2026 Weed Control Update

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Waterhemp in western North Dakota

Counties:

Ward
McHenry
Sheridan
Pierce
Wells

Left: Female waterhemp

Right: Male waterhemp

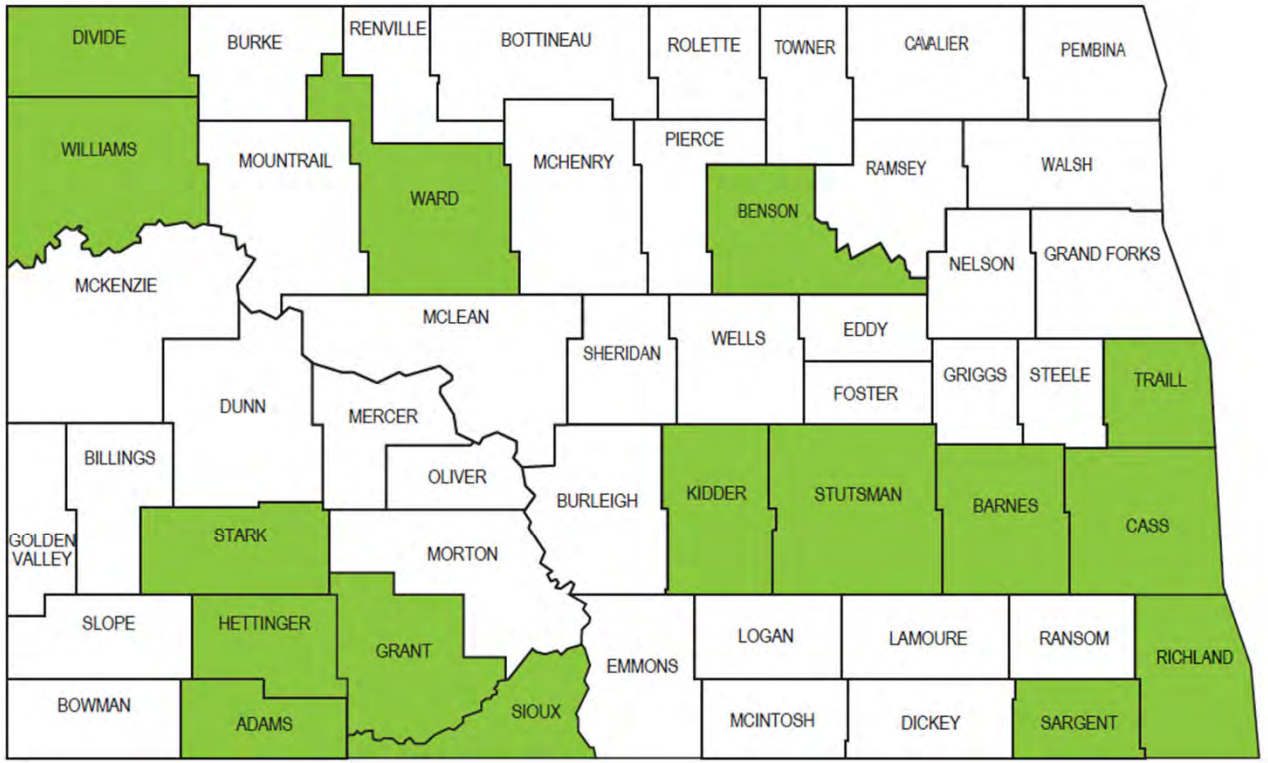
Waterhemp in Sheridan County


Waterhemp in Ward
County

Pigweed species	Stem	Leaves
Redroot pigweed	Very hairy	Dull green leaves, hairy
Powell amaranth	Sparse hairs on the main stem, more hairy near seed head	Dark green leaves, sparse hair
Waterhemp	Smooth, generally no hair	Narrow, shiny leaves

Powell and Redroot pictures: Cornell University

North Dakota Department of Agriculture
Palmer Amaranth Distribution



Previously detected, under management and ongoing monitoring

As of 10/29/25

We anticipate a Dicamba label in soybeans in 2026!

- **Dicamba is needed to take pressure off Liberty**
- **Dicamba should be used primarily PRE or early POST**

What not to do….

Year	Crop	Herbicide
2025	Soybean	Liberty 2X
2026	Canola	Liberty 2X
2027	Wheat	Starane
2028	Soybean	Liberty 2X

Try to use a crop sequence where you use Liberty once in 3 or 4 years.

Crop rotation scenarios

Year	Crop	Herbicide	Group
2025	Wheat	Starane + Bromoxynil + 2,4-D	4 + 6
2026	LL Canola	Sonalan Liberty	3 10
2027	Wheat	Huskie FX	27 + 6 + 4
2028	LL Soybean	Spartan + Metribuzin Flexstar/UB/Basagran	14 + 5 14/14/6

*Help growers be profitable, but help them preserve the chemistries we have.

How do we properly steward Liberty in Canola?

- Warm temps, higher humidity, sunny
- Medium droplets
- 15-20 gpa
- 3 lb AMS
- Small weeds (1-3 inches)
- Use for POST application, avoid using PRE
- Preplant: Use Gramoxone
- Beware: Some generic formulations are NOT equivalent and provide inferior weed control.
- Consider Treflan, Sonalan
- Have a strong weed control program the previous year

Should we tank mix Gramoxone and Roundup?

