Weed Control in Sugarbeet

Grand Forks Growers Seminar

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University of Minnesota

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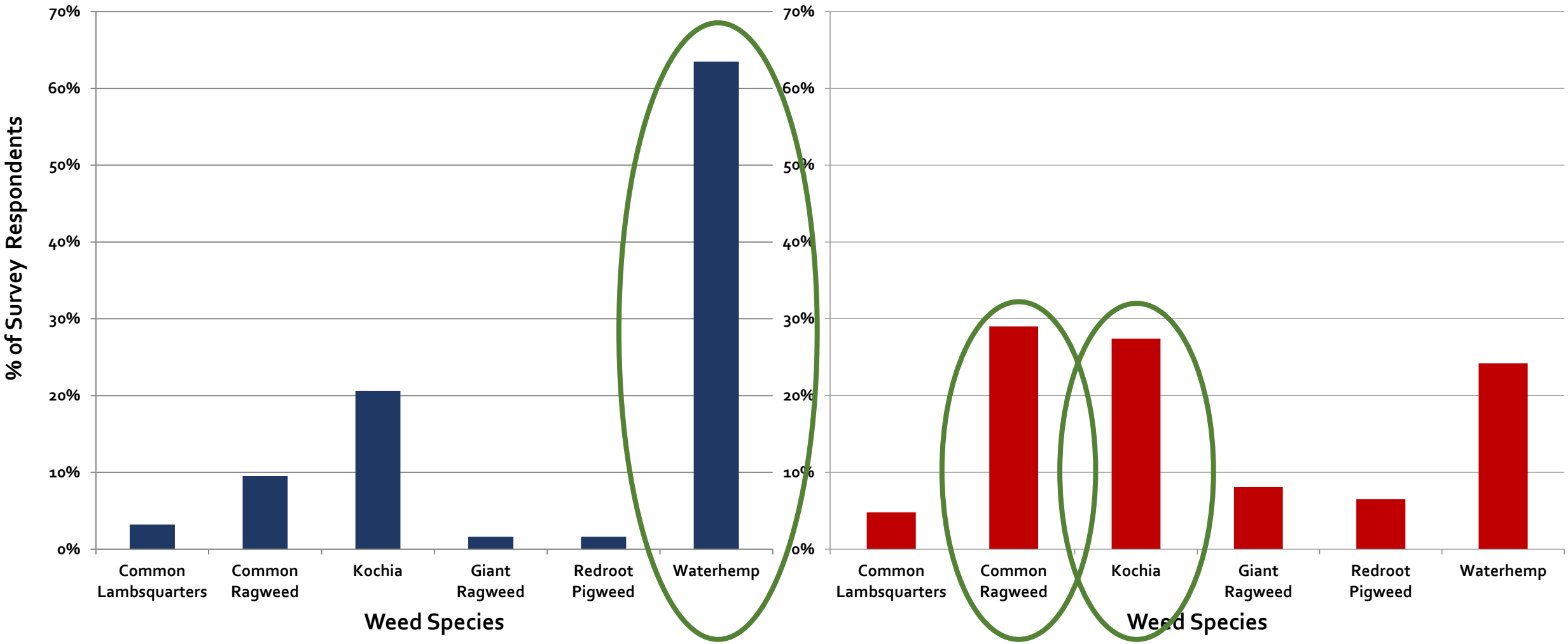
What was your worst weed control challenge? What was your second worst weed control challenge? [a]

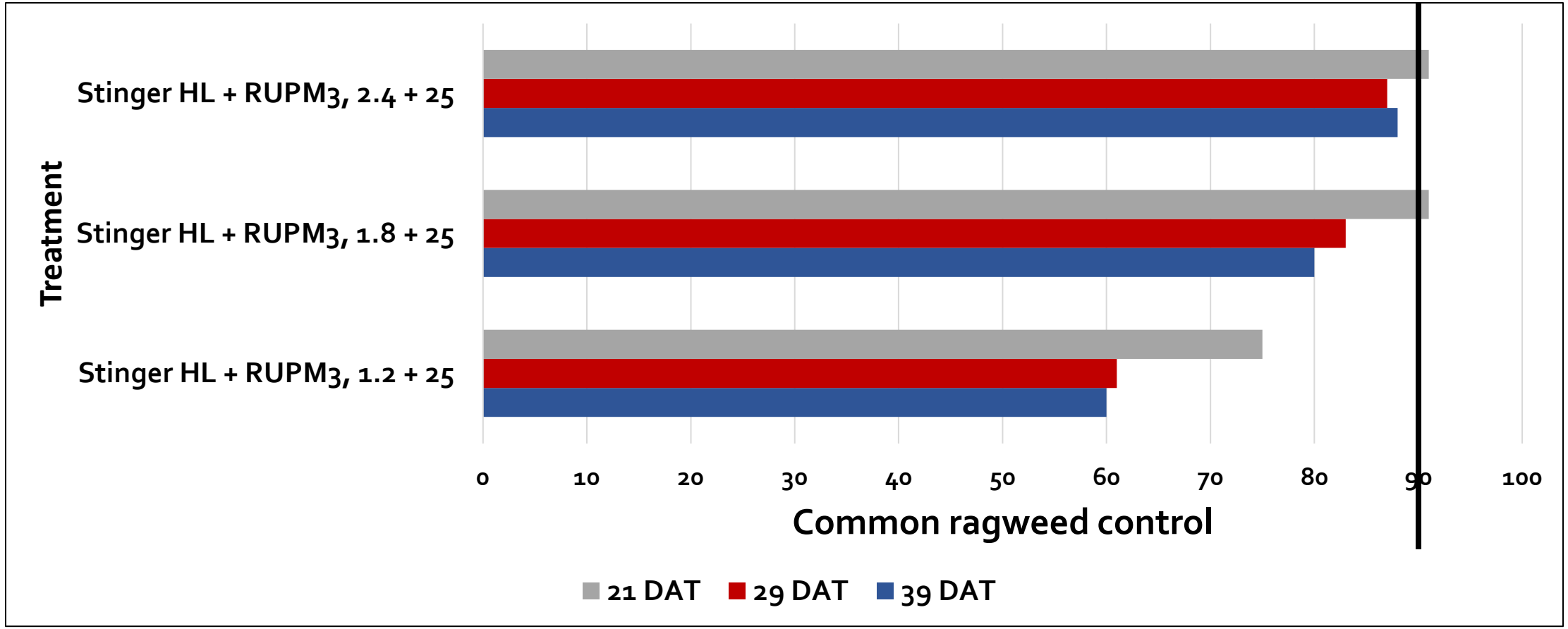


[a]2024 Grand Forks Growers Seminar, February 13, 2024

Best Management Practices for Stinger HL application and ragweed control

- Stinger HL at 2.4 fl oz/A must be our rate of choice with a single application.
- Stinger HL applied to ragweed less than 2-inch vs. greater than 2-inch.
- Time Stinger HL application to ragweed size rather than sugarbeet stage.
- May need to separate glyphosate and Stinger HL application if you want to delay termination nurse crop to 4-lf sugarbeet.

