The War Against Weeds

Joe Ikley

Extension Weed Specialist

1/21/2025

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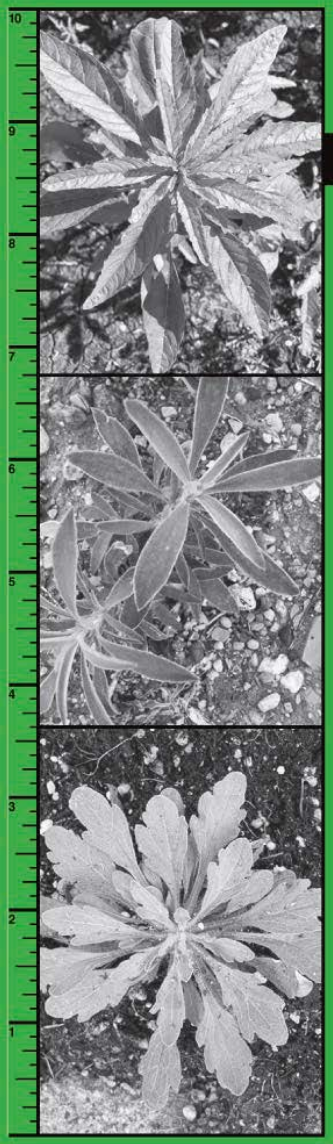

W253-25

Please do not use beyond 12/31/2025

2025

North Dakota Weed Control Guide

Compiled by
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Fargo, North Dakota

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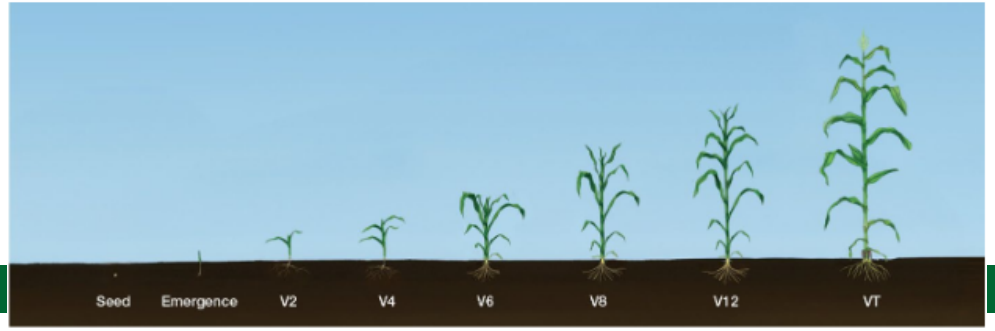
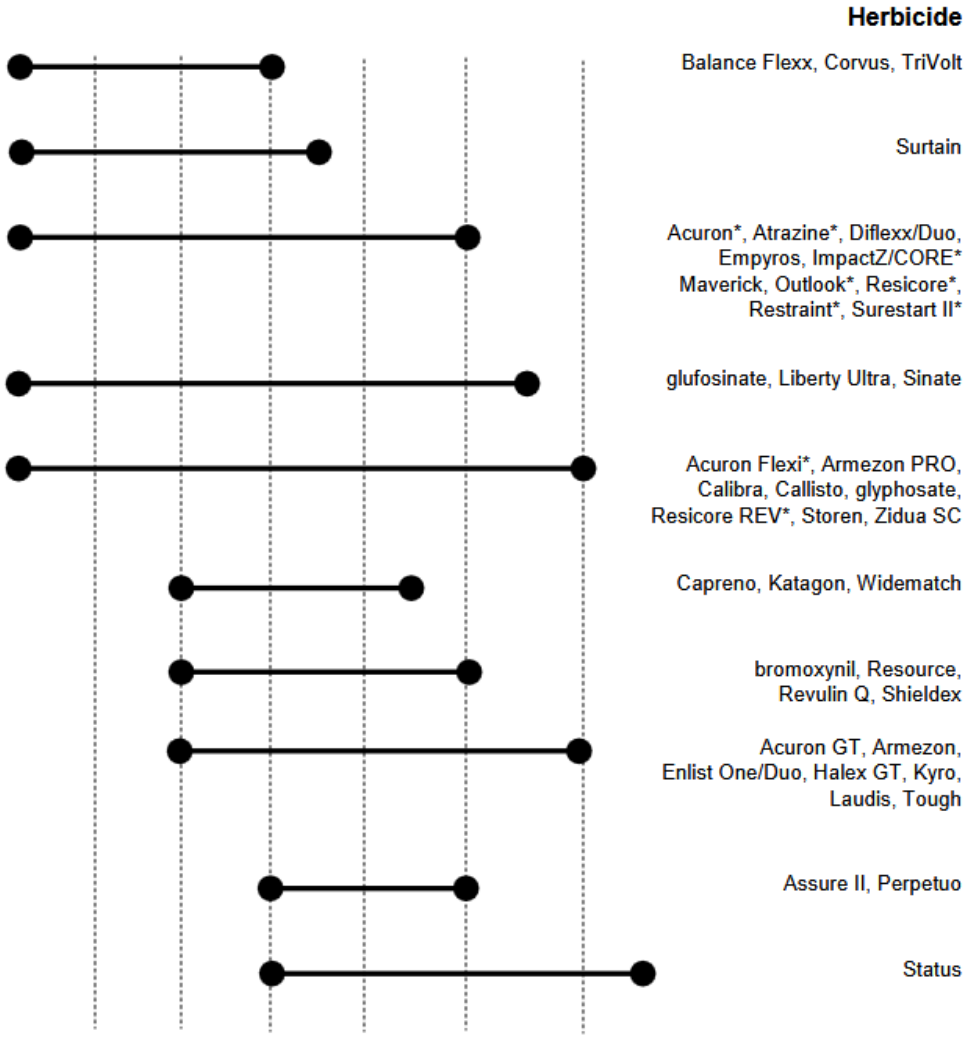
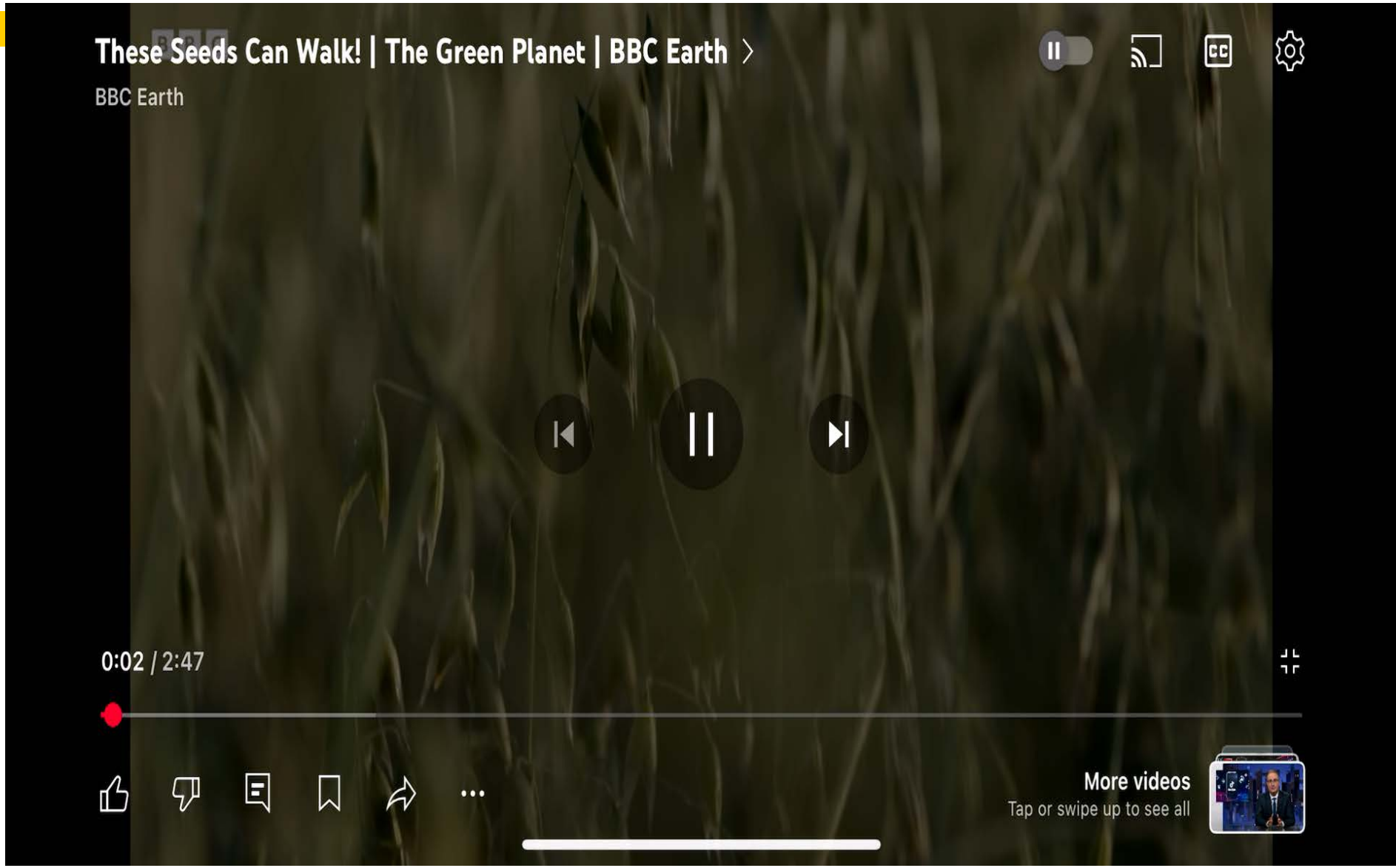

Seed
Emergence
V2
V4
V6
V8
V12
VT


Herbicide
Balance Flexx, Corvus, TriVolt
Surtain
Acuron*, Atrazine*, Diflexx/Duo, Empyros, ImpactZ/CORE* Maverick, Outlook*, Resicore*, Restraint*, Surestart II*
glufosinate, Liberty Ultra, Sinate
Acuron Flexi*, Armezon PRO, Calibra, Callisto, glyphosate, Resicore REV*, Storen, Zidua SC
Capreno, Katagon, Widematch
bromoxynil, Resource, Revulin Q, Shieldex
Acuron GT, Armezon, Enlist One/Duo, Halex GT, Kyro, Laudis, Tough
Assure II, Perpetuo
Status
*Product label lists corn height as cutoff. Growth stage on chart is approximation of height.