Yes or No?

Should we tank mix Gramoxone and Roundup?

Herbicide	Control (%)
Paraquat	53
Glyphosate	99
Glyphosate + Paraquat	58
Glyphosate fb Paraquat	99
LSD (0.05)	14

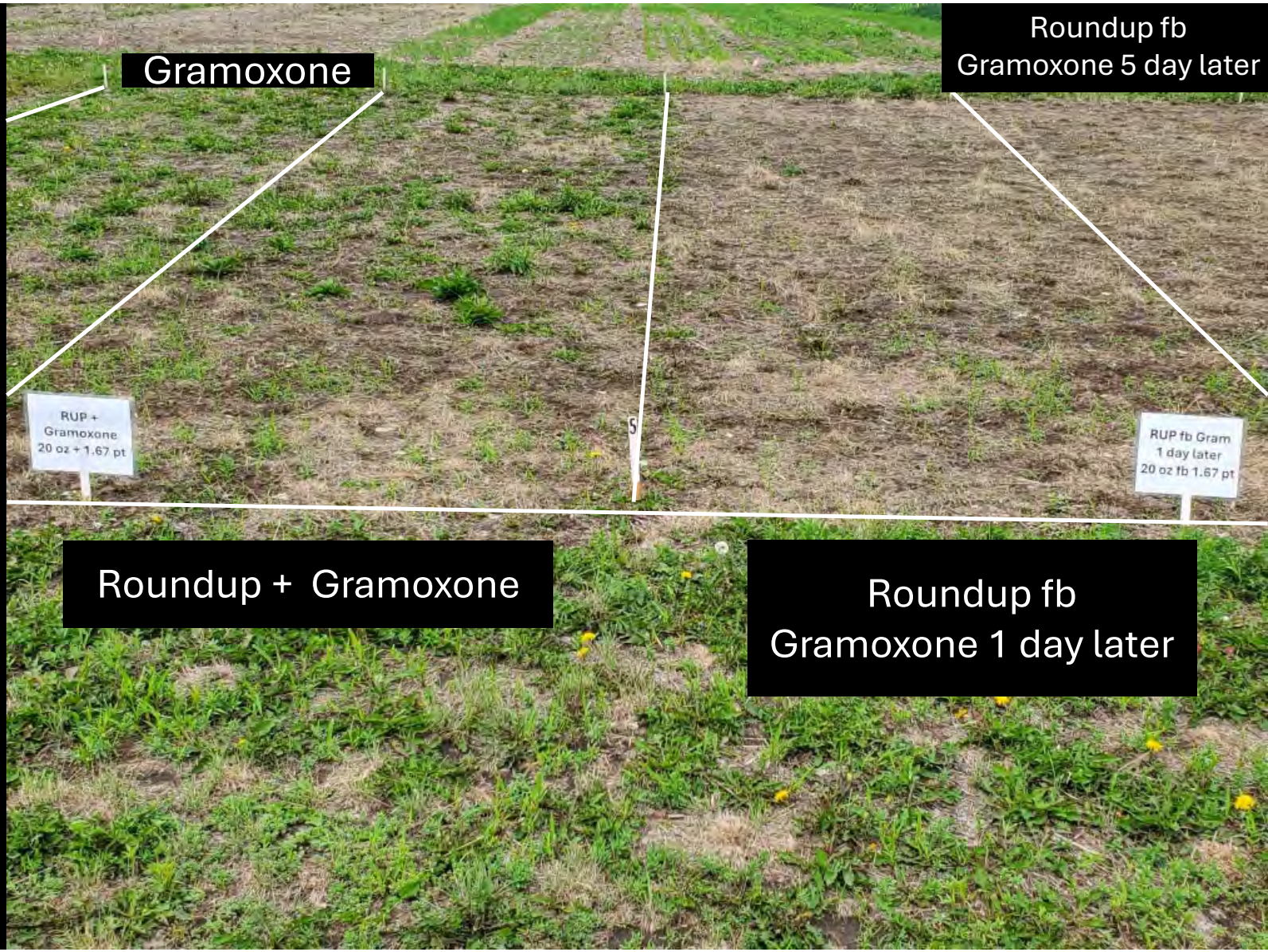
Different paraquat combinations were applied to 4-inch tall large crabgrass in Kingman County in 2017 (Table 1). Treatments were visually evaluated 3 weeks after application. Paraquat alone provided poor control of the large crabgrass while glyphosate alone provided excellent control. These types of responses are what we would expect from paraquat and glyphosate. An antagonistic response (58% control) was observed when glyphosate was combined with paraquat. To contrast, when glyphosate and paraquat were split-applied with the glyphosate applied 24 hours in advance of the paraquat, excellent control was observed. While the exact mechanism is unknown, it is likely due to a chemical or physiological incompatibility between paraquat and glyphosate. Table 1 adapted from Hay and Peterson, 2018.

https://eupdate.agronomy.ksu.edu/article_new/controlling-tall-thick-stands-of-weeds-in-wheat-stubble-293

Hay MM and DE Peterson (2018). Interactions of tank-mix partners with paraquat for enhanced grass control. Weed Science Society of America Annual Meeting. *In Proceedings* 58:158.

