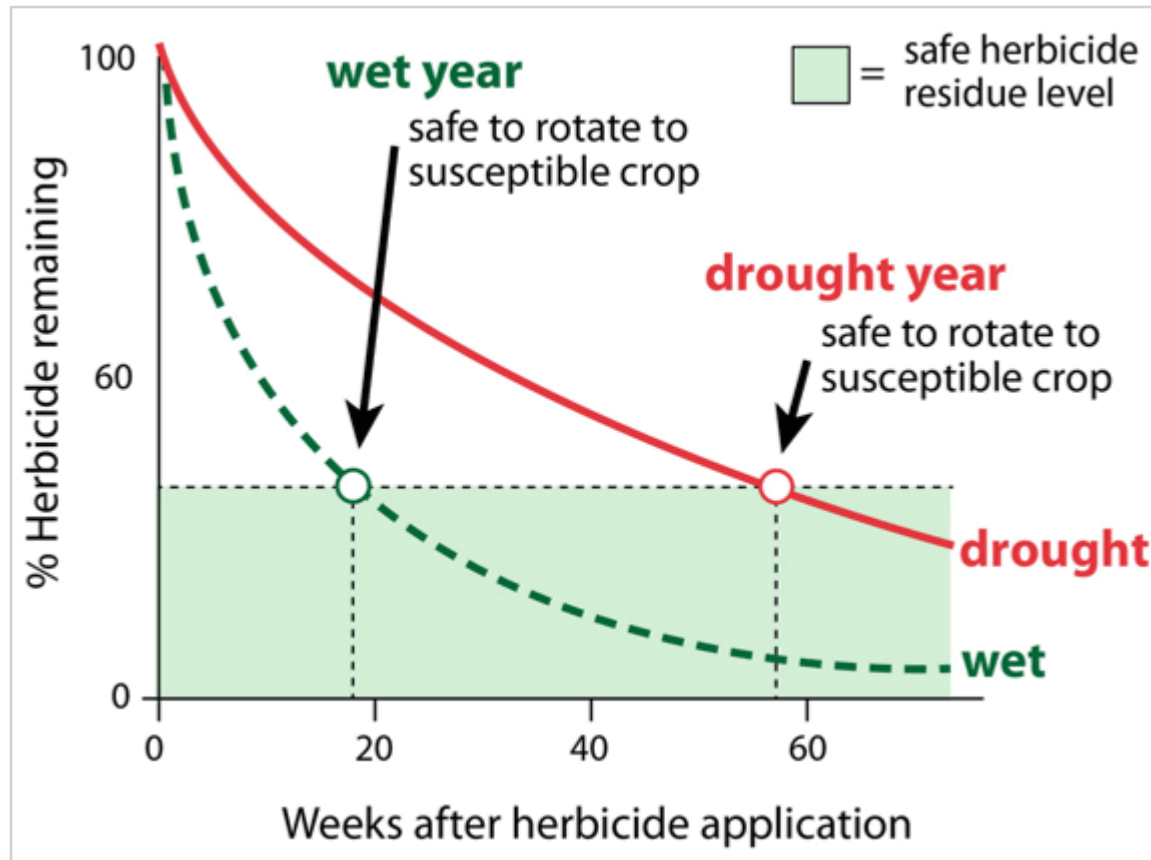


# Other Ultra Blazer Section 18 Emergency Exemption gleanings

- 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
- Ninety-two percent of respondents indicated they willingly would support application for a 2022 emergency exemption in sugarbeet in 2022.
- Spray volume and waterhemp size influenced control and regrowth.
- Some fields were bronzed more than others and for longer duration of time. Speed of recovery was dictated by soil moisture conditions.
- Some tried to correlate bronzing from Ultra Blazer to CLS. Heard both; less and more CLS following Ultra Blazer

**Herbicide carryover, when does it occur?**

# Herbicides may persist longer in dry vs. wet soils



- Pesticide labels provide guidance for crop rotation restrictions
- Environmental conditions, especially rainfall will ultimately determine persistence of herbicides

Colquhoun, J. 2006. Herbicide persistence and carryover. University of Wisconsin Extension publication A3819.