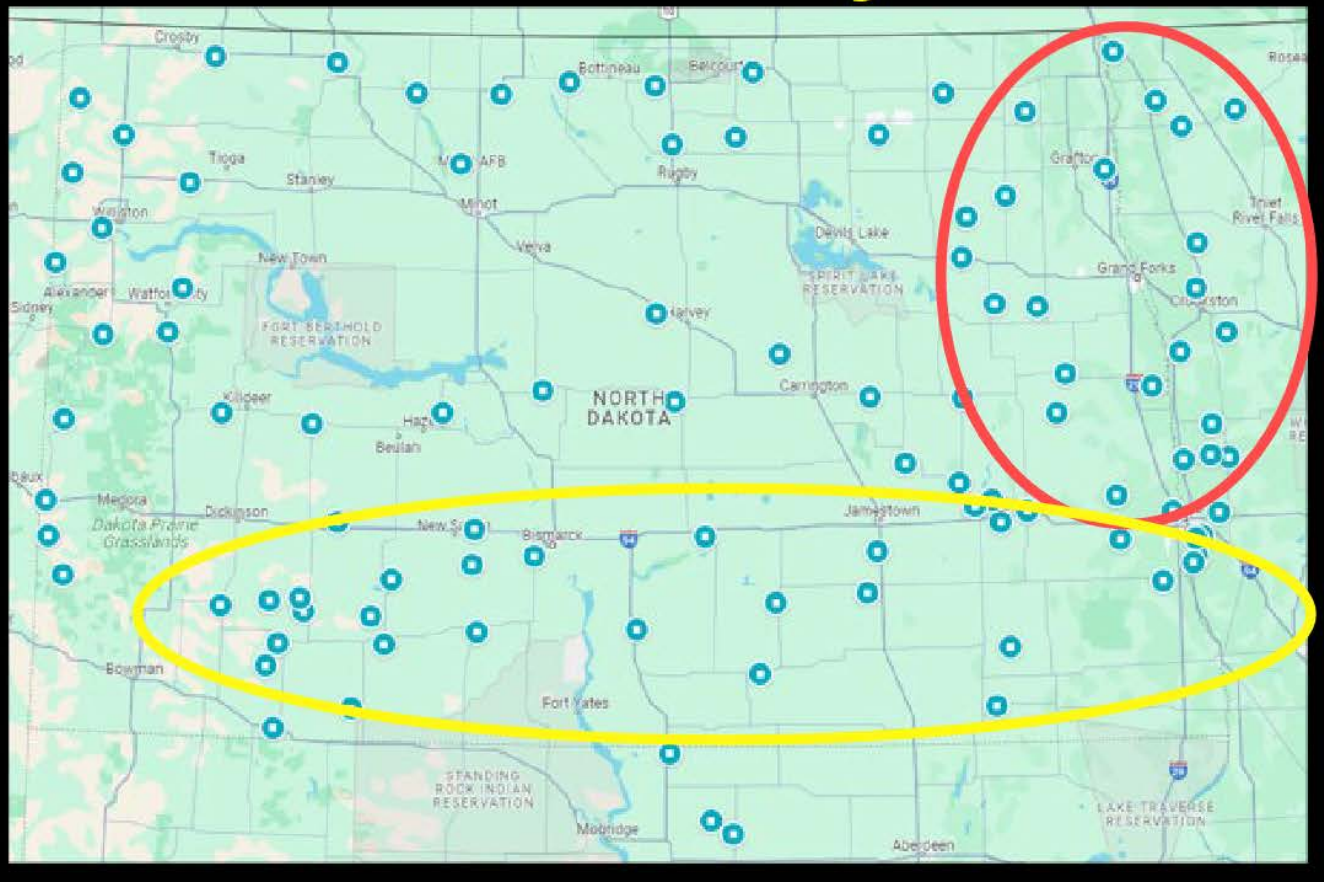
2025 Weed of the Year!



Wild Oat Resistance Testing (% Resistant)

Herbicide	Group #	2016-2020	2021	2022	2023
		N=208	N=34	N=48	N=48
Puma	1	75	88	92	85
Axial XL	1	39	35	73	33
Everest	2	71	85	96	78
GoldSky	2	71	53	94	55
Varro	2	85	91	100	90
Beyond Xtra	2	52	24	88	43
Assure II	1	72	82	88	83
Select	1	9	18	33	5

Nondirected State Survey of Wild Oat



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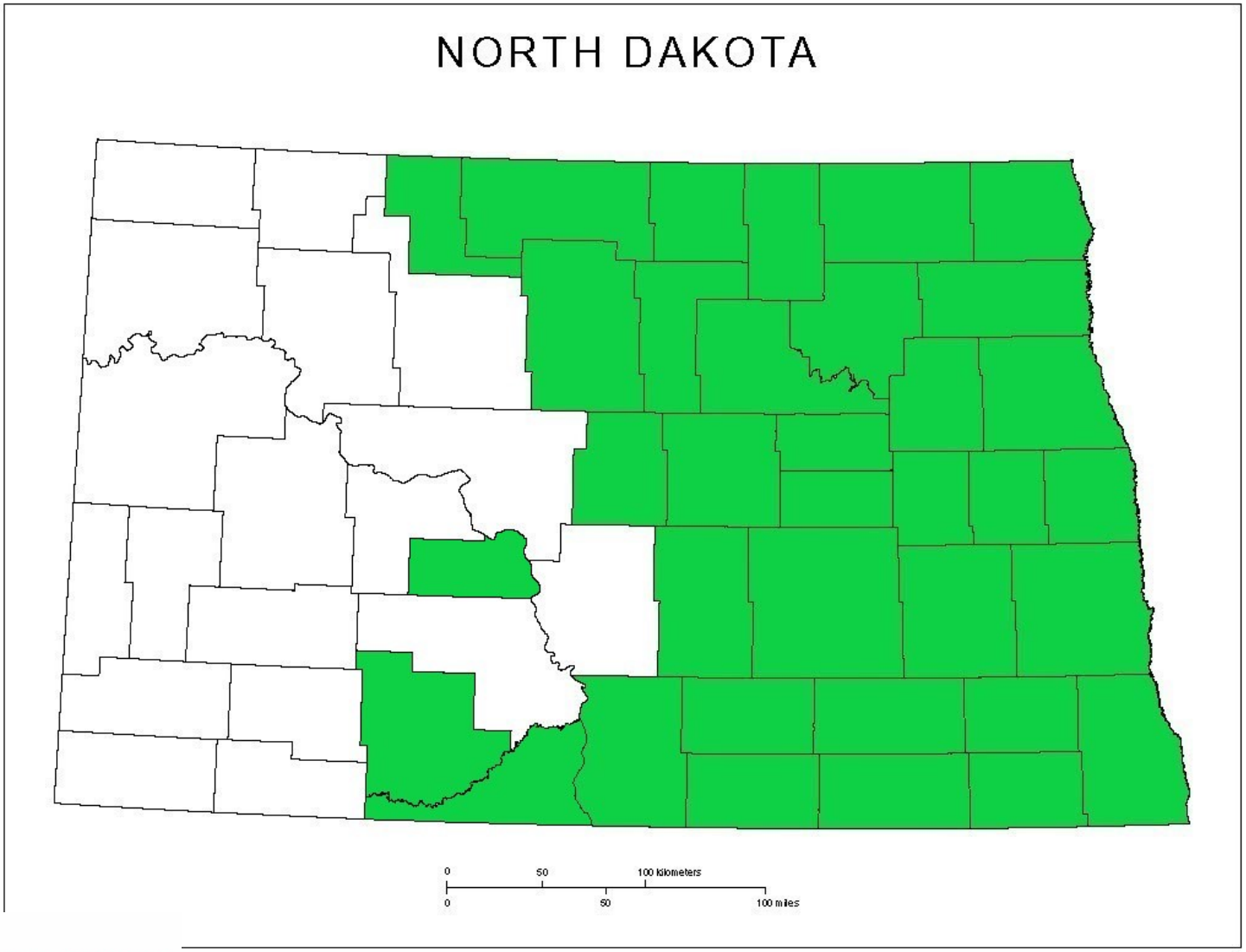
Dr. Kirk Howatt – NDSU

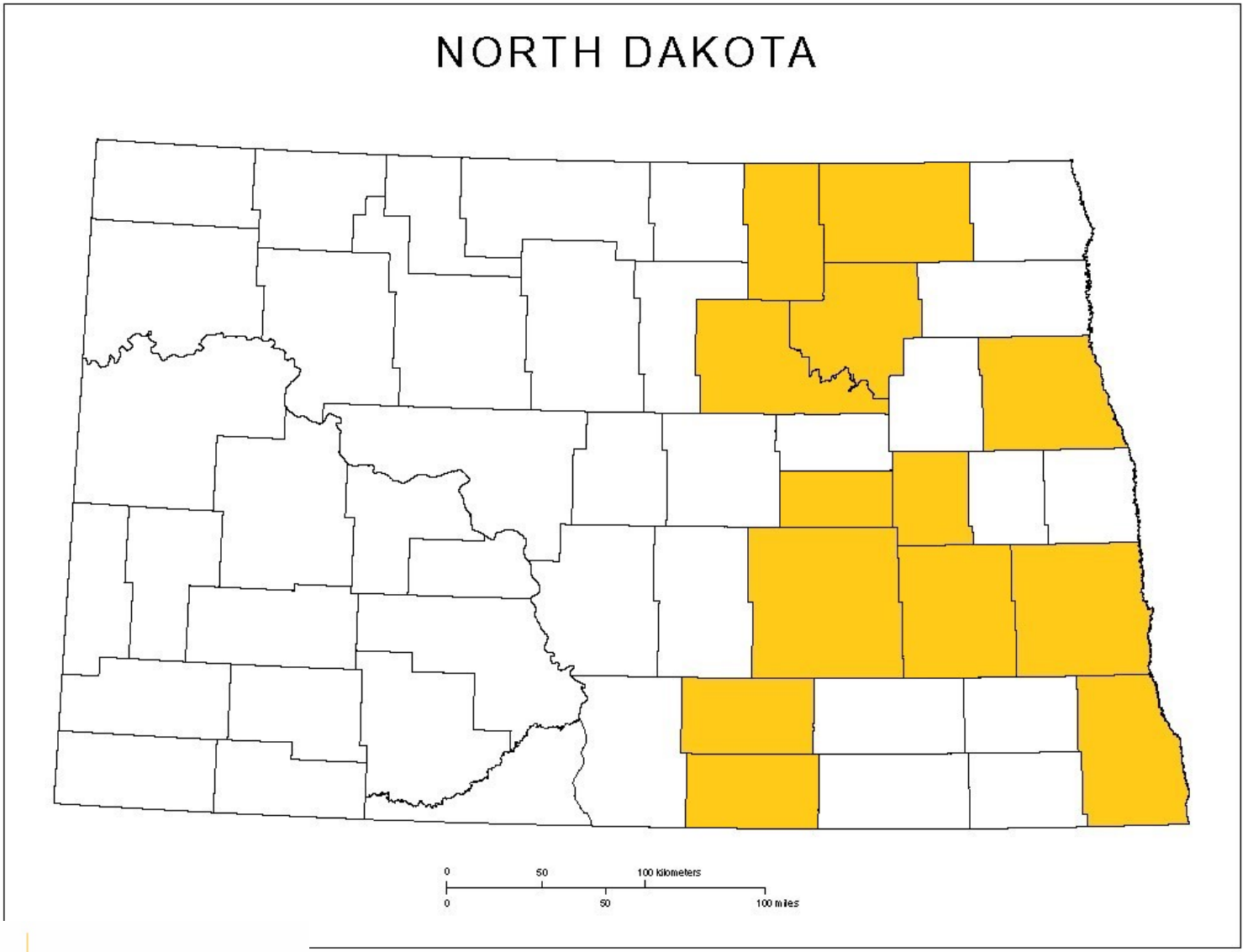
Wild Oat Resistance Testing – 2022 (% Resistant)