Common ragweed control in response to treatment, < 2-inch, Halstad, 2022.[a]



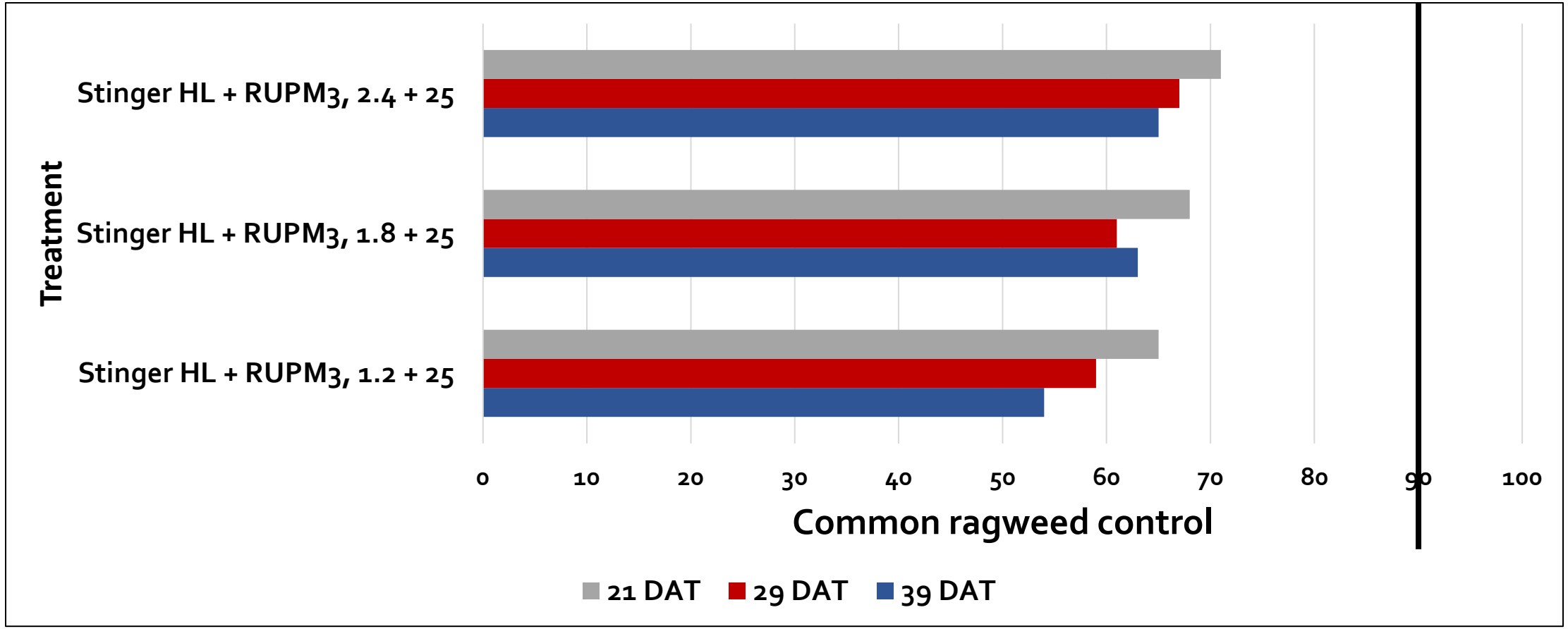
[a]Treatment mixed with non-ionic surfactant and liquid AMS

Common ragweed control, Halstad, MN, 2022

			Common ragweed control [b]		
Treatment[a]	Rate	Common Ragweed	July 8 29 DAAA	July 16 37 DAAA	July 26 47 DAAA
	fl oz/A	inch	%	%	%
Stinger HL + PowerMax3	2.4 + 25	<2	91 b	87 ab	88 a
Stinger HL + PM3 / Stinger HL + PM3	1.5 + 25 / 1.5 + 25	<2 / 10 day	91 b	91 a	89 a
Stinger HL + PM3 / Stinger HL + PM3	1.8 + 25 / 1.8 + 25	<2 / 10 day	95 a	92 a	94 a
LSD (0.10)			4	8	8

[a] Treatment mixed with non-ionic surfactant and liquid AMS
[b] application a applied to ragweed less than 2-inch and 13 days later

Common ragweed control in response to treatment,2- to 4-inch, Halstad, 2022.[a]



[a]Treatment mixed with non-ionic surfactant and liquid AMS

Common ragweed control, Halstad MN, 2022

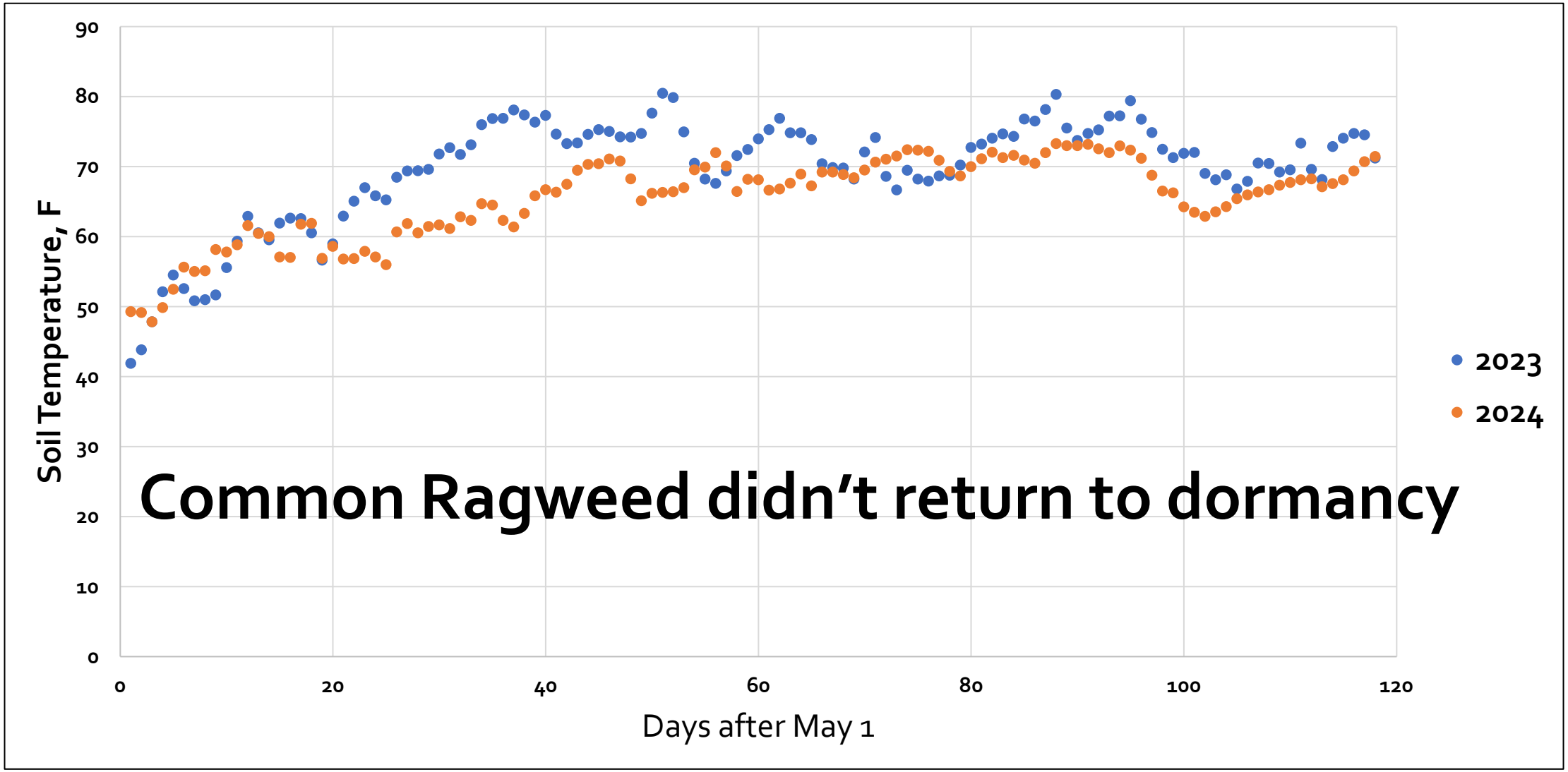
			Common ragweed control		
Treatment	Rate	Common Ragweed	July 8 21 DAAB	July 16 29 DAAB	July 26 39 DAAB
	fl oz/A	inch	%	%	%
Stinger HL + PowerMax3	2.4 + 25	2-4	71	67 ab	65 b
Stinger HL + PM3 / Stinger HL + PM3	1.5 + 25 / 1.5 + 25	2-4 / 10 day	69	69 a	77 a
Stinger HL + PM3 / Stinger HL + PM3	1.8 + 25 / 1.8 + 25	2-4 / 10 day	70	69 a	79 a
LSD (0.10)			NS	9	6

[a] Treatment mixed with non-ionic surfactant and liquid AMS
[b] application b applied to ragweed greater than 2-inch AND 10 days later

Why were there so many common ragweed escapes in 2024?