Dandelion control

Sprayed: June 26
Pictures: July 22



2025

Applied May 12

Roundup*

Gramoxone

RUP + Gramoxone

Common lambsquarters control 25 DAT

2512

Minot 2025

Effect of drought conditions on weed control

Reduced control of kochia with Liberty when sprayed under drought conditions, high temps, and low humidity.

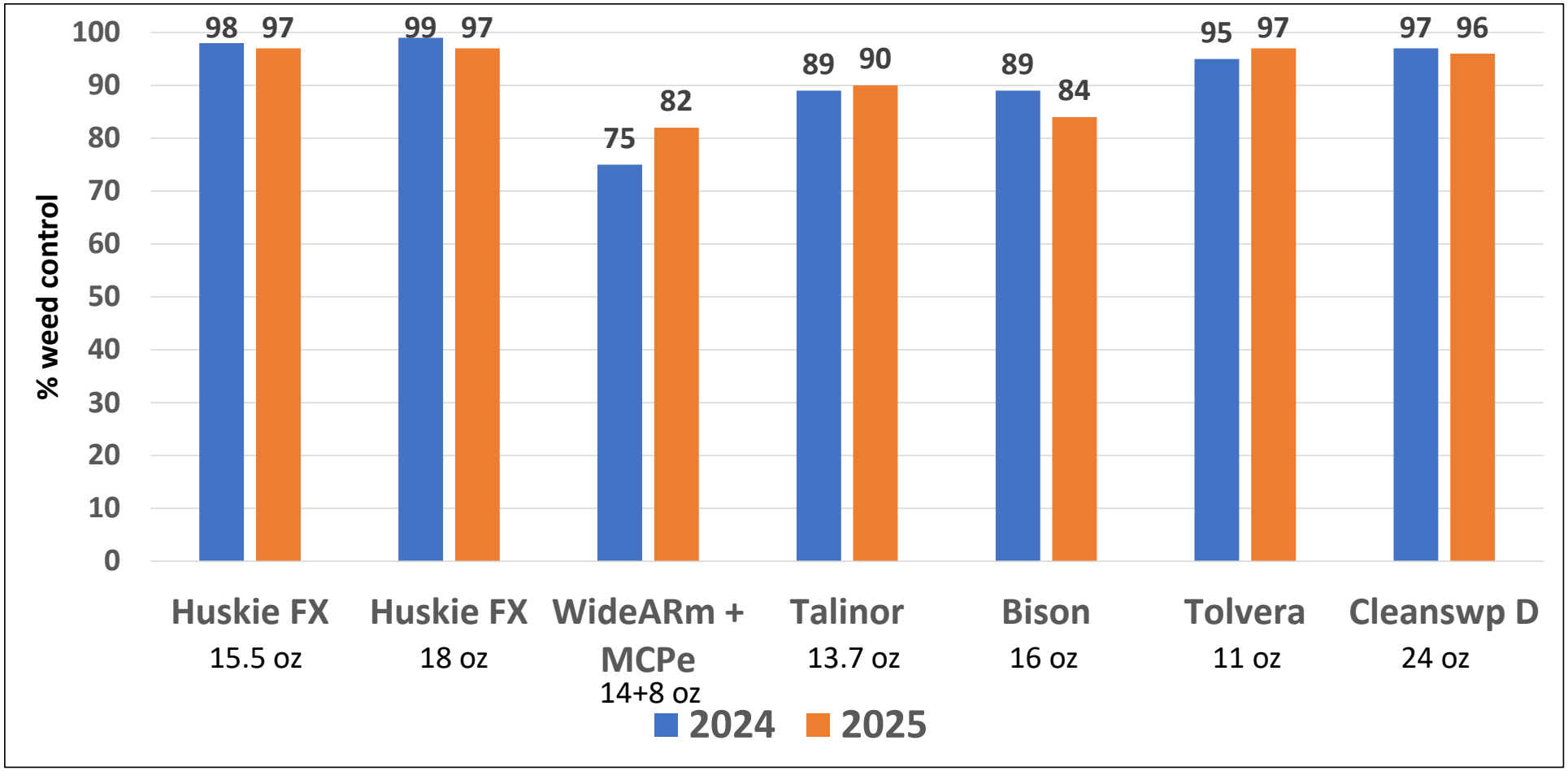
Reduced control of kochia with Gramoxone when sprayed in drought conditions, high temps, and low humidity.

Liberty sprayed in high heat and low humidity versus sprayed at moderate heat with normal humidity.

Liberty performed much better when plants were not drought-stressed.

Kochia control in spring wheat

Kochia control in spring wheat



***Late July evaluation. Kochia generally < 3" at application.**

Crop Rotation Interval Following Tolvera

Crop	Rotation Interval (months)
Corn, Wheat, Barley	0
Oat, Triticale, Rye	3
Alfalfa, Camelina, Canola, Chickpea, Dry bean, Flax, Lentil, Millet, Dry Pea, Safflower, Sorghum, Soybean, Sunflower	9
Potatoes (>8” in following 9 mo)*	9/15*
Other crops not listed	15
Sugar beet	18

Weed control with fall-applied Anthem Flex and Zidua

Anthem Flex = Pyroxasulfone + Aim

Zidua = Pyroxasulfone

Zidua	Anthem Flex
2.7 oz	3 oz
3.6 oz	4 oz
4 oz*	4.5*

Why fall applications?