Herbicide	Group #	Random	Targeted
		N=98	N=48
Puma	1	40	92
Axial XL	1	10	73
Everest	2	27	96
GoldSky	2	23	94
Varro	2	21	100
Beyond Xtra	2	17	88
Assure II	1	30	88
Select	1	4	33

Waterhemp Distribution



Group 14-Resistant Waterhemp



Pigweed Control with PRE Herbicides

- 2023: Dry after planting
  - Less than 0.5” within 14 days of PRE
  - 1 inch after 4 weeks and 10 events
- 2024: Very wet after planting
  - 1 inch 2 days after PRE
  - 6 inches within first 3 weeks

- Different PRE programs with metribuzin on waterhemp

PRE Herbicides and Metribuzin Rates

- Evaluate 0.25 and 0.5 lb ai/A metribuzin with soybean herbicides

Active ingredient	US Trade name	Rate (per A)
Flumioxazin + pyroxasulfone	Valor EZ + Zidua SC	2.5 fl oz + 3.5 fl oz
Flumioxazin + cloransulam	Surveil (Valor + Firstrate)	3.5 oz
Flumioxazin + cloransulam + pyroxasulfone	Surveil + Zidua SC	3.5 oz + 3.5 fl oz
Flumioxazin + pyroxasulfone + metribuzin	Fierce MTZ*	1.25 pt
Sulfentrazone	Spartan	4 fl oz
Dicamba	Xtendimax, Engenia	0.5 lb ae

*Additional MTZ spiked in to total 0.25 and 0.5 lb

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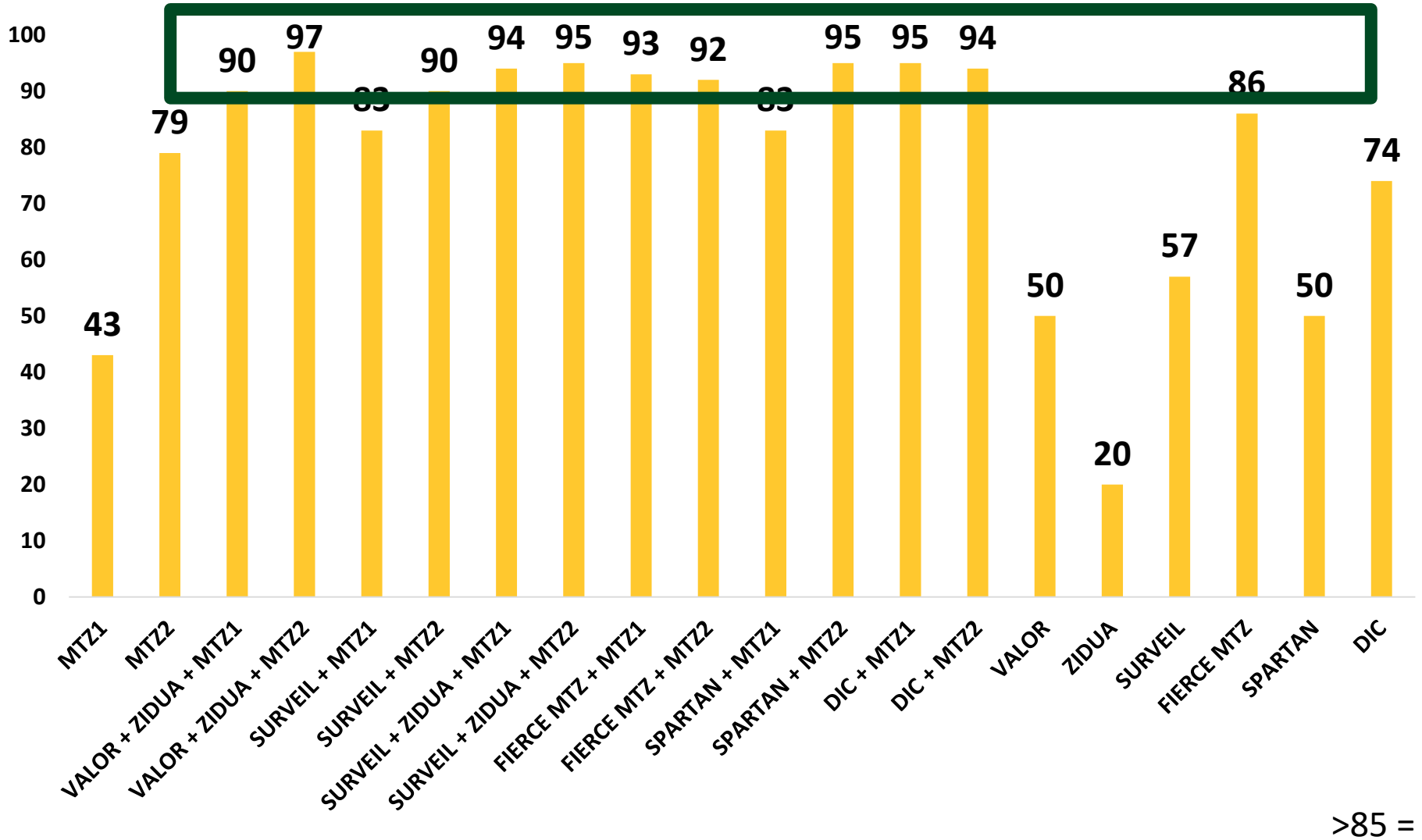
Waterhemp Control – 2023
4 Weeks After Planting



>85 = A

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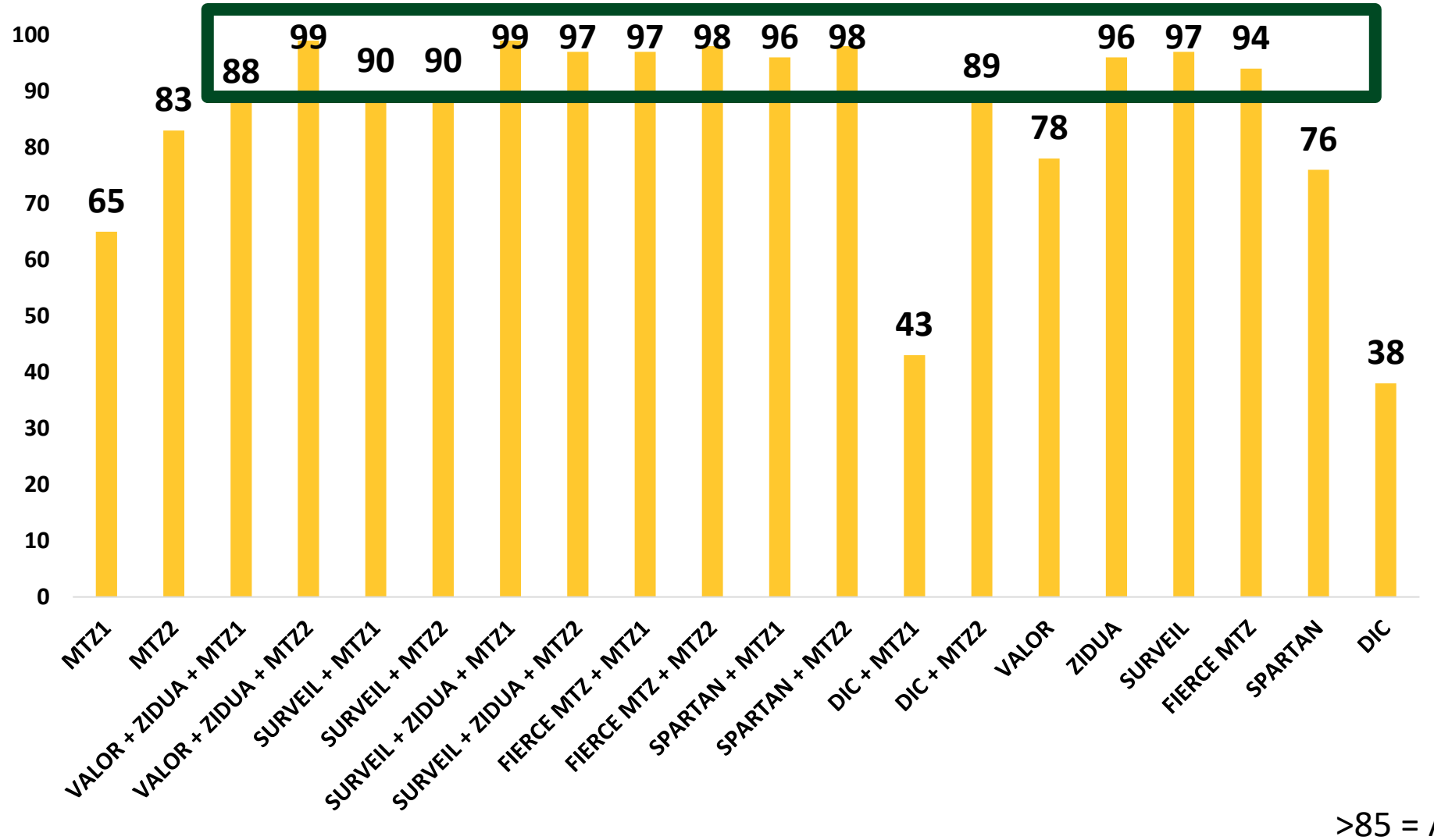
Waterhemp Control – 2024
4 Weeks After Planting