- Timing of the first Stinger HL application was influenced by weather.
- Growers didn’t compensate with higher Stinger HL rates for the second application on larger, actively growing ragweed
- Carryover concerns
- Complex tank mixtures
  - Spray timed to waterhemp stage instead of common ragweed stage
- Ragweed continued to emerge well into June

Daily average soil temperature at 4-inch at Sabin, MN, May 1 to August 15, 2023 and 2024



Other thoughts about Stinger HL

- 10.5 months **Rotation Interval** with soils greater than 2% organic matter AND rainfall more than 15 inches during 12 months following application
- Most of us measured significant rainfall in June, July and August. Very little rain in September and October
- Rainfall is especially important if Stinger HL rate is greater than 3.6 fl oz/A in a season
- Manage clopyralid products in the sequence with sugarbeet

Spring Wheat	Sugarbeet	Corn
WideMatch	Stinger HL	SureStart/II / TripleFlex/II
WideARmatch		Resicore / Resicore XL
Curtail		Maverick
PerfectMatch		Kyro

+ Stinger may cause leaves to cup, pucker, or have strapping.
+ Plants may be shorter than those that are not affected.
+ Soybean may be a darker green color in areas not affected

Crop Rotation Intervals for All States Except California, Florida, Idaho, Nevada, Oregon, Utah and Washington

Rotational Crops[1]	Rotation Interval[4] (Soils greater than 2% organic matter **AND** rainfall more than 15 inches during 12 months following application)	Rotation Interval[4] (Soils less than 2% organic matter **AND** rainfall less than 15 inches during 12 months following application)
barley, canola (rapeseed), cole crops (includes *Brassica* species grown for seed), field corn, flax, garden beet, grasses, oats, popcorn, spinach, sugar beet, sweet corn, turnip, wheat	anytime	anytime
alfalfa, asparagus, grain sorghum, onions, peppermint, safflower	10.5 months	10.5 months
spearmint, strawberry		
dry beans, soybean, sunflower	10.5 months	18 months[2]
lentils, peas, potatoes (including potatoes grown for seed), and broadleaf crops grown for seed (excluding *Brassica* species)	18 months[2]	18 months[2, 3]

1. For best results, conduct a field bioassay prior to planting any broadleaf crops that are not listed. Do not rotate to unlisted crops prior to 10.5 months following application.
2. Follow an 18-month crop rotation due to the potential for crop injury unless previous experience has shown no crop injury with the minimum 10.5-month rotation interval. **Restriction:** For these crops, a minimum 10.5-month rotation interval must be observed.
3. For best results, conduct a field bioassay prior to planting these sensitive crops.







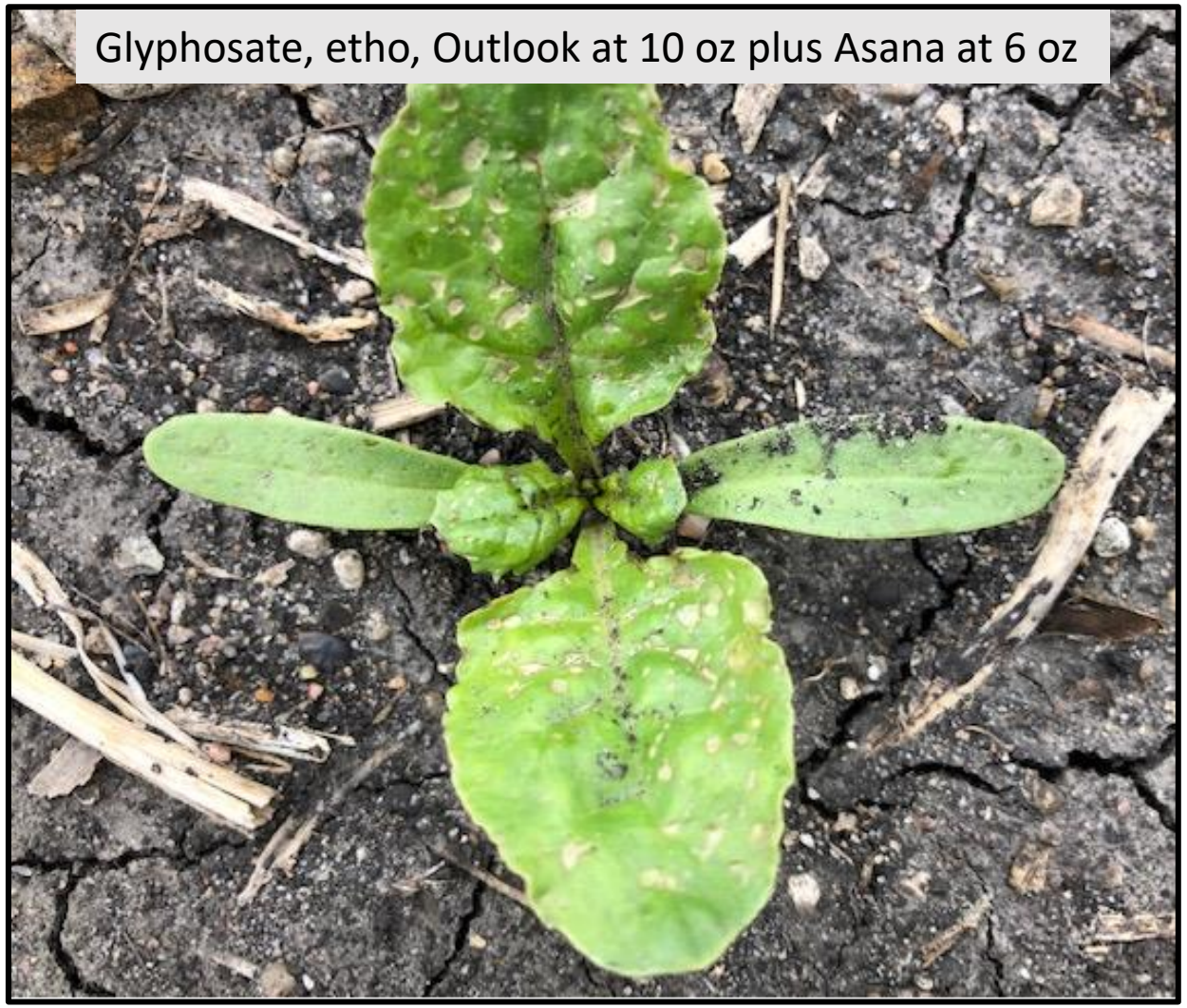
Why do you spray pesticide mixtures?

- Improve weed control
- Broaden spectrum of control
- Save trips

Dr. Dexter once wrote….