Weed control with fall-applied Anthem Flex or Zidua

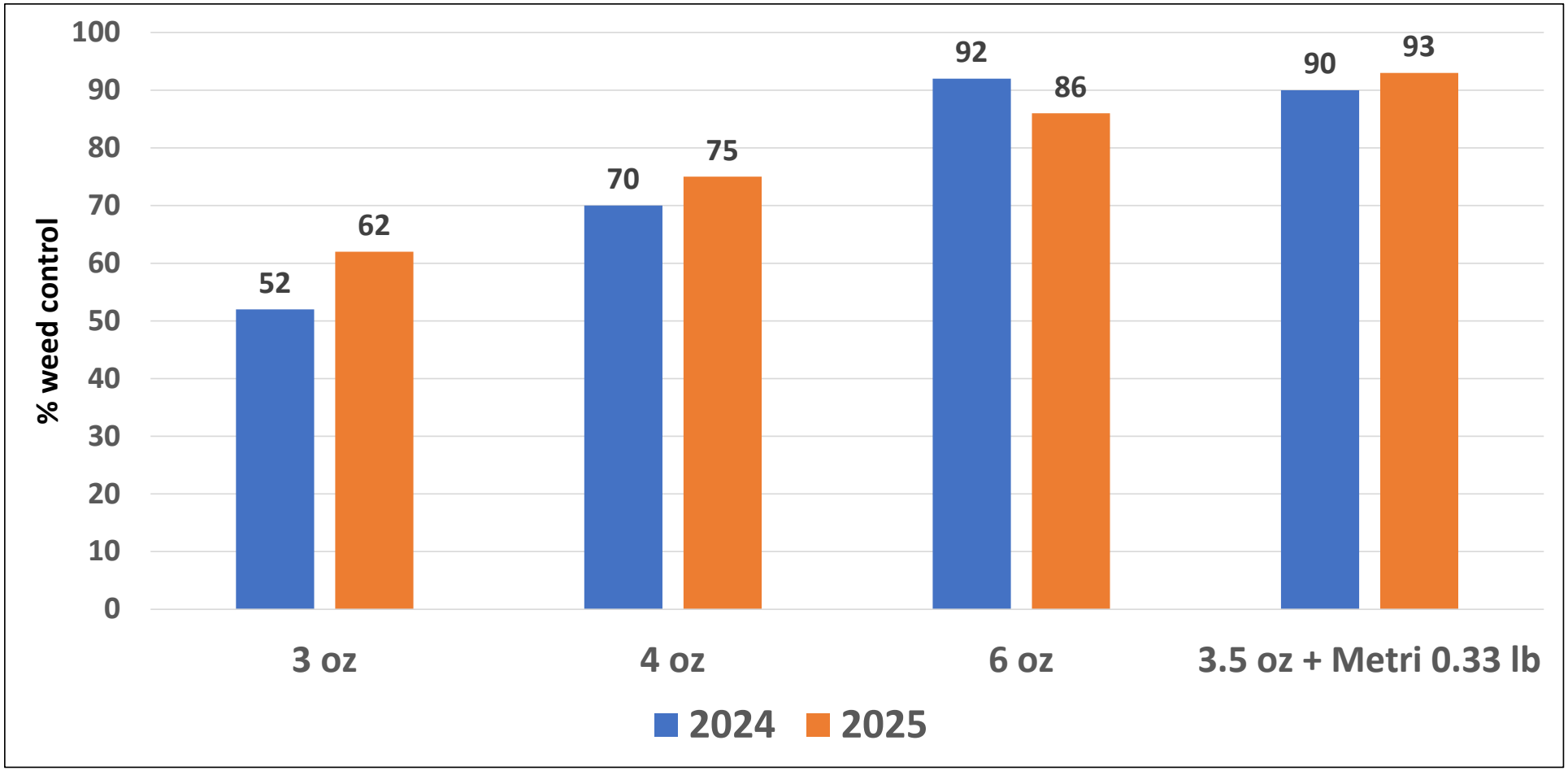
Suppression to Good Control

Kochia
Wild oat
Bromes

Suppression

Green foxtail
Wild buckwheat
Prickly lettuce
Lambsquarters

Kochia control with fall-applied Anthem Flex



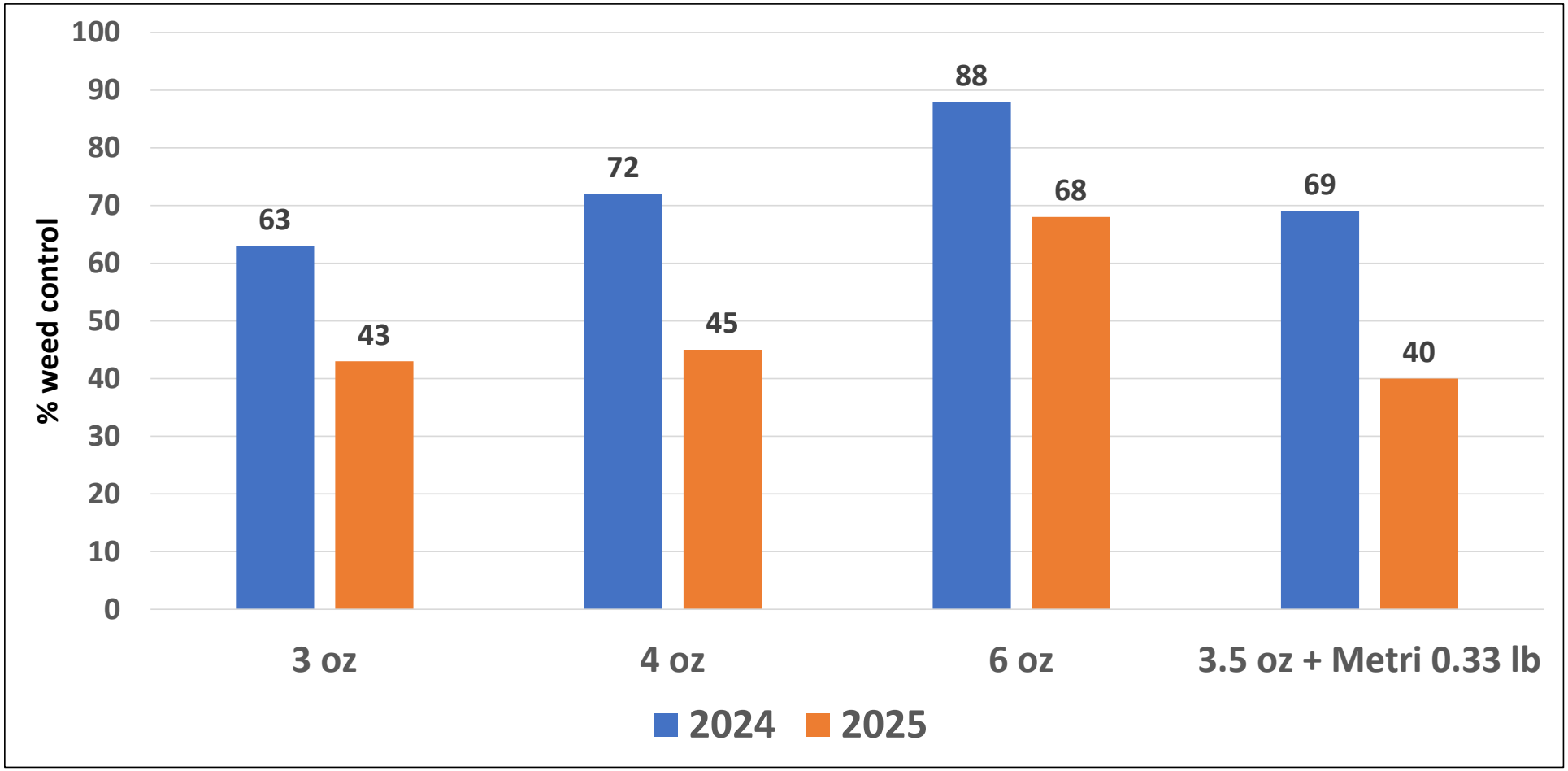
*Treatments applied Oct 16, 2023. Evaluation June 27, 2024.

*Treatments applied Oct 18, 2024. Evaluation June 15, 2025

Anthem Flex = Zidua + Aim

Minot

Green foxtail control with fall-applied Anthem Flex



*Treatments applied Oct 16, 2023. Evaluation June 27, 2024.

*Treatments applied Oct 18, 2024. Evaluation June 15, 2025.

Anthem Flex = Zidua + Aim

Minot

Wild oat resistance testing

(% resistant)

Herbicide	Group	2016-2020	2021-2024
Puma	1	75	84
Axial XL	1	39	45
Everest	2	71	85
GoldSky	2	71	69
Varro	2	85	90
Raptor	2	52	60
Assure II	1	72	69
Select	1	9	17
		n=208	n=174