>85 = A

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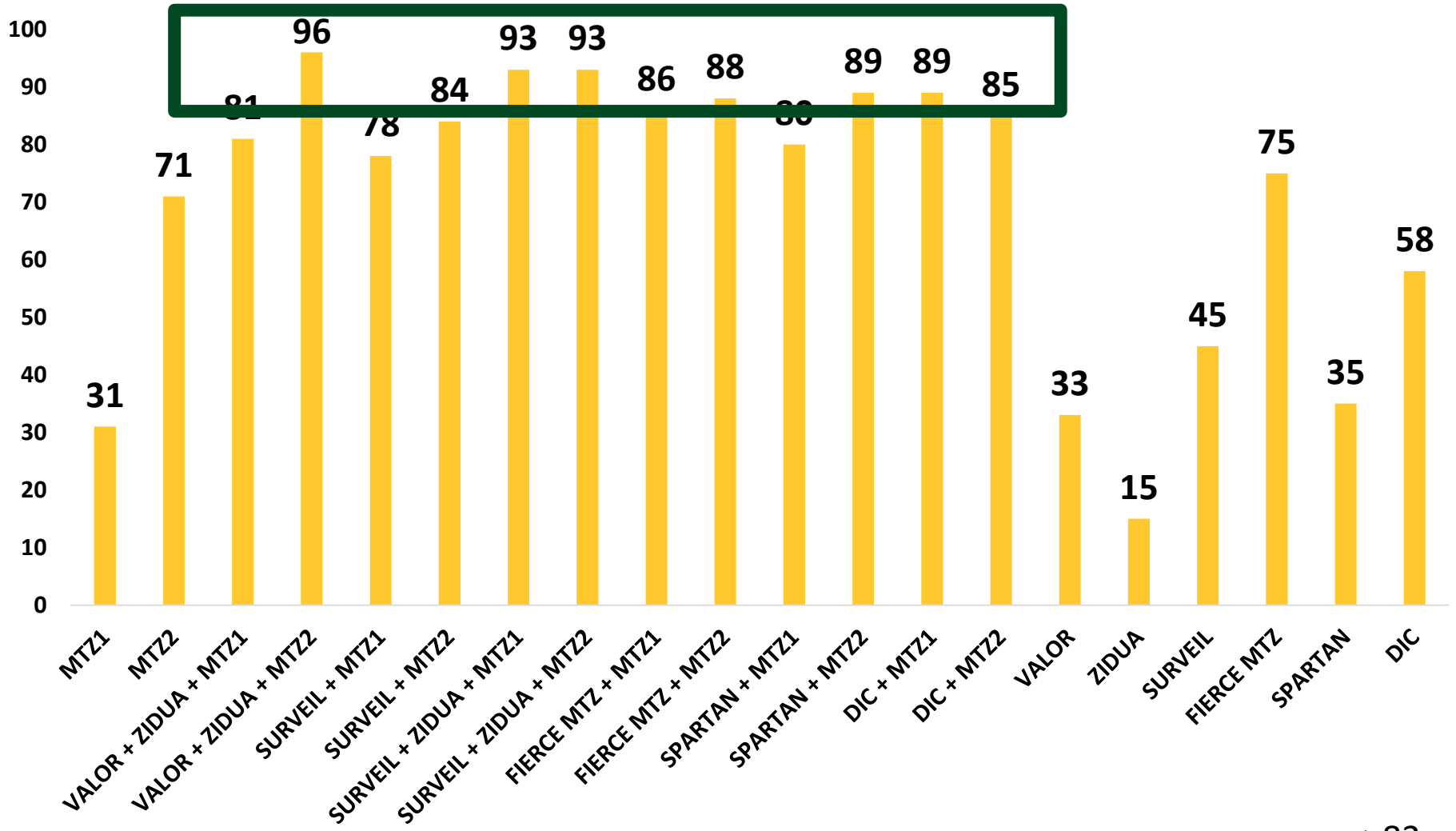
Waterhemp Control – 2023
6 Weeks After Planting



>83 = A

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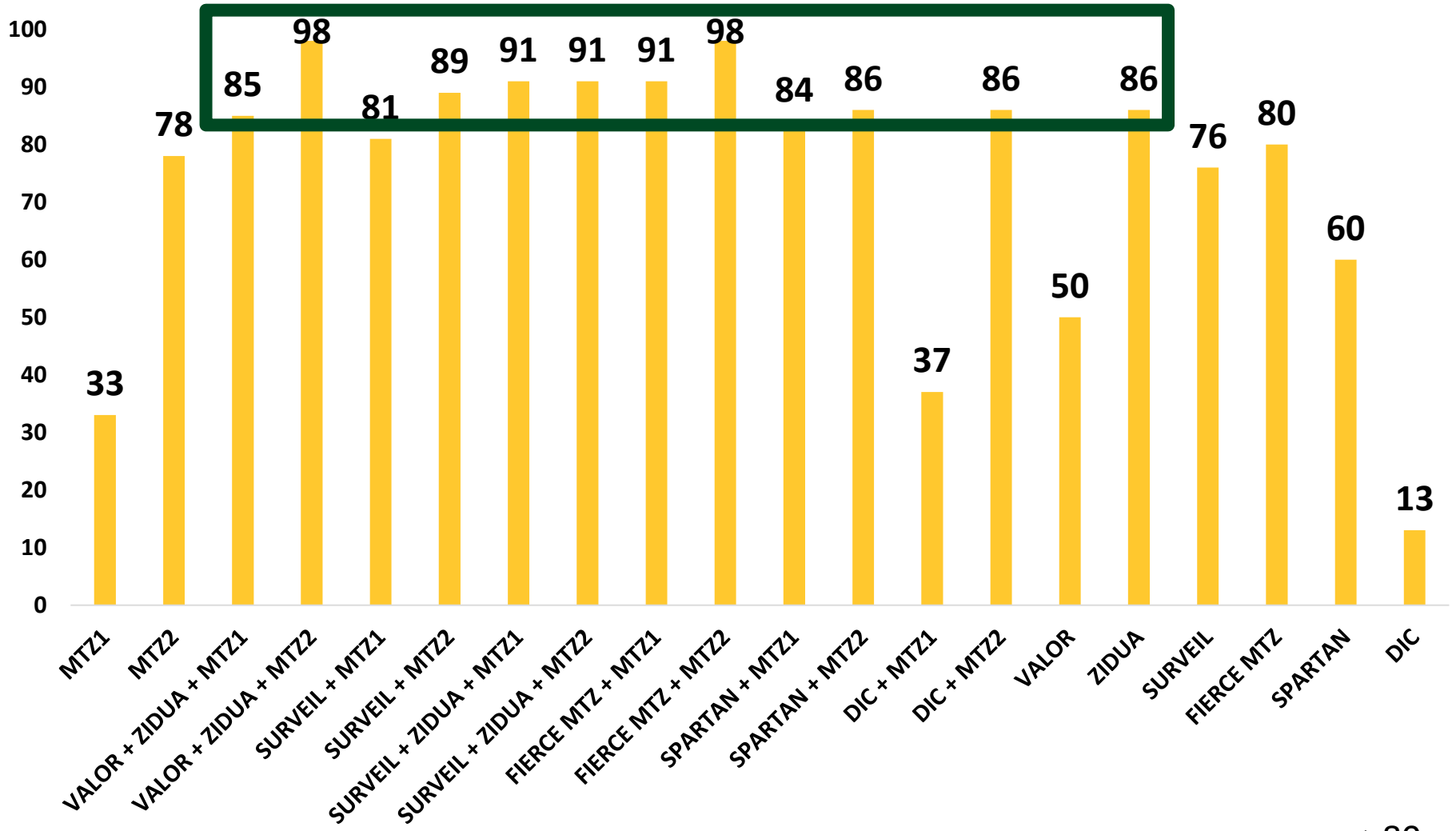
Waterhemp Control – 2024
6 Weeks After Planting



>80 = A

Flumioxazin (Valor)

Pyroxasulfone (Zidua)

Flumi + Pyrox + metribuzin (Fierce MTZ)

Degradation of Soybean PRE Herbicides

Active ingredient	Trade name	Water Solubility (mg/L)	Primary degradation
Acetochlor	Harness, etc (Not Warrant/encapsulated)	223	Microbial
Dicamba		4500	Biological
Dimethenamid-P	Outlook	1174	Microbial
Flumioxazin	Valor, etc	1.79	Microbial
Metribuzin	Sencor, Tricor, etc	1100	Microbial
S-metolachlor	Dual Magnum, etc	488	Microbial
Pendimethalin	Prowl, etc	0.275	Anaerobic
Pyroxasulfone	Zidua, etc	3.49	Microbial
Sulfentrazone	Authority/Spartan, etc	110 @ pH 6 780 @ pH 7 1600 @ pH 7.5	Microbial
Trifluralin	Treflan, etc	0.3	

Source: WSSA Herbicide Handbook

Degradation of Group 15 Herbicides

Active ingredient	Trade name	Water Solubility (mg/L)	Half-life (days)	Primary degradation
Acetochlor	Harness, etc (Not Warrant/encapsulated)	223	10-20	Microbial
Dimethenamid-P	Outlook	1174	20-38	Microbial
S-metolachlor	Dual Magnum, etc	488	30-50	Microbial
Pyroxasulfone	Zidua	3.49	16-26	Microbial

Source: WSSA Herbicide Handbook

Soybean Premix Herbicides

Fierce MTZ

Active ingredient	Trade name	Water Solubility (mg/L)	Half-life (days)	Primary degradation
Flumioxazin	Valor, etc	1.79	11.9 to 17.5	Microbial
Metribuzin	Sencor, Tricor, etc	1100	30-60	Microbial
Pyroxasulfone	Zidua, etc	3.49	16-26	Microbial

Boundary

Active ingredient	Trade name	Water Solubility (mg/L)	Half-life (days)	Primary degradation
Metribuzin	Sencor, Tricor, etc	1100	30-60	Microbial
S-metolachlor	Dual Magnum, etc	488	30-50	Microbial

Source: WSSA Herbicide Handbook

Waterhemp Control – Fargo 2024
6 Weeks After Planting

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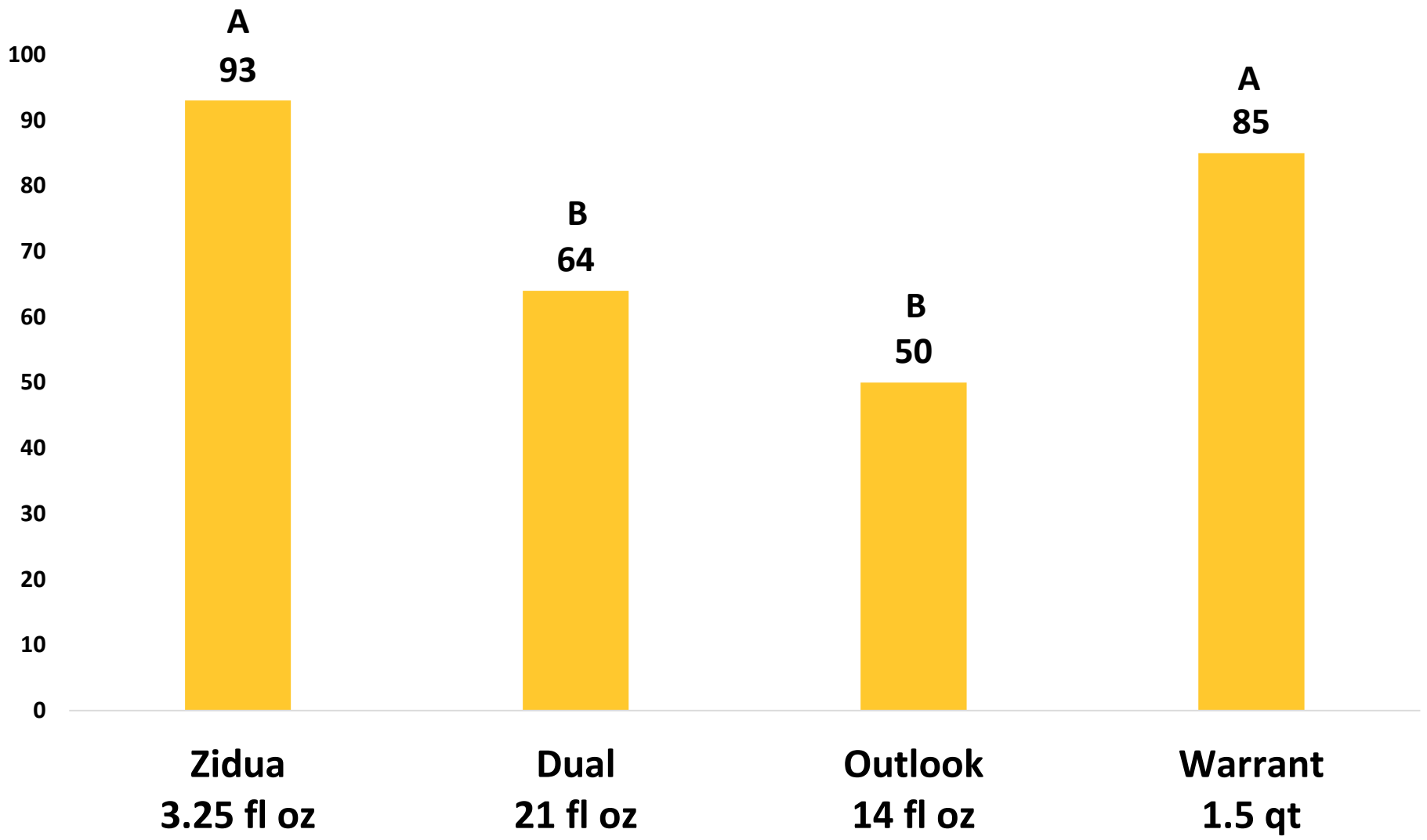