# Factors affecting herbicide carryover

- **Herbicide itself**

- The chemical structure of a herbicide affects absorptivity (binding to soil) and water solubility.
- Herbicides highly bound to soil particles are often less likely to be available for microbial degradation.

- **Moisture**

- Moisture enables herbicide to be in the soil solution
- Soil microbes are most active under moist but not saturated condition
- Herbicide adsorption (binding) is greater under dry conditions

- **Temperature**

- Optimum soil microbial activity occurs in June, July and August when temperatures range from 70F to 85F.
- Less breakdown before June or after August or when soil temps are less than 50F

- **Soils**

- CEC, especially organic matter
- Soil pH

# Carryover risk. Risk might be greater in drought conditions.

MOA/ Family	Trade Name	Common Name	Primary Dissipation Mode	Risk of Carryover Injury season following application to:		
				Corn	Soybean	Sugarbeet
Auxin	Stinger	clopyralid	Microbial	-	Moderate	-
ALS	Pursuit	imazethapyr	Microbial	Moderate	-	High
HPPD	Callisto	mesotrione	Microbial	-	Very low	High
HPPD	Laudis	tembotrione	Microbial	-	Low	High
PPO	Authority	sulfentrazone	Microbial	Low	-	High
PPO	FlexStar	fomesafen	Microbial	Moderate	-	High
PPO	Sharpen	saflufenacil	Microbial	-	Low	Low
PPO	Valor	flumioxazin	Microbial	Low	-	Moderate
PSII	Aatrex	atrazine	Microbial	-	High	High
PSII	Sencor	metribuzin	Microbial	Low	-	High

# Group 4 herbicides and carryover to soybean

- Products in small grains, corn, and sugarbeet contain clopyralid (Stinger in sugarbeet).
- Stinger degradation is by microbes; application rate, soil texture, moisture and temperature affect rate of Stinger degradation/carryover.
- Stunting and stacked soybean nodes
- Soybean injury is erratic in fields; plant to plant variation or pockets of heavy damage
- Soil residues of Stinger do not cause the uniform distortion of leaves associated with drift of 2,4-D or dicamba.



# Stinger carryover to soybean





# Stinger carryover to soybean



# Common ragweed control



# We have observed some ragweed biotypes more difficult to control

- Common ragweed seed collected from sugarbeet fields with escapes
- Control, PowerMax at 32 and 64 fl oz and Stinger at 3 and 6 fl oz/A
- Visual control weekly
- Table is visual control 50 DAT

Stinger Rate	Control	ACS-1	ACS-2	ACS-3	Minn- Dak
fl oz/A	%	%	%	%	%
3	85	60	50	90	70
6	90	70	60	95	85

Control is a 'university standard', likely susceptible



**Stinger HL 'Higher Load' is approved for corn, cereals, canola, and sugarbeet in MN and ND.**

Product	Loading	Labeled rate	Sugarbeet rate
Stinger	3 lb/gal	4 – 10.7 fl oz/A	2 – 6 fl oz/A
Stinger HL	5 lb/gal	2.4 – 6.4 fl oz/A	1.2 – 3.6 fl oz/A

	Converting Stinger rate to Stinger HL rate			
	fl oz/A	fl oz/A	fl oz/A	fl oz/A
Stinger	2	3	4	6
Stinger HL	1.2	1.8	2.4	3.6



# Roundup PowerMax 3 Herbicide

Nonselective foliar control of both grass and broadleaf weeds

Active Ingredient and Site of action

- Glyphosate in the form of the Potassium (K) salt
  - 4.80 lb ae/gal
  - 5.88 lb ai/gal

Equivalent Application Rates (fl oz/A)

lb ae/A	Roundup PowerMax 3 Herbicide	Roundup PowerMax Herbicide
0.75	20	22
1.125	30	32
1.5	40	44
2.25	60	64