- sugarbeet herbicides may be tank mixed legally
- if all herbicides in the mixture are registered for use on sugarbeets
- and if no prohibitions against tank mixes appear on a label

I call it ‘Complex Mixtures’



- EC formulations (Outlook and *S*-metolachlor) fleck sugarbeet
- Asana may be "synergizing" the flecking phenotype
- The speckle is related to a surfactant system "spreading" the droplet

Sugarbeet injury, greenhouse, March 2023

Treatment	Rate	GR, 10 DAT	GR, 14 DAT	GR, 17 DAT
	fl oz /A	----------%----------		
RUPM3 + ethofumesate (base)	30 + 12	10 c	4 c	3 c
Base + Outlook	21	16 c	12 b	9 c
Base + Outlook and Mustang Maxx	21 + 4	27 b	15 b	18 b
Base + Outlook, Mustang Maxx and Stinger HL	21 + 4 + 3.6	37 a	37 a	43 a
LSD (0.10)		10	9	10

- Injury from Mustang Maxx (or Asana) less than chlorpyrifos.
- Add adjuvant with RUPM, ethofumesate and Outlook. Leave it out with RUPM, ethofumesate, Outlook, insecticide, and Stinger

Run 2


POST Herbicides Alone
Control
Base+Outlook
Base+Outlook+
Mustang Max
Base+Outlook+
Mustang Max+
Stinger HL


POST Herbicides with High Surfactant Methylated Oil Concentrate
Control
Base+Outlook
Base+Outlook+
Mustang Max
Base+Outlook+
Mustang Max+
Stinger HL

Its about finding balance

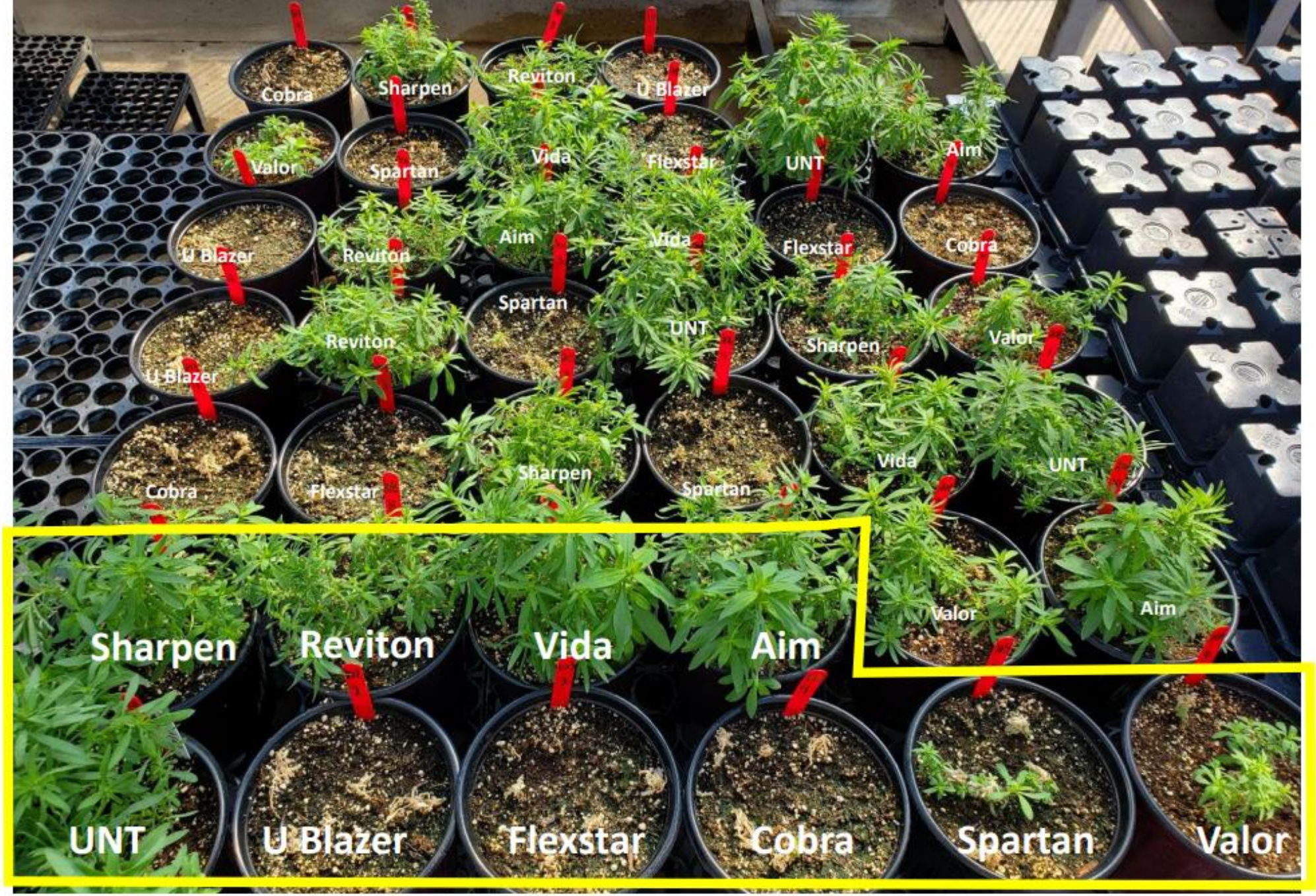
Tank-mixes

- Fewer trips
- Synergy between products
- Herbicides, fungicides, and insecticides
- Fighting the weather
- Getting across the acres

Products singly

- Herbicide rate and application timing to each specific weed or pest
- Consistent results
- Fewer surprises from weather