Waterhemp Control – Fargo 2024
Days until first 3” waterhemp

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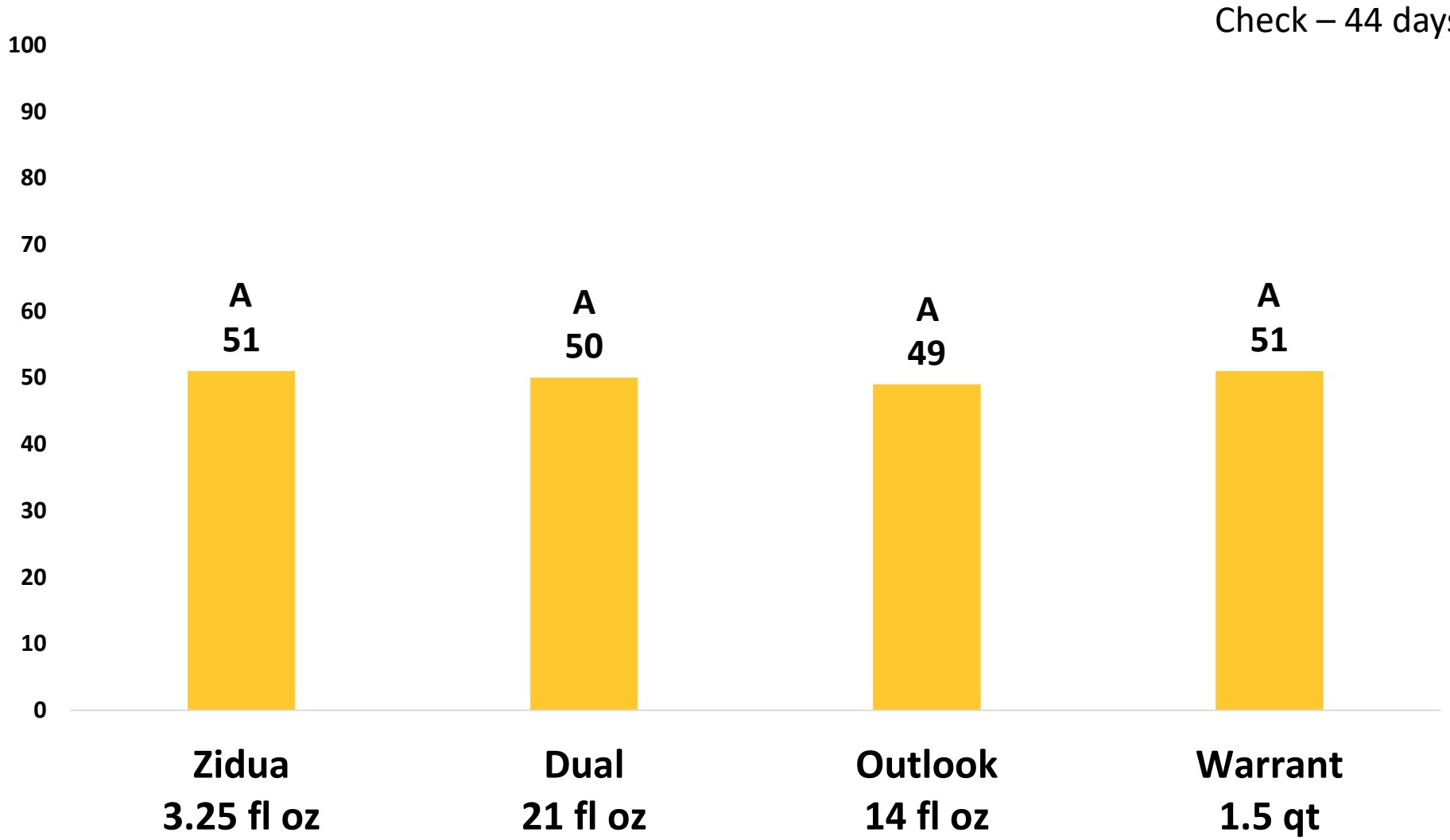

Metribuzin and Sulfentrazone Rates

- Funded by North Dakota Soybean Council
- Crop Safety and Weed Control
  - Fargo, Glyndon, Carrington, Minot, Hettinger, Williston
- Metribuzin
  - 4 oz ai (5.33 oz of 75DF)
  - 8 oz ai (10.7 oz of 75DF)
- Sulfentrazone
  - 2 oz ai (4 fl oz of 4F)
  - 4 oz ai (8 fl oz of 4F)

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Waterhemp Control – 2024
6 Weeks After Planting

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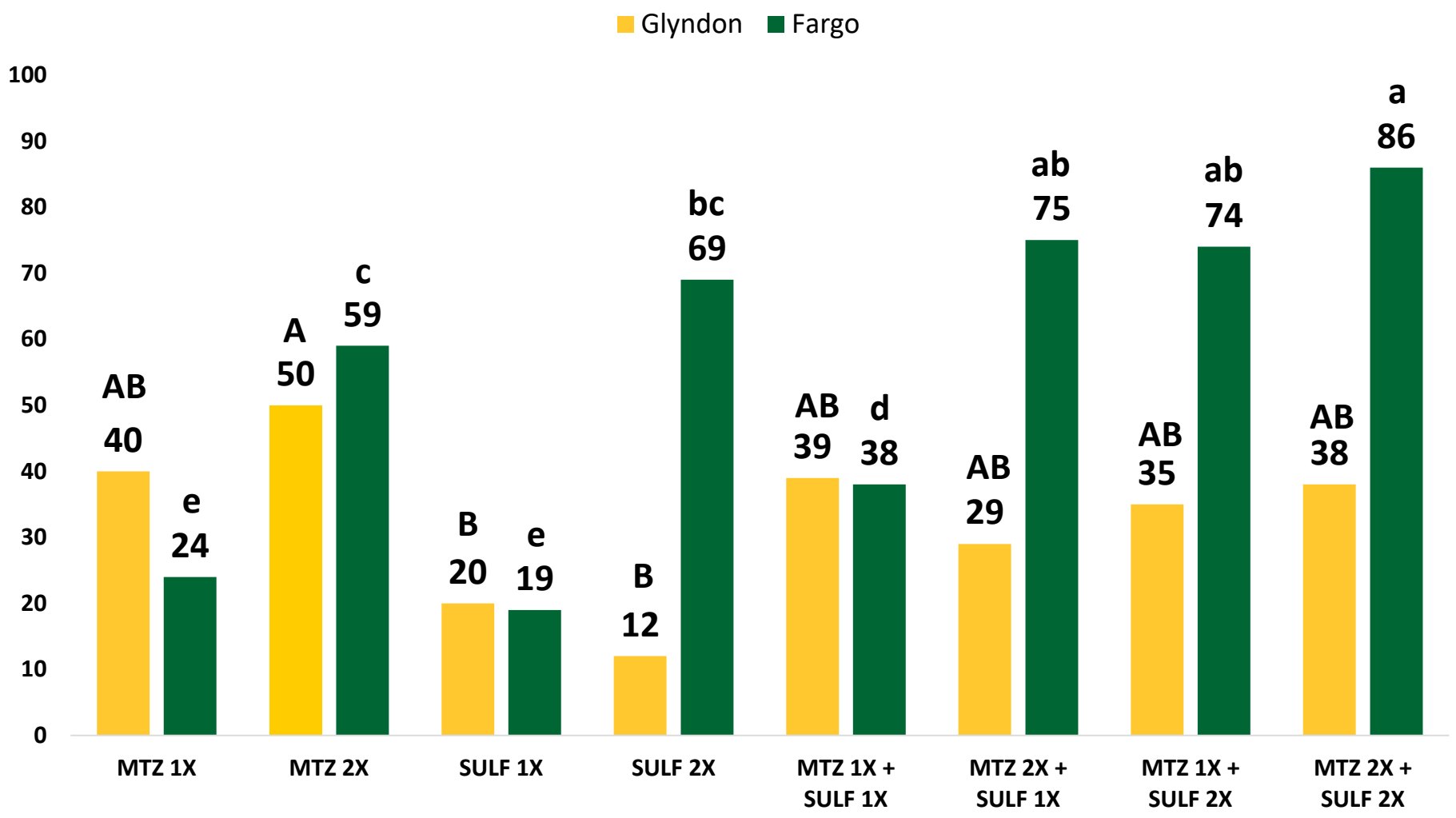