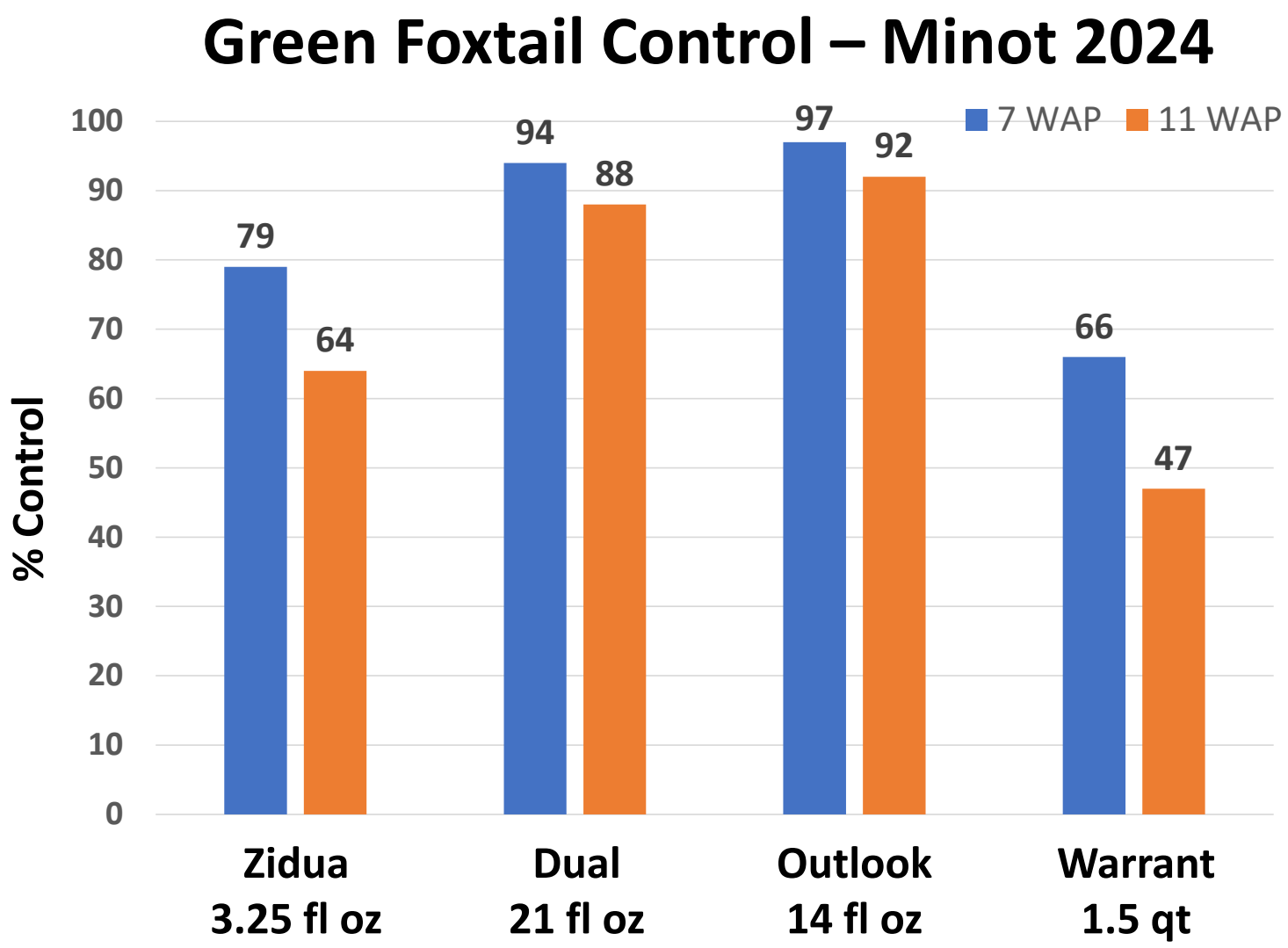
*Samples not randomly collected

Table 2. Wild oat resistance to postemergence herbicides in 2022. Random plants were seed collected from random state-wide roadside survey. Targeted plants were seed collected from suspected resistant plants.

Herbicide	Random	Targeted
	Wild oat (n=98)	Wild oat (n=48)
	% resistant	% resistant
Puma[1]	40	92
Axial[1a]	10	73
Everest[2]	27	96
pyroxsulam[2b]	23	94
Varro[2]	21	100
Beyond Xtra[2]	17	88
Assure II[1]	30	88
Select[1]	4	33

[a]Random samples were treated with Axial Bold, Targeted samples were treated with Axial XL.

[b]Random samples were treated with PerfectMatch, Targeted samples were treated with GoldSky.


Green Foxtail Control – Minot 2024
% Control
100
90
80
70
60
50
40
30
20
10
0
7 WAP
11 WAP
79
64
94
88
97
92
66
47
Zidua
3.25 fl oz
Dual
21 fl oz
Outlook
14 fl oz
Warrant
1.5 qt

Lentil tolerance to Tough and Metribuzin plus adjuvants

Metribuzin Conversion Chart

					Glory 4L	Metricor 4F
				Dimetric	Metribuzin 4L	Tricor 4F
Metribuzin	Metribuzin	75DF	75DF	3 lb ai/gal	3.8 lb ai/gal	4 lb ai/gal
lb ai	g ai/ha	oz pr	lb pr	fl oz	fl oz	fl oz
0.07	78	1.5	0.093	3.0	2.36	2.2
0.094	105	2.0	0.125	4.0	3.17	3.0
0.125	140	2.7	0.167	5.3	4.21	4.0
0.141	158	3.0	0.188	6.0	4.75	4.5
0.188	210	4.0	0.25	8.0	6.32	6.0
0.25	280	5.3	0.33	10.7	8.42	8.0