# Palmer amaranth update

## PALMER AMARANTH

*Amaranthus palmeri*

SHOWN RESISTANCE TO:

2 3 4 5 9 14 15 27

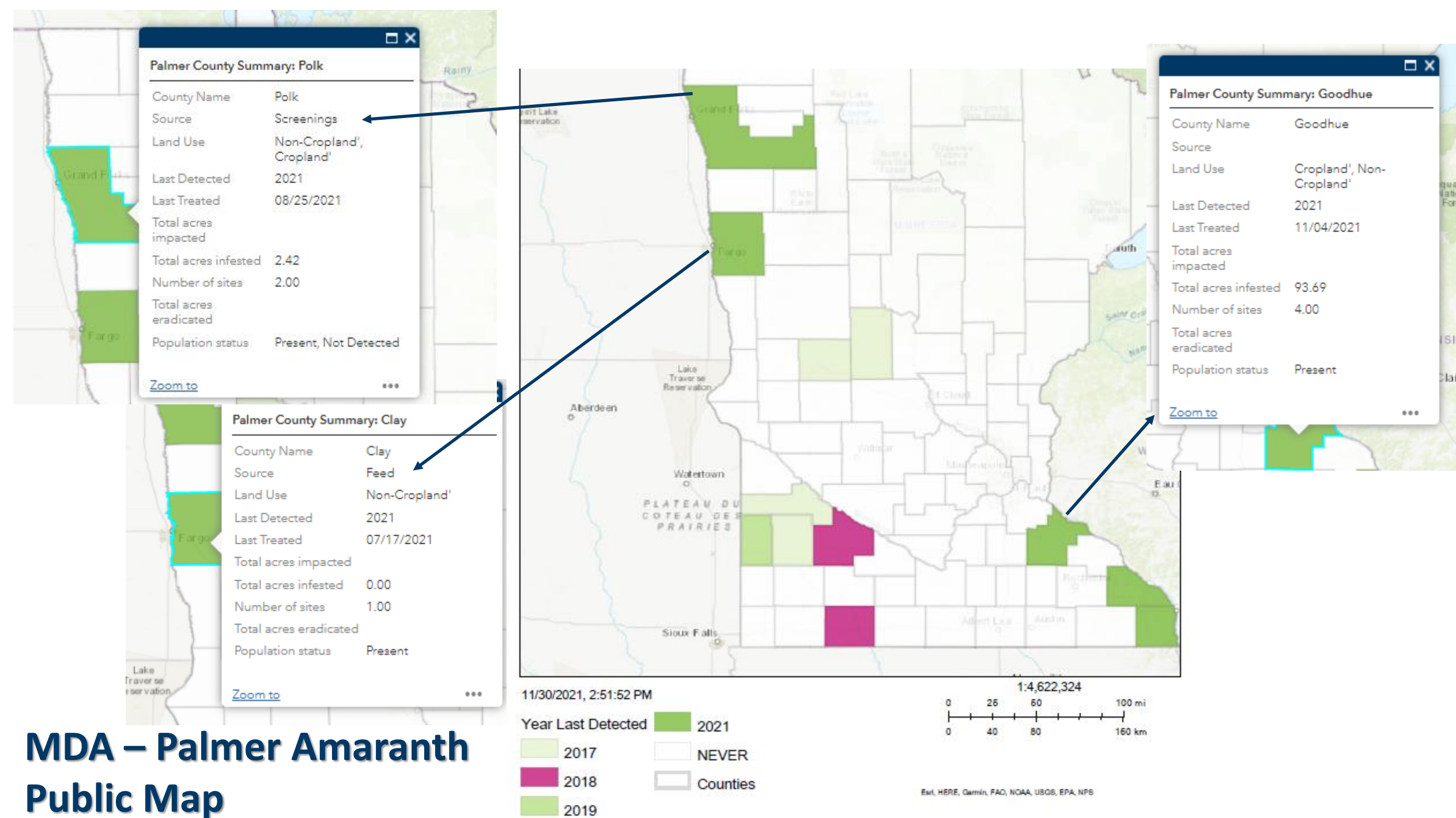


# Why the big deal?

- Fast growing (up to 2-3 inches/day)
- Prolific seed producer
  - Potential 500,000+ seeds/plant
- Can cause severe yield losses
  - Up to 91% in corn & 79% in soybean
- Herbicide resistance concerns
  - R to multiple SOAs common