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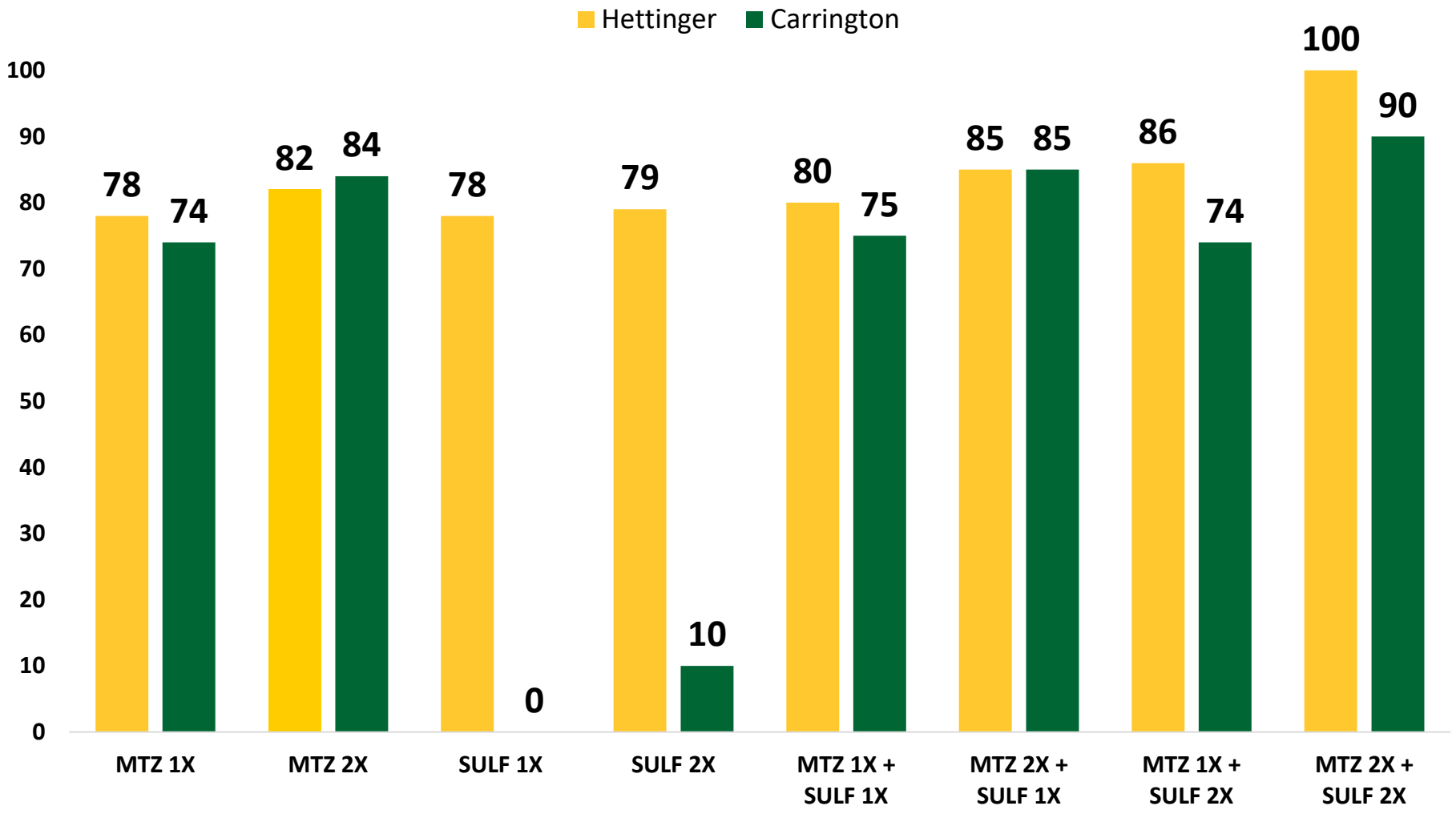
Kochia Control – 2024
6 Weeks After Planting



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Foxtail Control – 2024
6 Weeks After Planting

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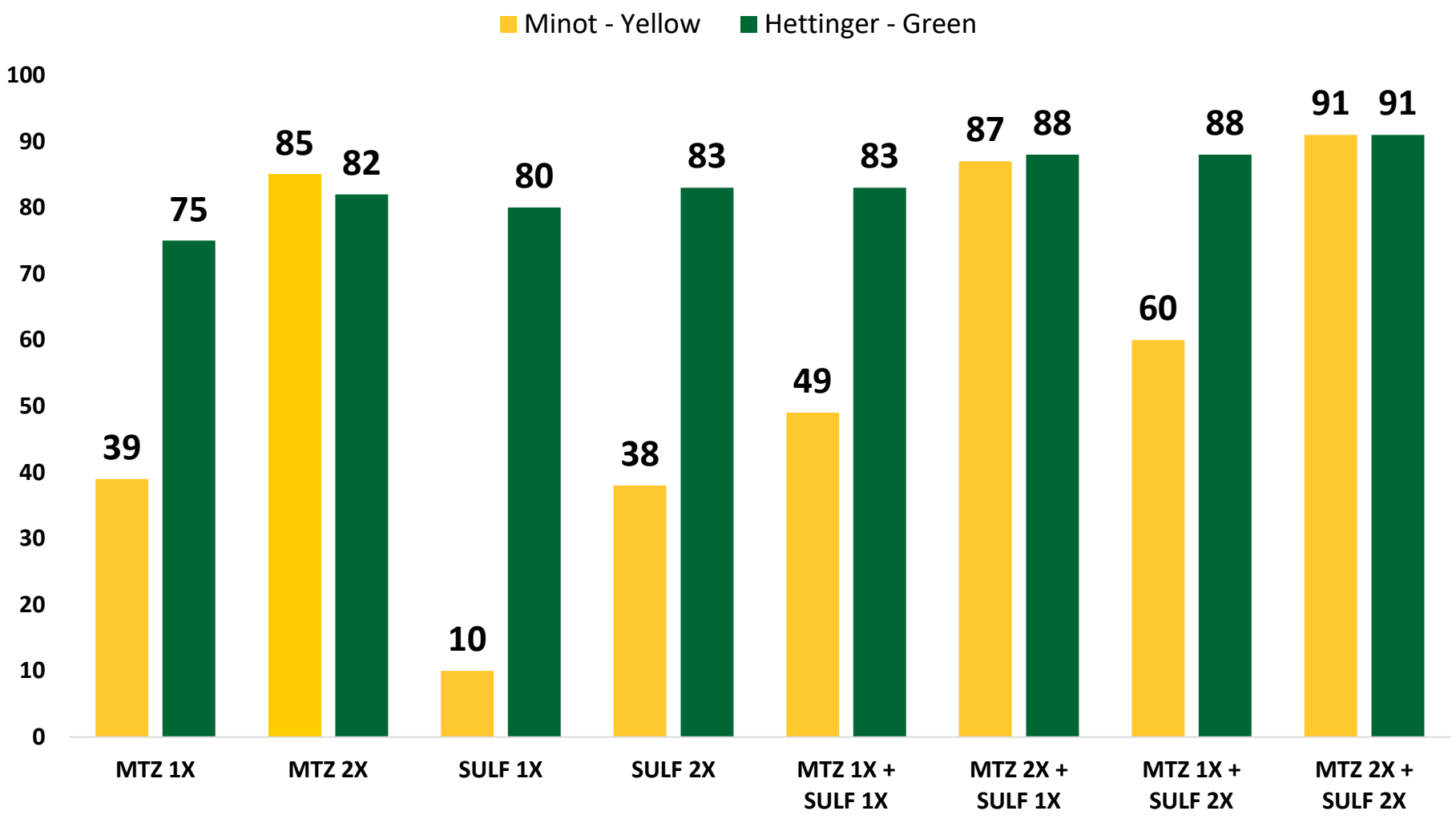


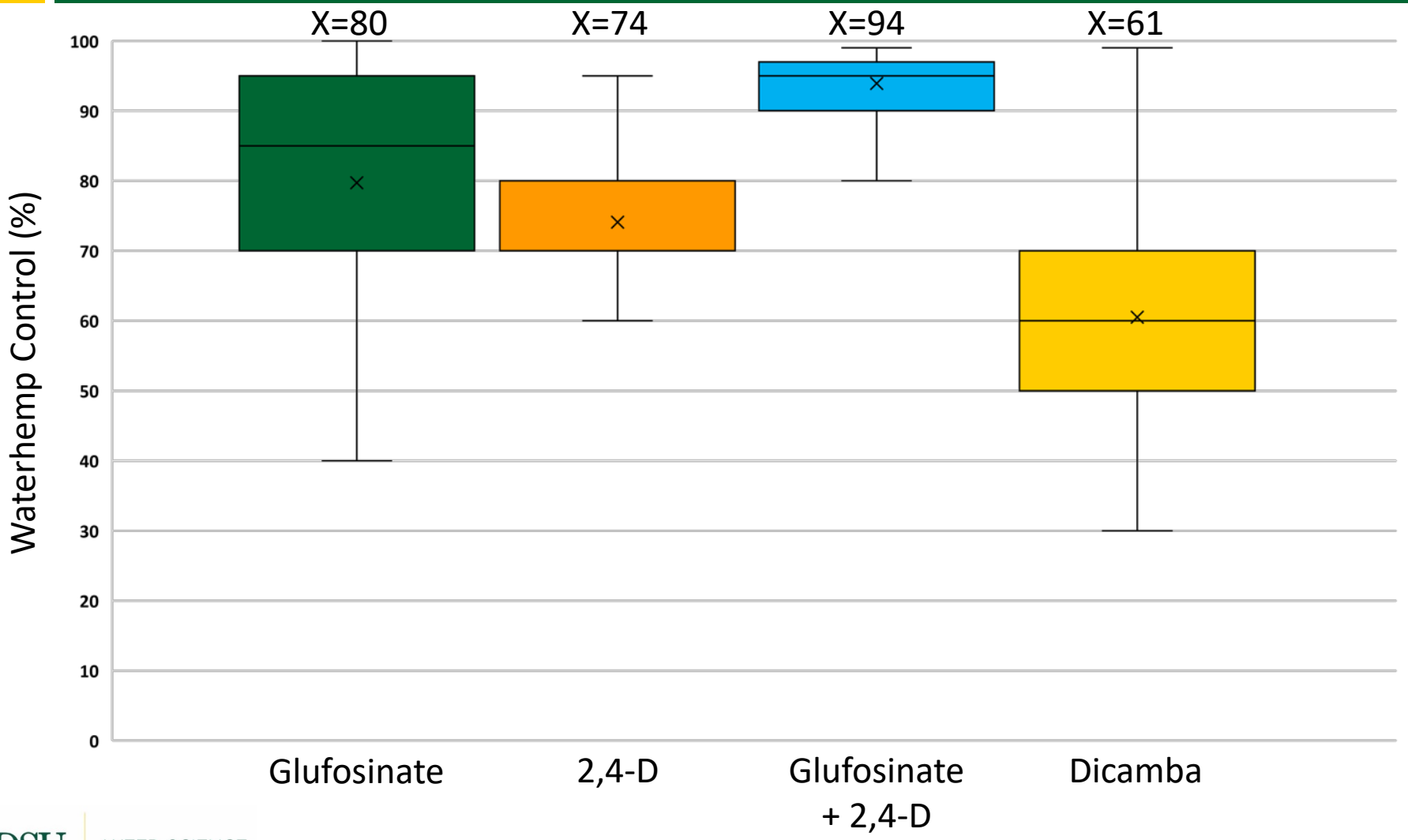
Metribuzin and Sulfentrazone Rates Crop Safety

- No difference between soybean variety at any site
  - MTZ-tolerant, PPO-sensitive
  - MTZ-sensitive, PPO-tolerant
- No sulfentrazone injury observed at any site
- High rate of metribuzin led to slight crop injury (<10%) at:
  - Glyndon, MN – sandy loam, pH of 8.2
    - 8 inches of rain within first 3 weeks after planting
  - Minot
- No difference in yield observed at any site except:
  - Fargo – silty clay, pH of 8
    - 6 inches of rain within first 3 weeks. Standing water
    - Tank-mix of high rate of sulfentrazone + metribuzin
      - 7 bu A^{-1} less than weed-free

POST Waterhemp Control 2019-2023

- POST applications at NW22 (near Fargo)
- 3-4 inch tall waterhemp
  - N=510
- POST alone or following a PRE
  - N = 332 or 178
- Glufosinate – 32 fl oz
- 2,4-D (Enlist One) – 32 fl oz
- Glufosinate + 2,4-D – 32 + 32 fl oz
- Dicamba (Engenia or Xtendimax) – 12.8 or 22 fl oz