Mauler

Study 2529
Rep 3

PRE: May 13
POST 2": June 4
POST 4": Not sprayed yet*

Photos: June 13

Tough 10 fl oz
Metri 75DF 2 oz
Select 2EC 6 fl oz

Tough + Met + NIS*

Prowl + Sharpen + AMS + MSO

T + Met + Select + COC

Tough + NIS

T + Met + Select + COC*

Tough + NIS*

Untreated

Tough + Met + NIS

Study 2529
Rep 3

PRE: May 13
POST 2”: June 4
POST 4”: June 14

Photos: June 20

Tough 10 fl oz
Metri 75DF 2 oz
Select 2EC 6 fl oz

May 22 to July 6:
0.75” rain

Tough + Met + NIS

Prowl + Sharpen + AMS + MSO

T + Met + Select + COC

Tough + NIS

T + Met + Select + COC

Tough + NIS

Untreated

Tough + Met + NIS

Study 2529
Rep 3

PRE: May 13
POST 2": June 4
POST 4": June 14

Photos: June 26

Tough 10 fl oz
Metri 75DF 2 oz
Select 2EC 6 fl oz

May 22 to July 6:
0.75" rain

Tough + Met + NIS

Prowl + Sharpen + AMS + MSO

T + Met + Select + COC

Tough + NIS

T + Met + Select + COC

Tough + NIS

Untreated

Tough + Met + NIS

Study 2529
Rep 3

PRE: May 13
POST 2”: June 4
POST 4”: June 14

Photos: July 2

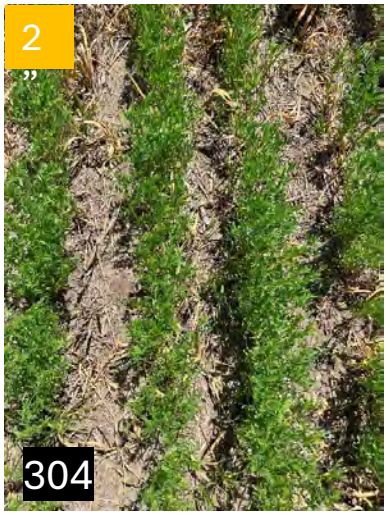
Tough 10 fl oz
Metri 75DF 2 oz
Select 2EC 6 fl oz

May 22 to July 6:
0.75” rain

Tough + Met + NIS

Prowl + Sharpen + AMS + MSO

T + Met + Select + COC



Tough + NIS

T + Met + Select + COC

Tough + NIS

Untreated

Tough + Met + NIS

Study 2529
Rep 3

PRE: May 13
POST 2": June 4
POST 4": June 14

Photos: July 18

Tough 10 fl oz
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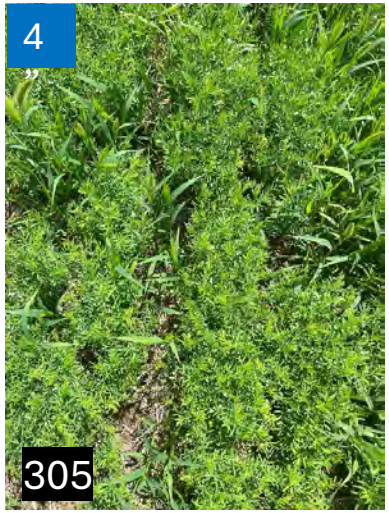
Tough + NIS



