

Project title – County/Region: 2022 Continued Evaluation of Conventional Variable Rate Herbicide Tank Mixes on Waterhemp Control – Renville County/South Central

Cooperator: Next Gen Ag LLC

Nearest Town: Renville, MN

Soil Type: Webster Clay/4.5% OM/Fine Texture

Tillage: Conventional

Previous Crop: Corn

Plant Date: May 24<sup>th</sup>, 2022

Variety: Becks 1630E @ 150,000/A

Row Width: 30 Inches

Fertilizer: None Added

Weed Management: Study Objective

Insecticide: Seed Treatment Only

Harvested Population: N/A

Harvested Date: N/A

Experimental Design: RCBD (Randomized-Complete Block Design)

Purpose of Study:

Waterhemp continues to be a challenging weed in farmer fields rapidly developing resistance to multiple modes of action that results in grower continued reliability of genetically engineered herbicide trait resistance. Adding 2, 3, 4, and more trait resistances in soybeans will inevitably result in continued development of waterhemp resistance with no remaining modes of action as adding one herbicide resistant trait into the genetics at a time allows an already resistant population to the previous 3 modes of action plenty of time to develop resistance to a fourth post-emergent mode of action. Residual herbicides are the only way to limit resistance as these products engage the weed at the most vulnerable part of the life cycle (emergence). This study focuses on variable rate tank mixes of conventional residual herbicides with target goals of achieving 95% waterhemp control at a relative cost of \$35-\$40 per acre. The cost goal was targeted well before the volatile and substantial inflation impact of 2022, so treatments that achieved the cost goal at grant writing in 2021 likely now exceed no longer meeting criteria. A program that combines multiple modes of action and uniformity of use across all genetics.

Results:

- 1) 2021 Data in Combined Analysis Impacted the A+28 Due to Lack of Early Activating Rain on PRE.
- 2) 2022 Data had an Early Activating Rain After PRE and 80% of Entries Achieved the 90%+ Threshold with 45% Achieving 95%+.
- 3) Applying Variable Rate Tank Mixes as a single PRE or two-pass is effective.

- 4) PRE only VRTM control at A+56 ranged from 87-97% and averaged 92%.
- 5) PRE fb Layby VRTM control at A+56 ranged from 79-98 and averaged 92%.
- 6) Best end of season treatments were a result of ONLY Flexstar POST. Flexstar applied alone POST vs. part of PRE tank mix increased control by 3-5%.
- 7) Treatments are on label, but there are specific guidelines surrounding Valor SX and Warrant tank mixes. This study does not violate those guidelines, but growers should read both product labels to understand the potential risk.
- 8) After 5 years of evaluating these products across 26 different soybean varieties and 4 companies I have witnessed injury once and crop recovered within a week.
- 9) Grower's farming soils higher in sand (>33%) and/or lower in %OM (<4.5%) should consider experimenting on the lower end of tank mix rates.

Drop this table to the right of your text boxes.... coincides with the results bullets. Format as needed.

**Waterhemp Control from Residual Variable Rate Tank Mixes in Soybean, Renville, MN 2022 & Combined**

Treatment <sup>a</sup>	Rate	Waterhemp Control								App. Code
		A+14 <sup>b</sup>		A+28		A+42		A+56		
		'22	2YR	'22	2YR	'22	2YR	'22	2YR	
	oz/A* or fl oz/A	-----%-----								
Val + War + Zid + Flx <sup>c</sup>	*1.5 + 30 + 3.25 + 7.5	100	100	99	79	88	83	85	87	A
Val + War + Zid / Flx	*1.5 + 30 + 3.25 / 7.5	98	93	100	86	96	91	96	90	A/B
Val + War / Zid + Flx	*1.5 + 30 / 3.25 + 7.5	98	96	100	85	91	93	90	91	A/B
Val + Zid / War + Flx	*1.5 + 3.25 / 30 + 7.5	94	94	99	76	97	92	97	89	A/B
Val / War + Zid + Flx	*1.5 / 30 + 3.25 + 7.5	95	94	90	60	92	90	92	79	A/B
Val + War + Zid + Flx	*2 + 40 + 4 + 10	100	100	99	94	95	96	95	95	A
Val + War + Zid / Flx	*2 + 40 + 4 / 10	98	99	100	83	99	99	98	98	A/B
Val + War / Zid + Flx	*2 + 40 / 4 + 10	93	96	99	74	91	93	89	91	A/B
Val + Zid / War + Flx	*2 + 4 / 40 + 10	96	95	100	76	94	93	93	94	A/B
Val / War + Zid + Flx	*2 / 40 + 4 + 10	93	96	89	66	90	89	89	89	A/B
Blkt + Val + War + Flx	6 + *1.5 + 30 + 7.5	100	100	99	86	89	93	84	89	A
Blkt + Val + War / Flx	6 + *1.5 + 30 / 7.5	98	99	99	74	95	94	93	93	A/B
Blkt + Val / War + Flx	6 + *1.5 / 30 + 7.5	100	94	93	68	93	89	91	89	A/B
Blkt + Val + War + Flx	8 + *2 + 40 + 10	100	100	100	88	91	92	91	92	A
Blkt + Val + War / Flx	8 + *2 + 40 / 10	100	100	100	91	100	99	99	97	A/B
Blkt + Val / War + Flx	8 + *2 / 40 + 10	99	99	100	85	95	95	95	94	A/B
Blkt + Val + War + Flx	10 + *2 + 48 + 12	100	100	98	80	88	92	93	94	A
Blkt + Val + War / Flx	10 + *2 + 48 / 12	100	100	100	95	99	99	99	98	A/B
Blkt + Val / War + Flx	10 + *2 / 48 + 12	100	100	100	89	98	96	97	94	A/B
Blkt+Val+War+Flx+Zid	8 + *2 + 40 + 10 + 3.25	100	100	100	86	100	99	100	97	A
LSD (0.1)		6	6	6	17	7	7	9	9	

<sup>a</sup>PRE treatment applications contained no additional adjuvants; MSO at 0.5% v/v POST.

<sup>b</sup>A+[number]=Days after "A" application.

<sup>c</sup>Flx=Flexstar; War=Warrant; Val=Valor SX; Blkt=Blanket; Zid= Zidua SC equivalent.

COST: Trt 1 thru 5=\$35; Trt 6 thru 10=\$45; Trt 11 thru 13=\$27; Trt 14 thru 16=\$36; Trt 17 thru 19=\$42; Trt 20=\$54.