Postemergence Only



Following PRE

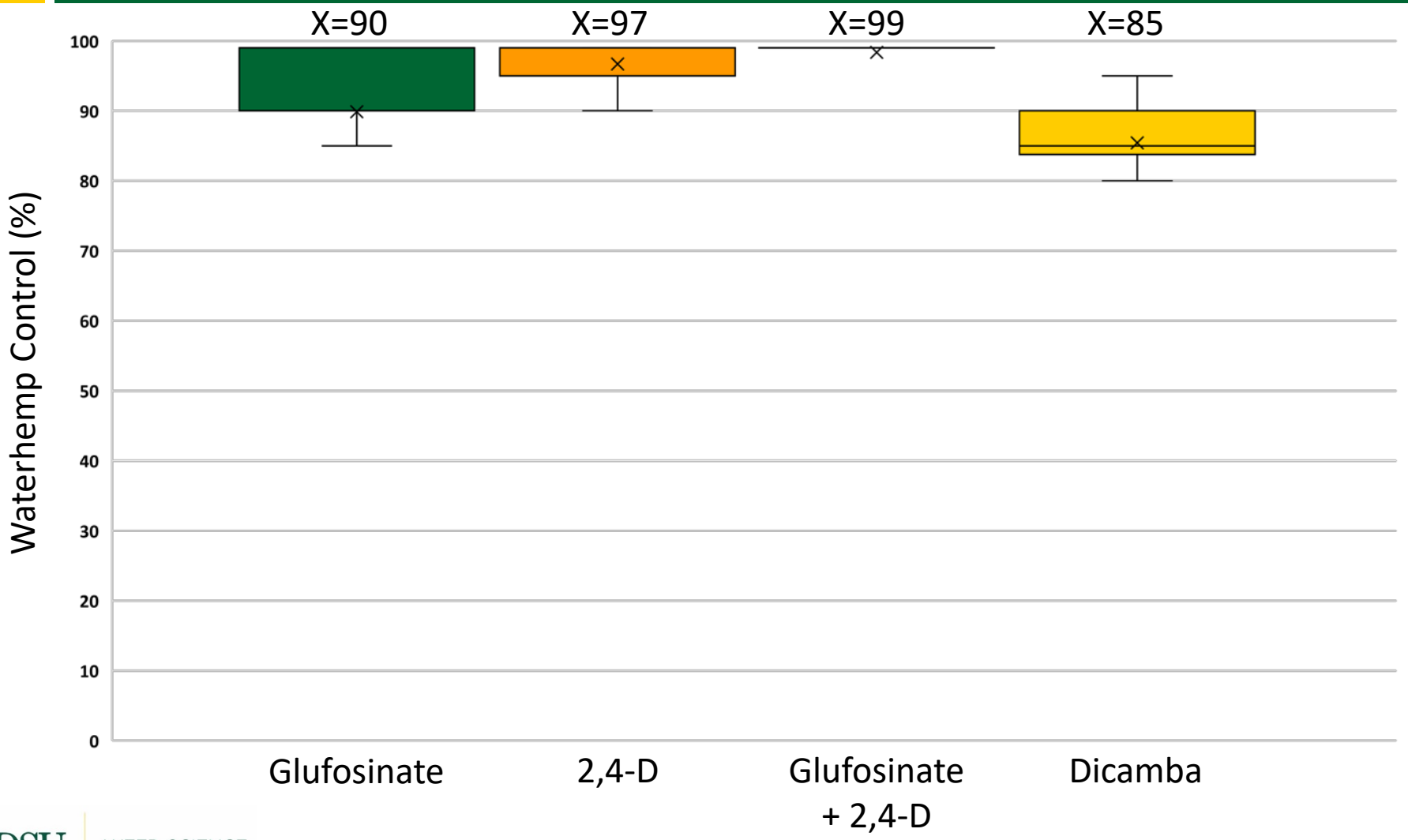


Table 5. Rotational Crop Planting and Emergency Replanting Intervals by Sharpen® herbicide Application Rate

Crop	Sharpen Rate (fl ozs/A)					
	1.0	2.0	3.0	4.0	5.0	6.0
	Rotational Crop Interval (months after application)[1]					
Alfalfa	4	5	6	7	8	9
Corn	0	0	0	0	0	0
Corn, sweet	0.5	1	2	3	4	4
Sorghum	0	0	0	0	1	1
Small grains[2]	0	0	0	0	3	3
Rice	0	0	0	0	4	4
Chickpea	0	0	2*	4	6	6
Edible pea	0	1	3	4	6	6
Field pea, dry	0	0	2	4	6	6
Edible bean[3]	0	1	3	4	6	6
Grass (forage, seed) Establishment	0	0	0	0	1	1
Soybean[4]	0 to 1	1 to 1.5	2 to 3	4	6	6
Lentil	0	1	3	4	6	6
Cotton[4]	1.5	3	4	6	6	9
Citrus fruit trees	1	1	4	4	4	4
Fig trees	3	3	4	4	4	4
Nut trees	3	3	4	4	4	4
Olive trees	3	3	4	4	4	4
Pomegranate trees	3	3	4	4	4	4
Pome fruit trees	3	3	4	4	4	4
Stone fruit trees	3	3	4	4	4	4
Sugarbeet	4	5	6	7	8	9

down) herbicide used to control or suppress a broad spectrum of
vity on most young (generally less than 5 inches tall) annual weeds
e.

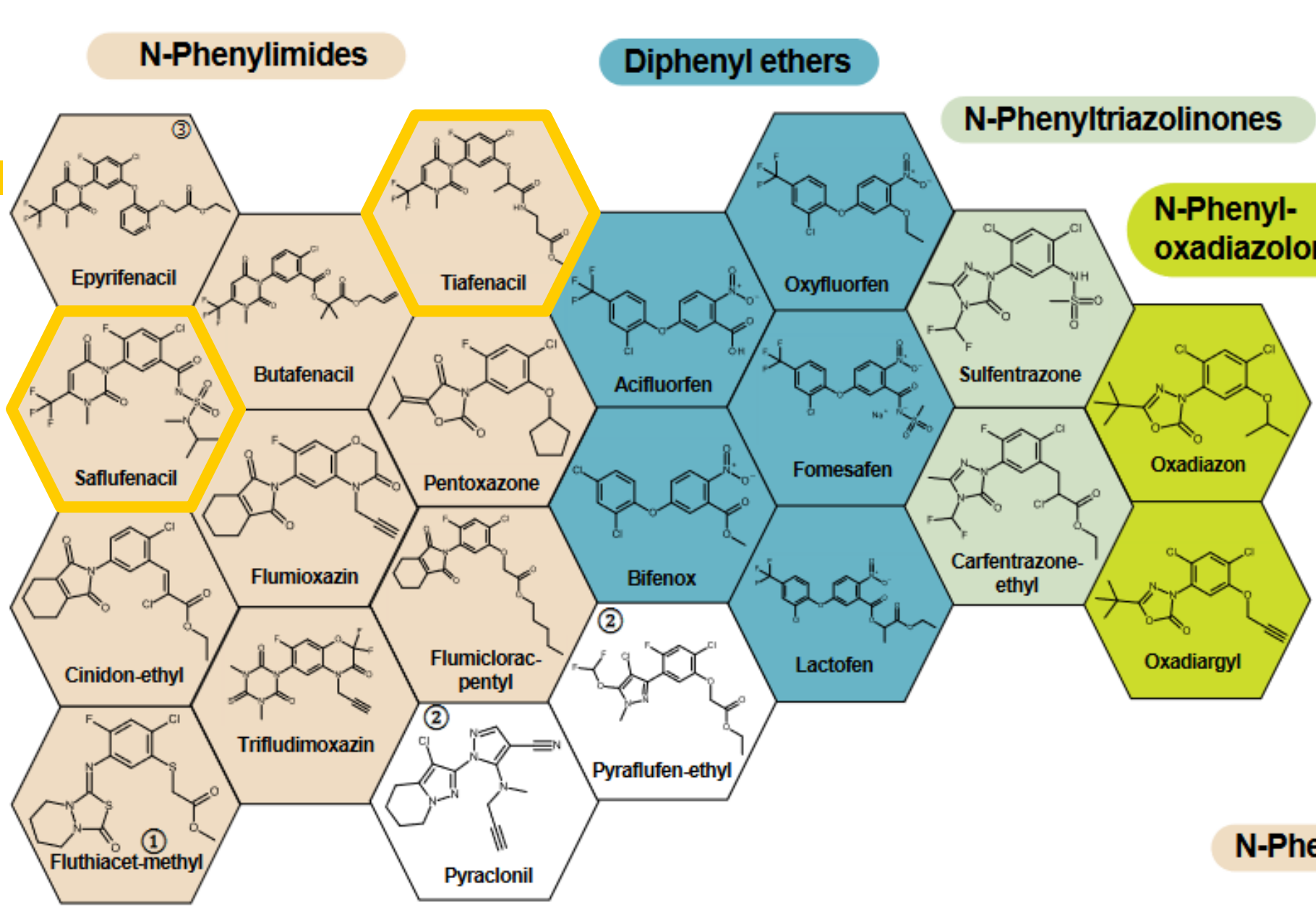
tivity (refer to **'Adjuvants'** section for details).
uate weed control. Inadequate coverage of target weeds, improper
inches), stressed, or mown weeds will usually result in unacceptable

gy or cooler weather conditions, or when weeds are growing under

a result, Reviton has no residual activity against weeds.

p and replanting intervals by Reviton application rate

p	Reviton Rate (fl oz/A)		
	1	2	3
	Rotational Crop Interval (Days after application)		
Corn	0	0	0
Wheat	0	0	0
Soybean†	0 - 7*	7*	7*
Cotton	7	14	14
Sugarbeet	30	30	60
Other crops	120	150	180
* The replanting interval for Soybean and rates are further defined in the Soybean section.			
† Not for use on Soybean in California			


N-Phenylimides
Diphenyl ethers
N-Phenyltriazolinones
N-Phenyl-
oxadiazolones
Epyrifenacil
Tiafenacil
Oxyfluorfen
Butafenacil
Acifluorfen
Sulfentrazone
Saflufenacil
Pentoxazone
Fomesafen
Oxadiazon
Flumioxazin
Bifenox
Carfentrazone-
ethyl
Cinidon-ethyl
Flumiclorac-
pentyl
Lactofen
Oxadiargyl
Trifludimoxazin
Pyraflufen-ethyl
Fluthiacet-methyl
Pyraclonil
N-Phenyl h