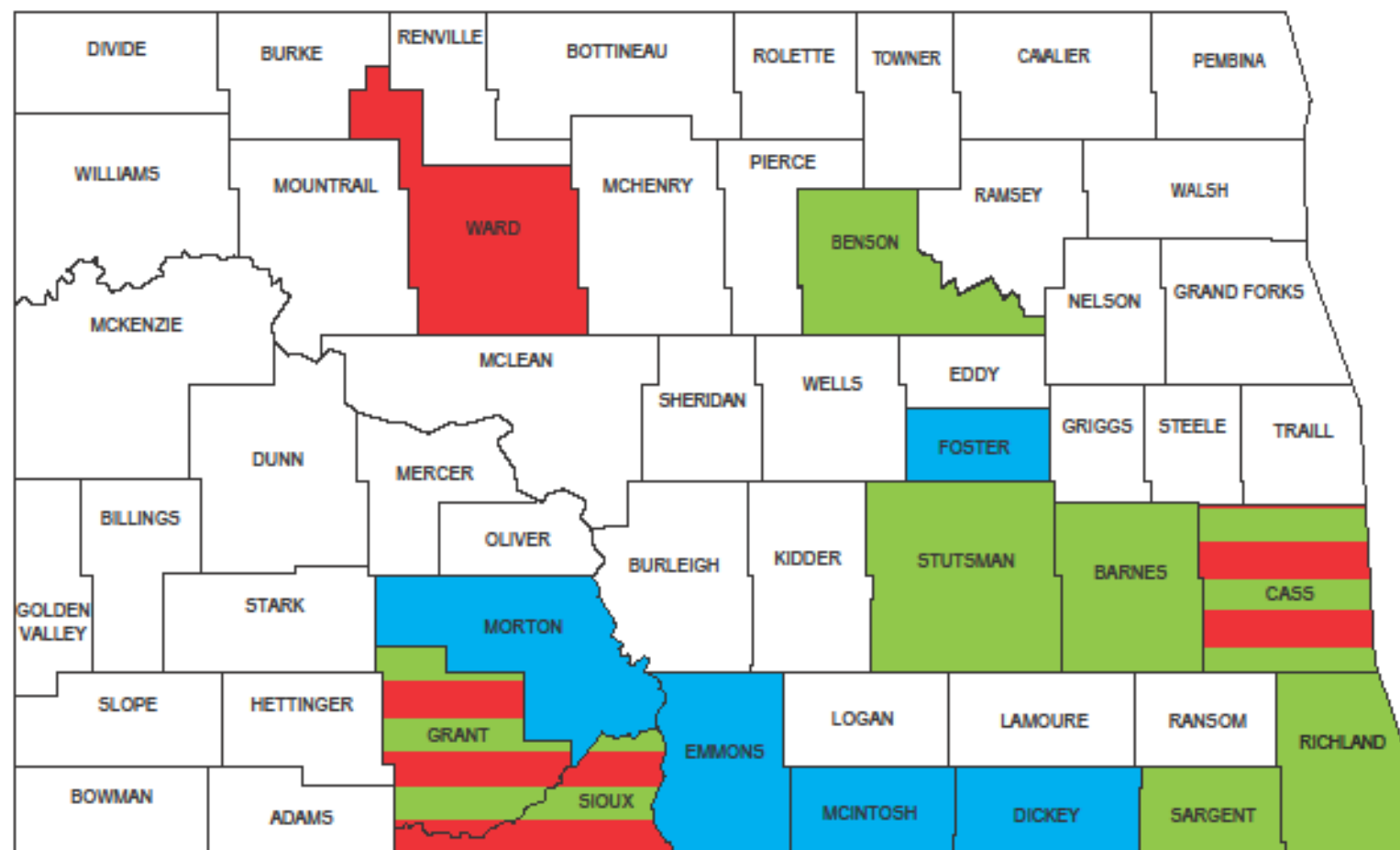
2	3	4	5	9	14	15	27
ALS INHIBITORS	MICROTUBULE INHIBITORS	SYNTHETIC AUXINS	PHOTOSYSTEM II INHIBITORS	EPSP SYNTHASE INHIBITOR	PPO INHIBITORS	LONG-CHAIN FATTY ACID INHIBITORS	HPPD INHIBITORS
Classic®, Pursuit®	Prowl® H <sub>2</sub> O, Trellan®	2,4-D, Clarity®, quinclorac	atrazine, metribuzin, Linex®	Roundup® (glyphosate)	Flexstar®, Cobra®	Dual®, Harness®	Callisto®, Laudis®