Minot

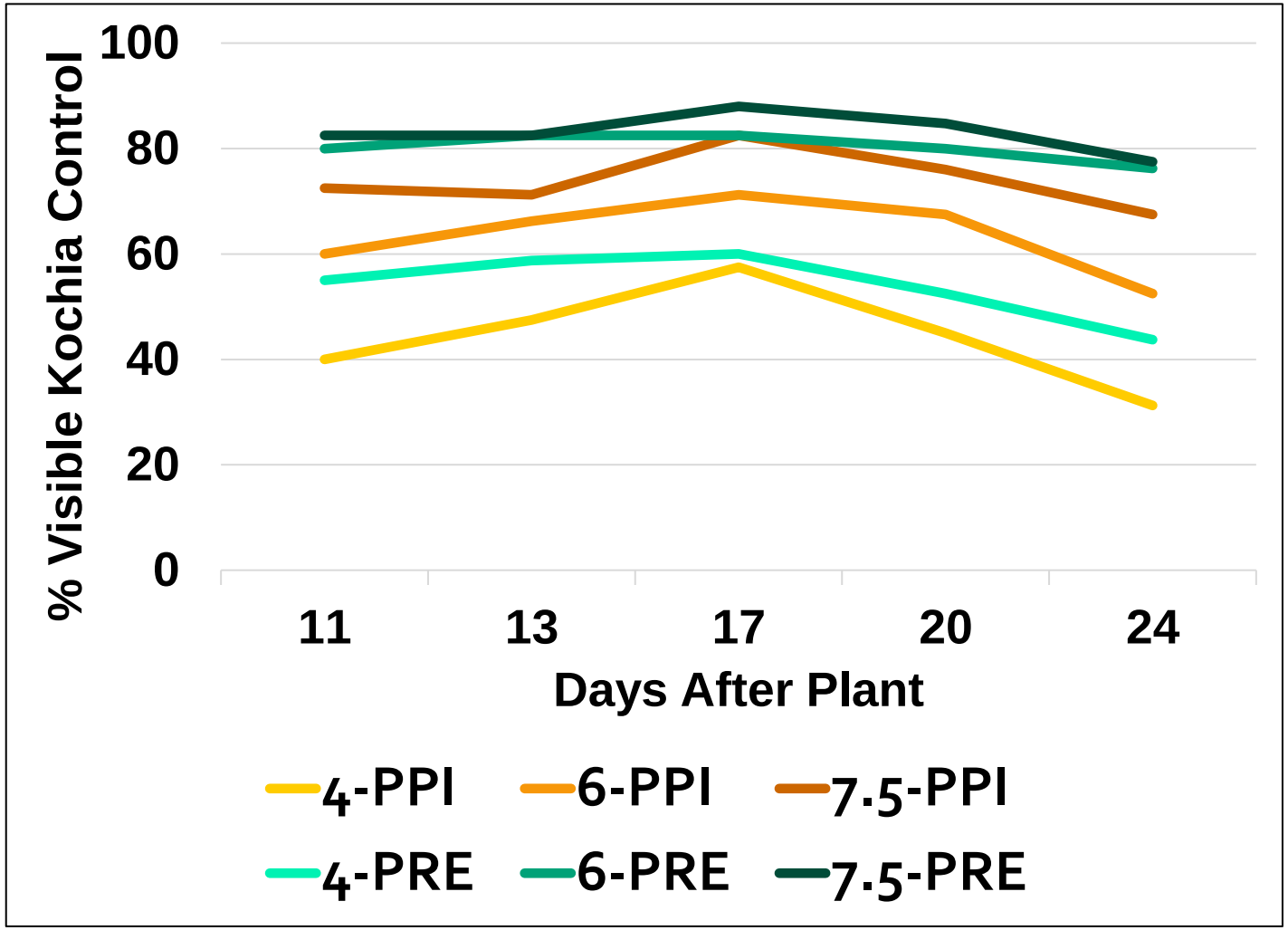


Slide courtesy of Brian Jenks, NDSU

PPI and PRE Comparison Study Results

- PRE applications performed better than PPI in 2024 due to timely rainfall
- Higher rates provided better control
- 6 and 7.5 pt/A rates PRE provided over 85% control

Kochia control in response to ethofumesate, Horace ND, 2024



Kochia control in sugarbeet

Three options

- Paraquat before sugarbeet emerges
  - Use rate depending on vegetation; 1.3 to 2 pt/A (max rate is 2.7 pt/A).
  - Gramoxone alone or in tank mixtures are permitted by ground and by air; a minimum of 10 gal/A by ground and 5 gal/A for aerial application.
  - Use spray nozzles that will produce medium to coarse droplets are recommended.
  - Use an adjuvant, Non-Ionic Surfactant (preferred) at 0.25% v/v (2 pt/100 gal). Crop Oil Concentrate or Methylated Seed Oil at 1.0% v/v (1 gal/100 gal).

Kochia control in sugarbeet

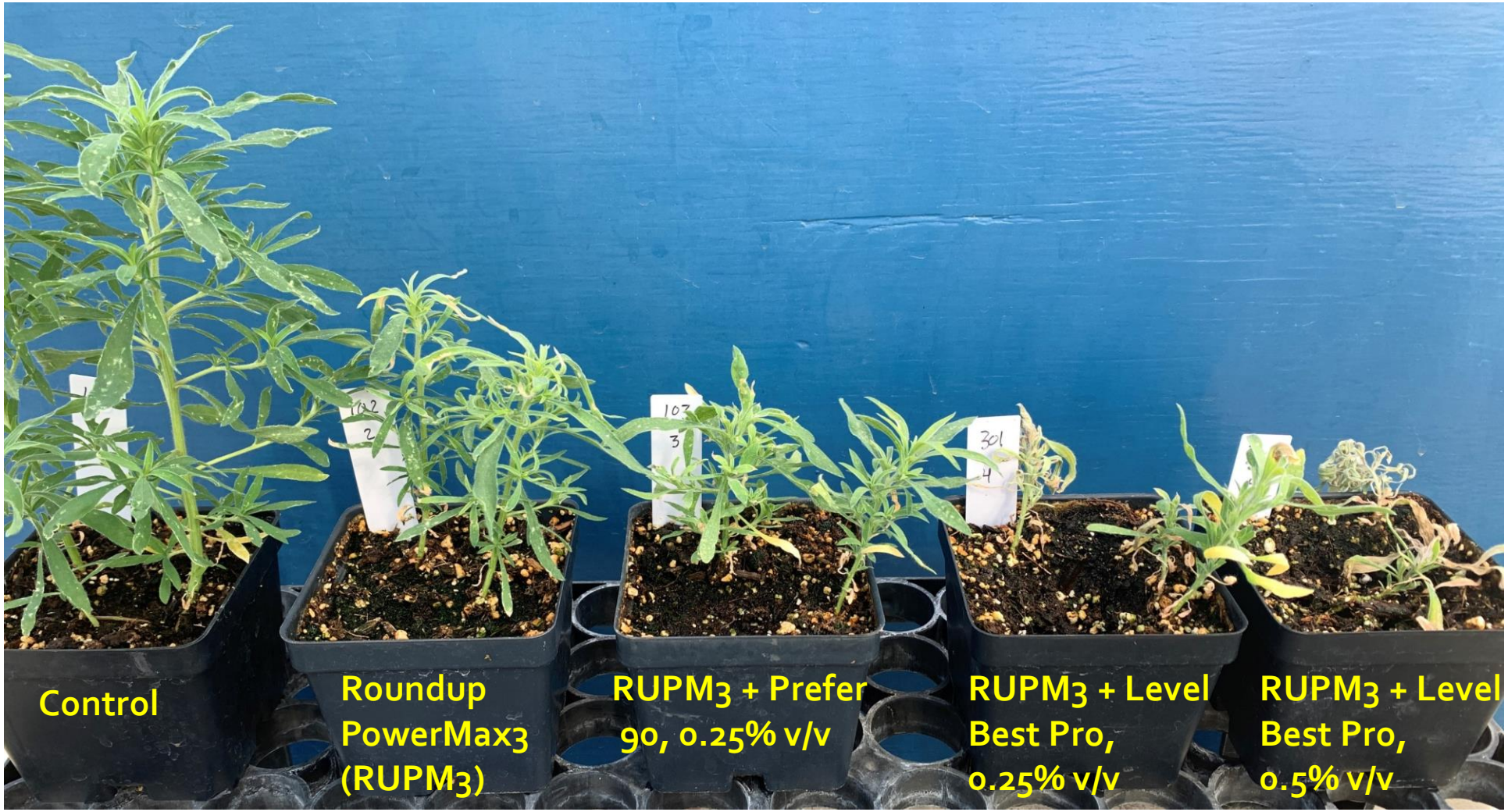
Three options

- Glyphosate sensitive kochia (fence-line kochia)
- Roundup PowerMax3 (full rates) mixed with a high quality adjuvant and ammonium sulfate
- Kochia up to 3-inch tall
- Shop for the best adjuvant you can source
    - ethoxylate tallow amine adjuvant