Dry Bean Desiccation – Pinto 2022
3 Days After Application

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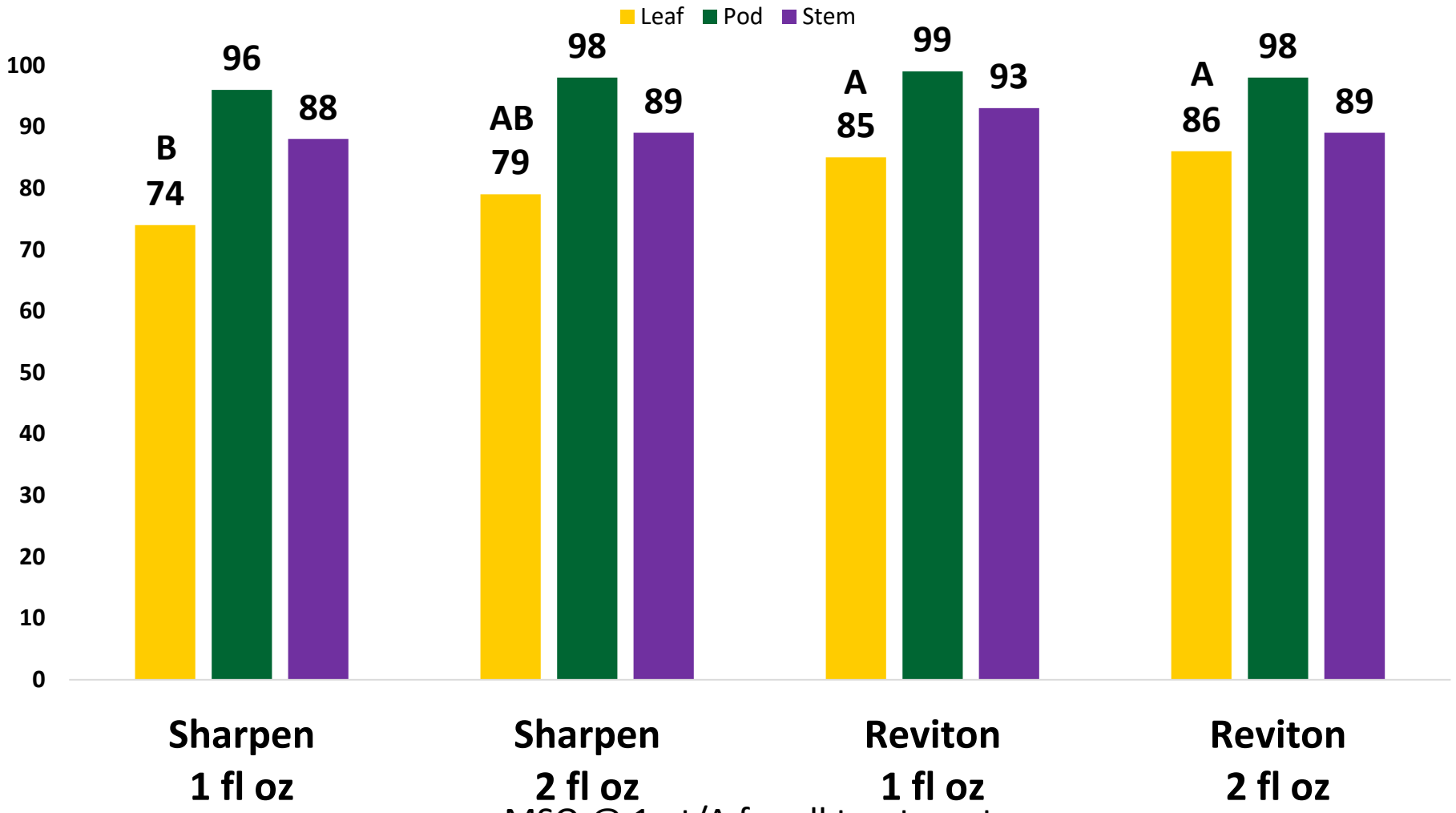

MSO @ 1 pt/A for all treatments

Dry Bean Desiccation – Pinto 2022
10 Days After Application

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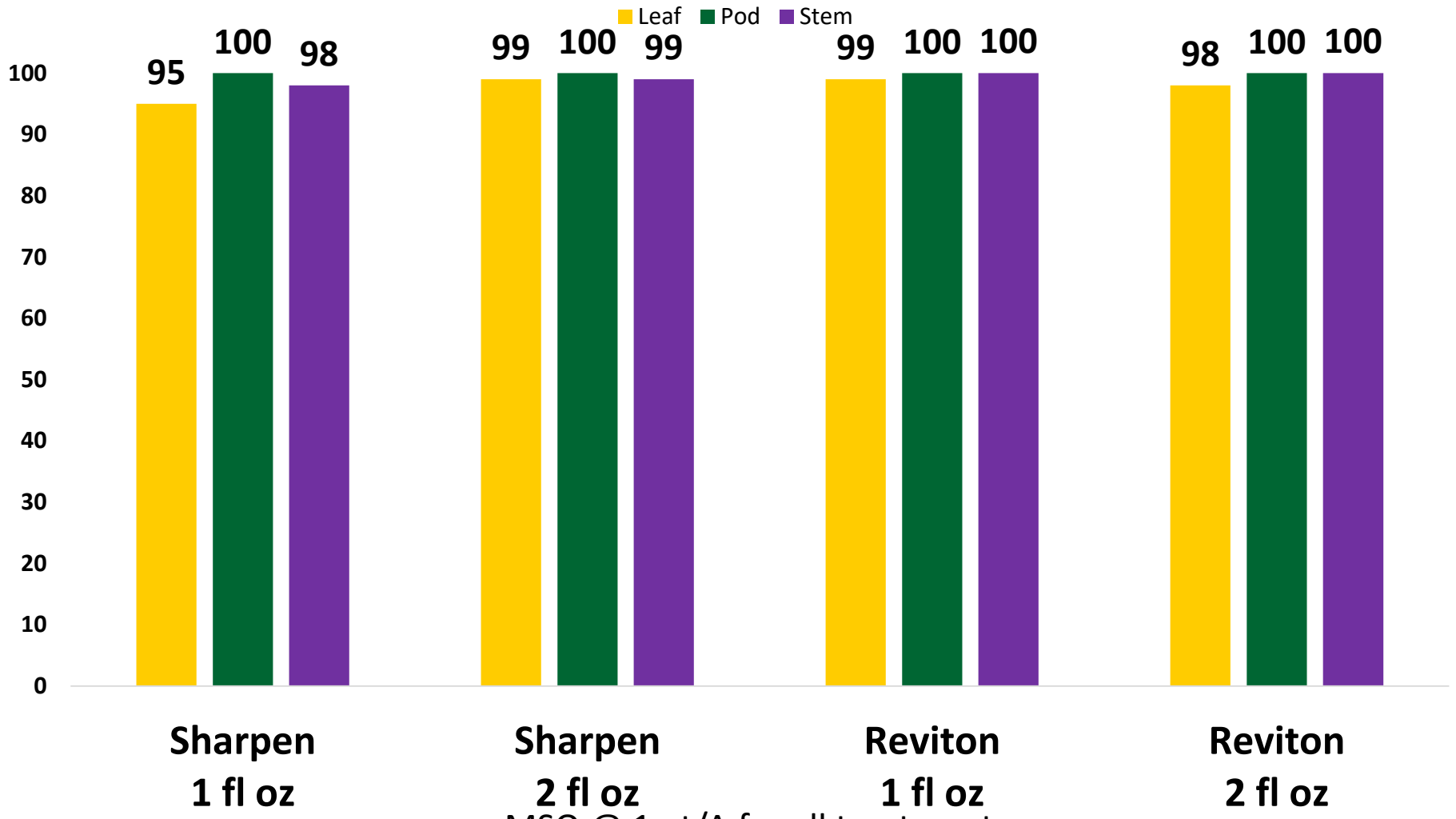

MSO @ 1 pt/A for all treatments

Dry Bean Desiccation – Pinto 2023
3 Days After Application

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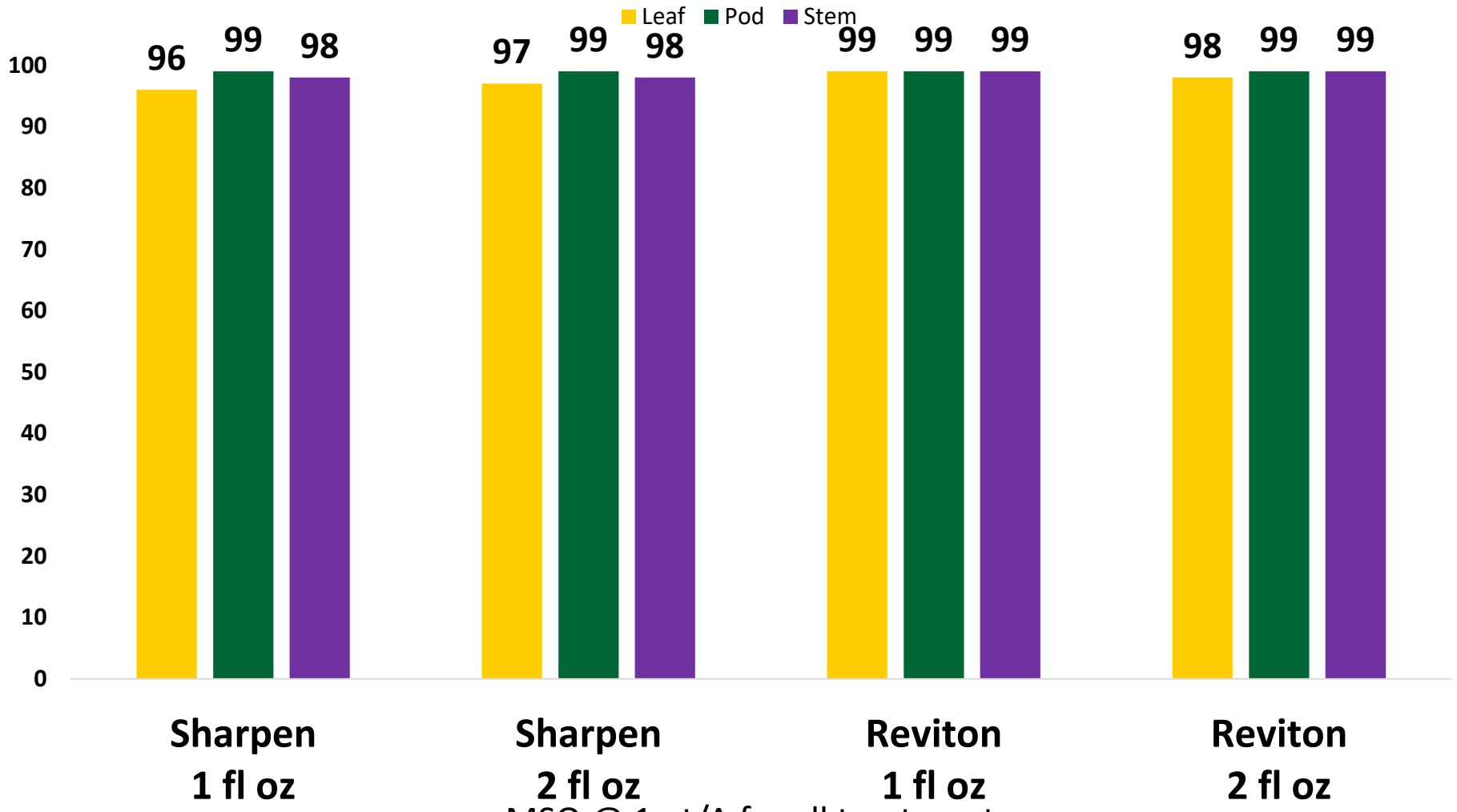

MSO @ 1 pt/A for all treatments

Reviton Desiccation?

- Not labeled
- Similar to Sharpen for dry bean desiccation
  - Including tank-mix with glyphosate, paraquat, or Defol

War Against Weeds Podcast

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K-STATE Research and Extension

The Ohio State University Weed Science

MU Extension University of Missouri

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