# North Dakota Department of Agriculture

## Palmer Amaranth Distribution



- Previously found but no longer detected
- Previously found and still detected, under management
- Population found in current year (2021)

As of 11/2/2021



# If you suspect Palmer amaranth.....

## 1) Take Photos and record location

## 2) Immediately call

- TOM PETERS, local U of M Extension Educator or IPM Specialist, crop consultant, county agricultural inspector and/or MDA's **Arrest the Pest** at **888-545-6684** to report locations

## 3) SAVE the plant(s) for positive ID!

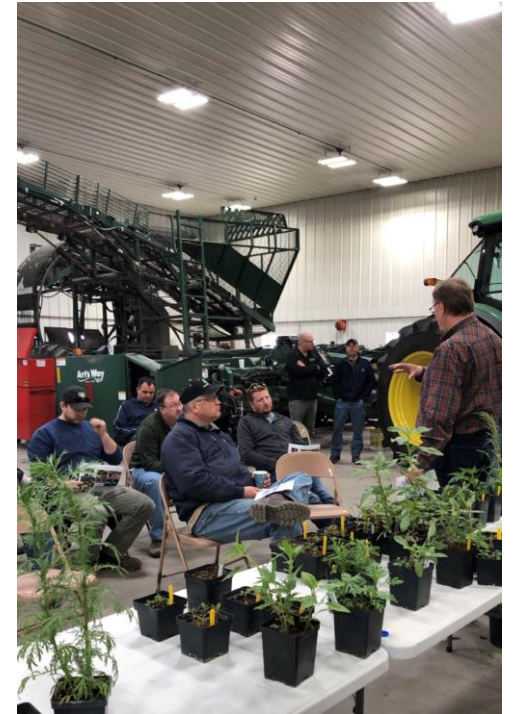
- Leave in the field if you can until the MDA can verify the plant and collect sample for genetic confirmation
- If hand-pulled, collect at least 5 leaves from each plant, place in Ziploc bag and refrigerate until you contact the MDA
- Dead and dry plant material should be placed in a paper bag and stored at room temperature.





# Machine Shop Meetings -2022

- Week of February 21 in East Grand Forks Factory District
- Locations, dates and time TBD
- Small group meetings
- No PowerPoint; plenty of donuts and coffee...and sometimes.....in the afternoon
- Weed Identification; weed control in sugarbeet
- Ultra Blazer in sugarbeet
- Strip Tillage; herbicide carryover



# **We appreciate your trust**

- The Sugarbeet Research and Education Committee for supporting our field research program.
- To Ransel Anderson, James Bergman, Scott Johnson, Kirk Luckow, Rod Olson, and Neil Rockstad for providing us with the opportunity to conduct our experiments on their fields.
- Strip Tillage project cooperators in Walsh and Polk Counties
- The University of Minnesota NW Research and Outreach Center, Crookston; especially Mr. Jeff Nielsen
- Shop Meeting Hosts

# Thank you for your continued support

Tom Peters

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