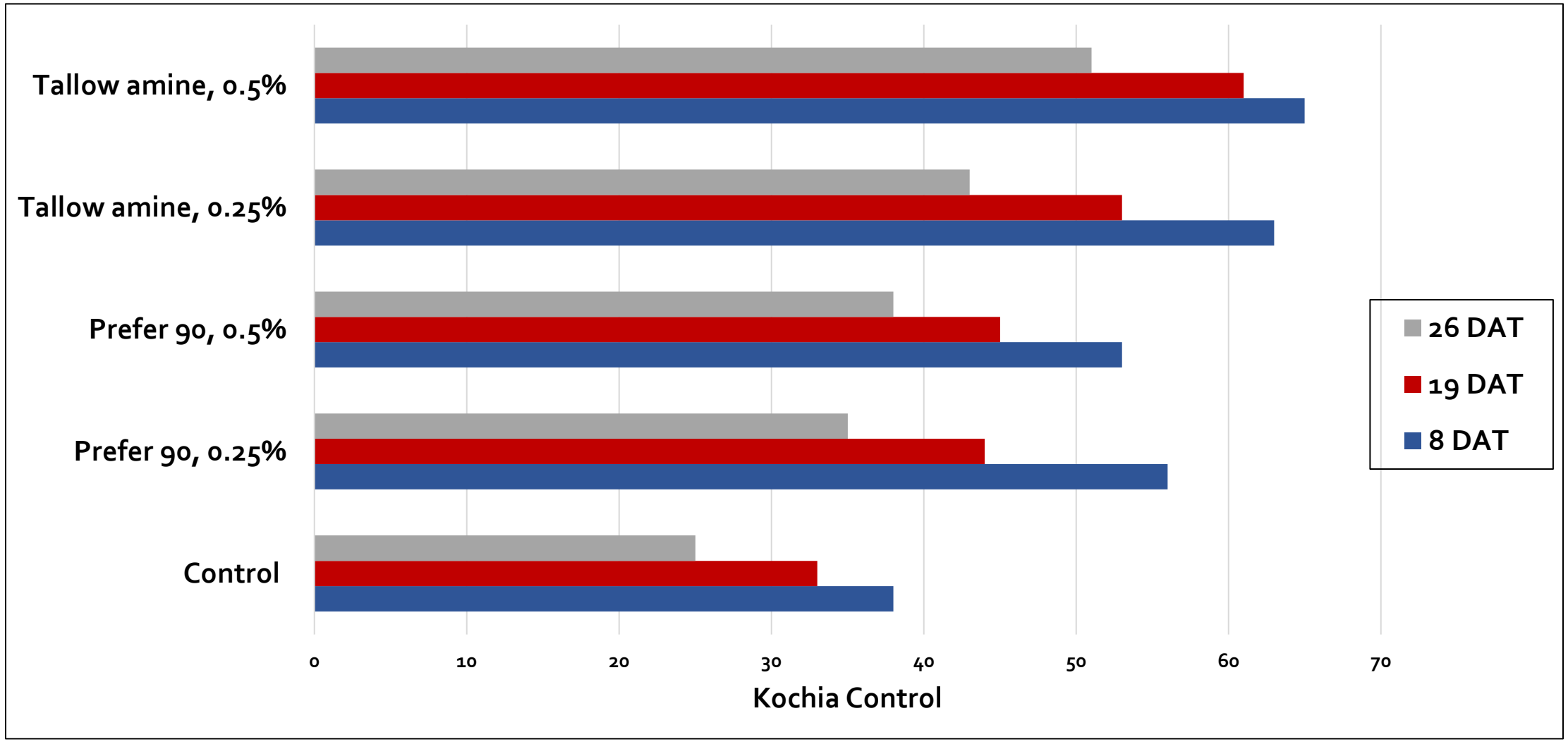
Tallow amine adjuvant

- Ethoxylated tallow amine (ETA) adjuvant was in the original glyphosate formulation.
- It was viewed by most old time weed scientists as the best formulation ever produced.
- ETA was repackaged as Level Best, non-ionic surfactant and water conditioner
- Level Best Pro is a non-ionic surfactant, water conditioner and deposition agent in 2024
- Last Chance; Last Chance Pro

Kochia control from Roundup PowerMax3 alone or with surfactants, 11 DAT, greenhouse, 2024.



Adjuvants with Roundup PowerMax3 at 30 fl oz/A for kochia control, Felton MN, 2024



Kochia control in sugarbeet

Three options

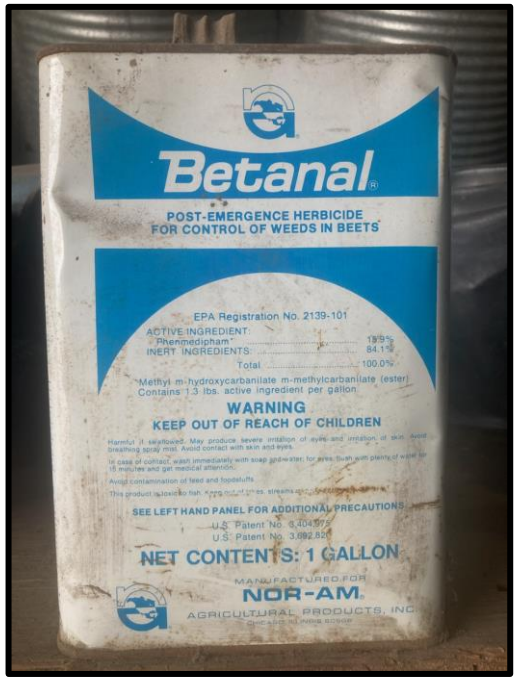
- Redevelopment of phenmedipham combines historical field and recent greenhouse and field experiments
- Spin-Aid, Betanal, ‘Blue Can’
  - Spin-Aid + ethofumesate; Spin-Aid + ethofumesate + RUPM3
  - Small kochia

Belchim USA
GROWING TOGETHER

- dime-size
- 4-leaves

- quarter-size
- 6- to 9-leaves

- too big
- Scout early next year



Kochia control from Spin-Aid, 11 DAAC, greenhouse, December/January 2023-24

Kochia Control 14 DAAD, Felton MN, 2024

Trt. Num.	Herbicide Treatment [a, c]	Rate	Kochia Control[b]
		(fl oz/A)	----%----
1	Spin-Aid	12	50 d
2	SA/ SA	12 / 16	66 c
3	SA/ SA/ SA	12 / 16 / 24	80 ab
4	PRE / SA/ SA	PRE / 12 / 16	80 ab
5	PRE / SA/ SA/ SA	PRE / 12 / 16 / 24	89 a

[a]Spin-Aid mixed with 4 fl oz/A ethofumesate. High surfactant methylated oil concentrate at 1 pt/A and AMS at 2.5% V/V.

[b]lsmeans with different letters significant at P=0.05

[c]Spin-Aid plus etho, glyphosate, HSMOC at 4 and 25 fl oz/A and 1 pt/A, respectively