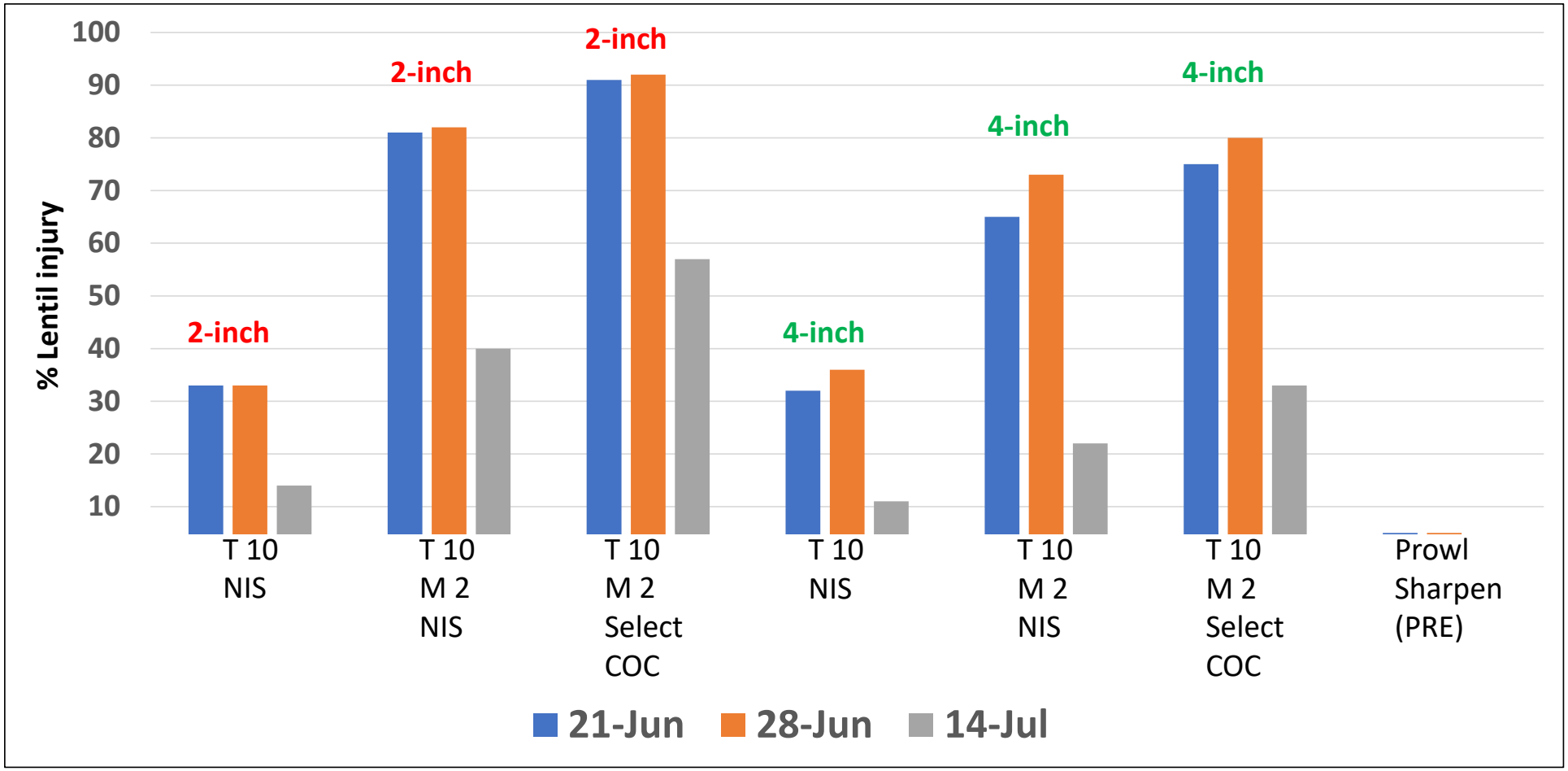
T + Met + Select + COC

Tough + NIS

Untreated

Tough + Met + NIS

Lentil tolerance to Tough and Metribuzin plus adjuvants applied to 2- and 4-inch lentil

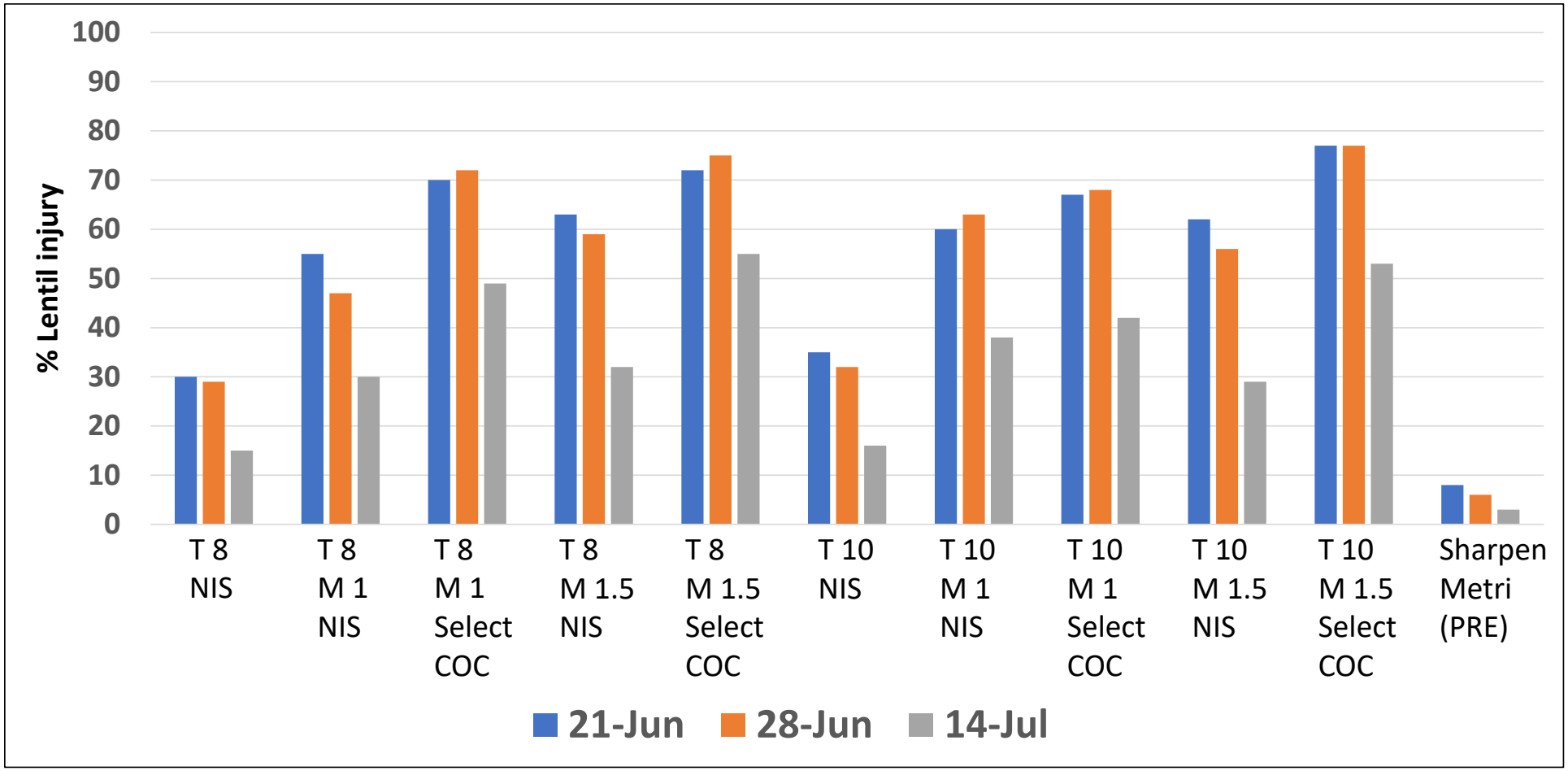


*Lentil planted and PRE treatment applied May 13. POST treatments applied to 2-inch lentil on June 4 and 4-inch lentil on June 14. Tough rate in fl oz, Metribuzin 75DF rate in dry oz.

2529

Minot 2025

Lentil tolerance to postemergence Tough and Metribuzin rates and adjuvants



*Lentils planted and PRE treatment applied May 13. POST treatments applied June 14 to 3-4" lentils.

2511 **Tough rate in fl oz, Metribuzin 75DF rate in dry oz. Minot 2025