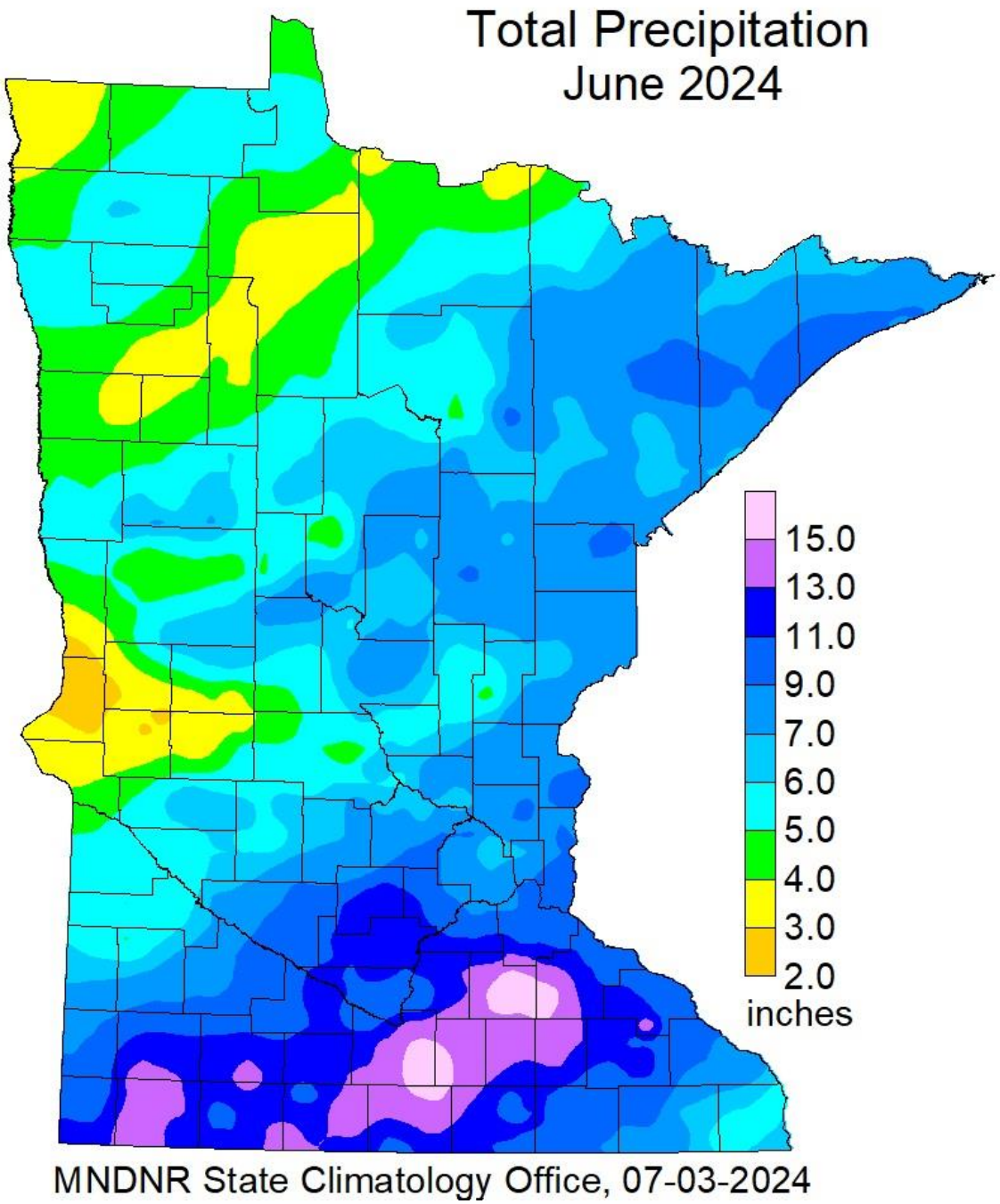
Working hypothesis

	Spin-Aid Rate[a]		
Sugarbeet Stage	Cold (<75F) at application	Warm (>75F) at application	Mixed with Stinger HL, etho and/or RUPM3[b]
(Lvs)	----------(fl oz per acre)----------		
Cotyledon	16	12	12
Early 2-lf (horns)	20	16	16
2-4 lf	28	24	24
4 lf	32	28	28

[a]Spin-Aid will be applied on 5-7 day intervals when sugarbeet are actively growing and on 10 day intervals when sugarbeet are not growing.
[b]Spin-Aid mixed with ethofumesate at 4 fl oz per acre with MSO or HSMOC at 1 pt/A

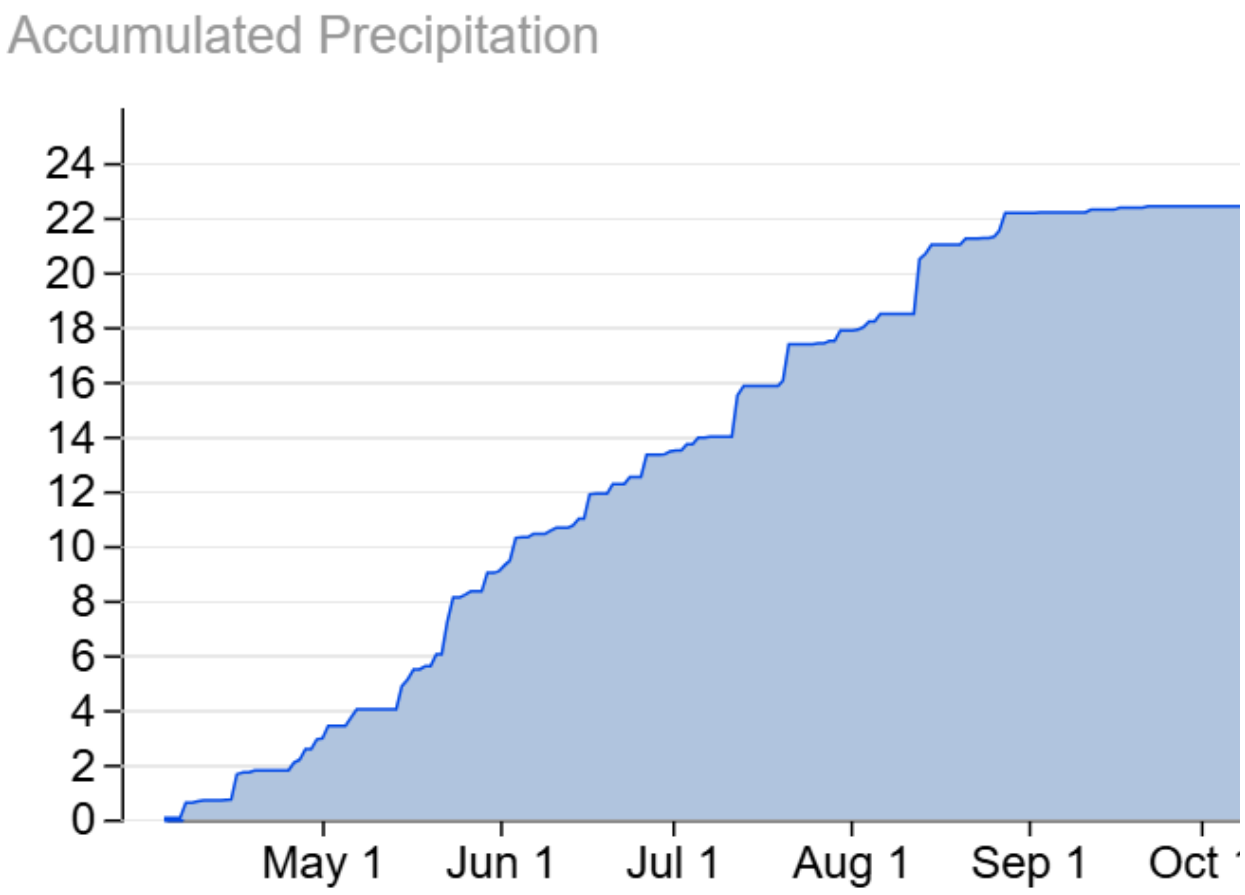
June 2024 Among the Wettest Months on Record in southern Minnesota

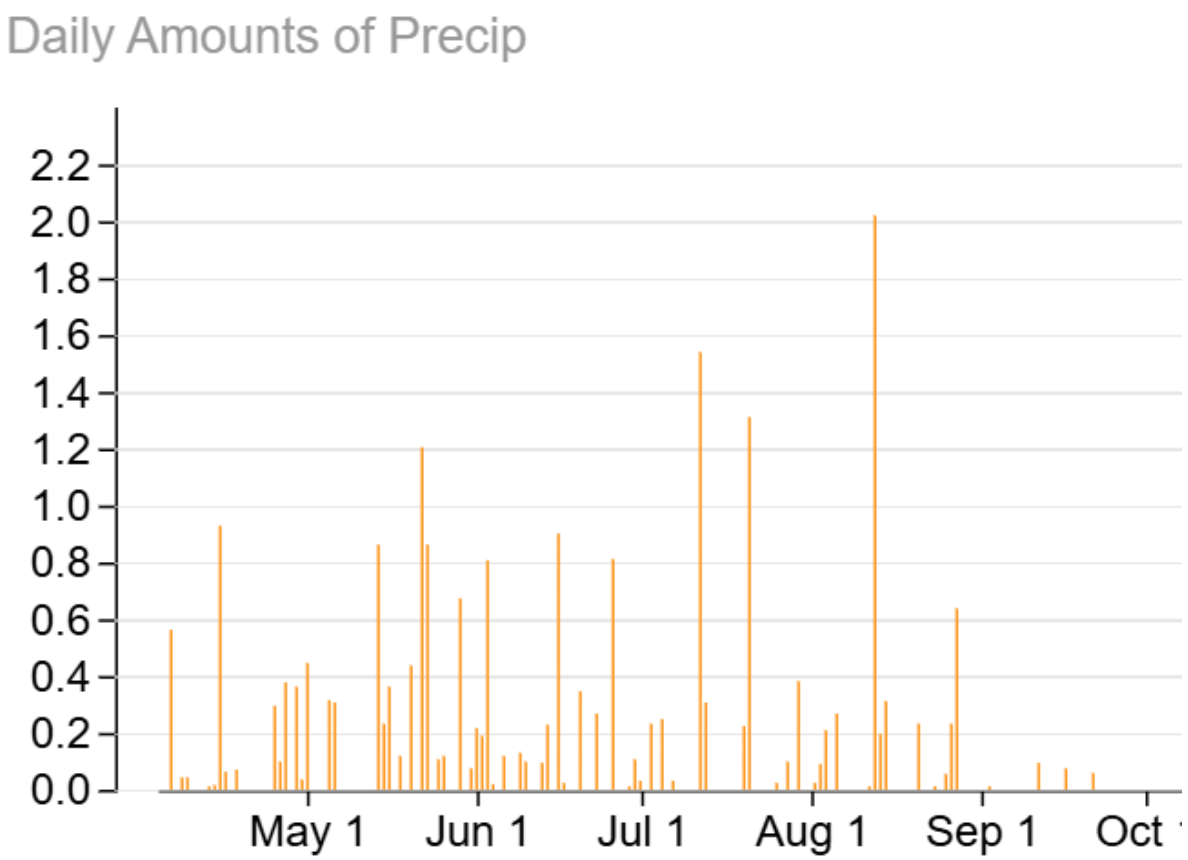
- June 2024 was the fourth-wettest June on record
- The state-average rainfall for the month, based on "gridded" data from NOAA, was 6.8 inches.
- This value was exceeded only by June 1905 (6.9 inches), June 1914 (7.3 inches) July 1897 (7.4 inches), and June 2014 (8.0 inches)



Hendrum MN, April 1 to October 1, 2024

Data from Climate Fieldview for a research site





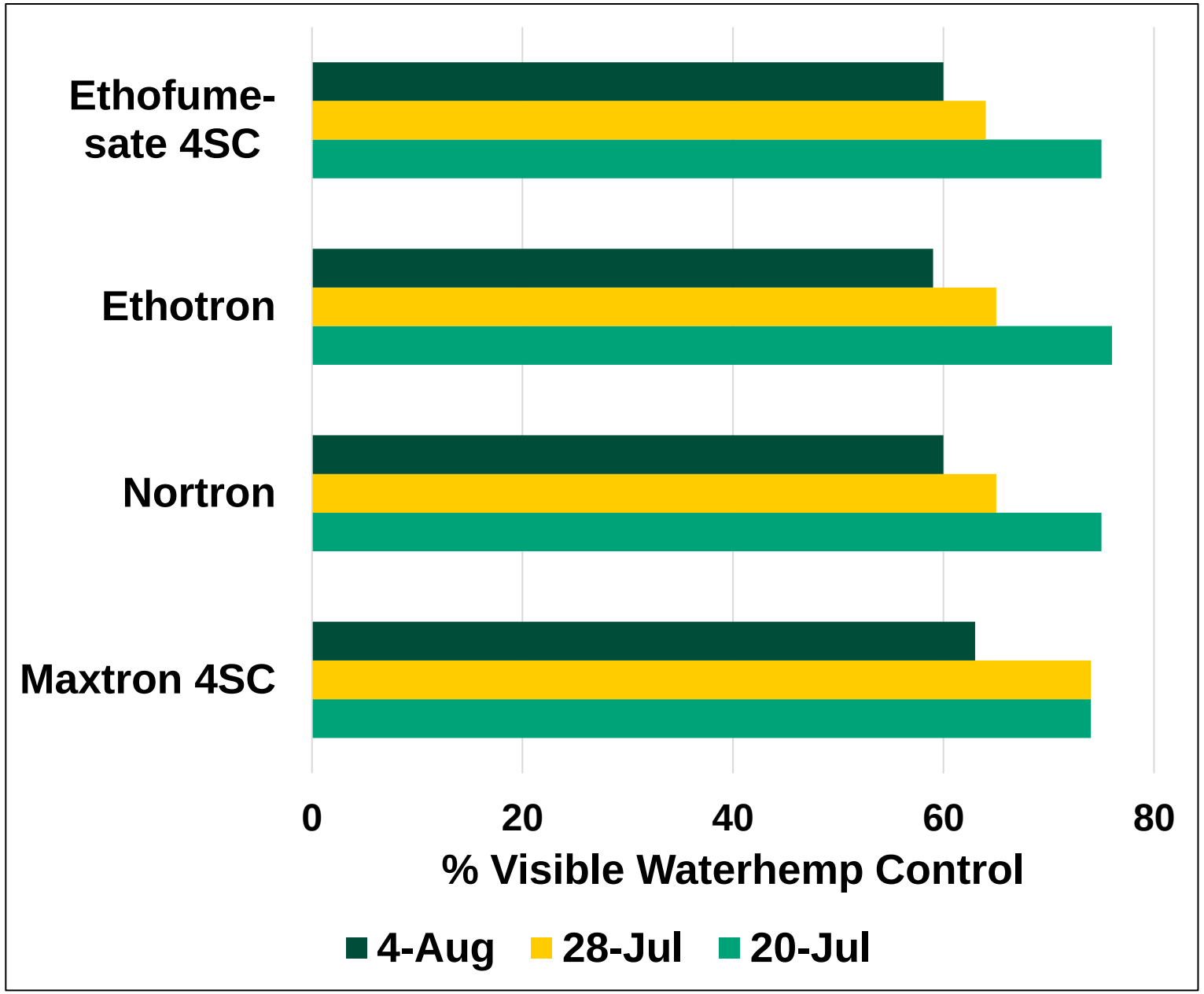
Ethofumesate in 2025
Group 15

Ethofumesate brands for sugarbeet production

- Nortron, Bayer CropScience
- Ethotron, UPL NA Inc.
- Ethofumesate 4SC, Farm Business Network
- Maxtron 4SC (3.78 lb/G), ALBAUGH, LLC
- Nektron SC, Atticus, LLC

Brand Comparison Study Results: Moorhead, MN

- No differences between brands; across evaluations
- Waterhemp control averaged 75%, 67% and 61%, 68, 76, 83 DAP



Each treatment includes 25 fl oz/A RUPM3 and 6 fl oz/A Nortron at 2-4 and 6-8 lf stage.

Thank you to our collaborators

- Sugarbeet Research and Education Board for funding
- Support from the Northwest Research and Outreach Center, Crookston MN
- Our grower cooperators
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- ACSH Moorhead Technical Center, Tyler Grove

Thank you for your continued support

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