Cooperator:	University of Minnesota Extension
Nearest Town:	Waseca and Rochester
Soil Type:	Clay loam and loam
Tillage:	Conventional
Previous Crop:	Corn
Planting Date:	Waseca: 05/28/2022 Rochester: 06/02/2022
Spray Dates:	Waseca: POST I 06/28/2022 POST II: 07/05/2022
	Rochester: POST I 07/01/2022 POST II 07/09/2022
Variety:	Stine 19EC12
Row Width:	30 inch
Harvest Population:	150,000
Experimental Design:	Randomized complete block with 4 replications

Purpose of Study:

Soybean varieties tolerant to 2,4-D-choline, glyphosate, and glufosinate have been widely adopted by Minnesota soybean growers. While 2,4-D tolerant soybeans provide growers with another site of action to manage glyphosate-resistant weed populations, there has also been difficulty in achieving adequate control of volunteer corn in this system. ACCase-inhibiting herbicides are often the primary tool for managing volunteer corn and the ACCase-inhibiting herbicides when tank mixed with auxinic herbicides showed antagonism and resulted in reduced control of grassy weeds. Growers relying on previously effective herbicide rates and application strategies are often surprised when they do not achieve adequate volunteer corn control. The objective of this research was to evaluate the interaction between ACCase-inhibiting herbicides (clethodim and quizalofop-ethyl) and 2,4-D choline alone or tank-mixed with glyphosate or *S*-metolachlor for glyphosate-resistant volunteer corn control in 2,4 -D tolerant soybean.

Results:

Generally, lower rates of either volunteer corn controlling graminicide resulted in reduced volunteer corn control, although reduced control was more pronounced with quizalofop-ethyl (Assure II) treatments. Higher graminicide rates helped overcome the antagonism between ACCase-inhibiting herbicides and 2,4-D choline and could be a useful strategy for managing volunteer corn. Sequential applications of quizalofop-ethyl (Assure II) provided better control of volunteer corn. Glyphosate did not appear to cause any antagonism.

TREATMENTS

•PREEMERGENCE •All treatments have a preemergence 1.33 pt/A Dual II Magnum

•POSTEMERGENCE

1.UNTREATED

2.Enlist + Glyphosate + Select Max 6 oz + (AMS & NIS)

3.Enlist + Glyphosate + Select Max 6 oz + Dual + (AMS & NIS)

4.Enlist + Glyphosate + Select Max 9 oz + (AMS & NIS)

5.Enlist + Glyphosate + Select Max 9 oz + Dual + (AMS & NIS)

6.Enlist + Select Max 6 oz + (AMS & COC)

7.Enlist + Select Max 6 oz + Dual + (AMS & COC)

8.Enlist + Select Max 9 oz + (AMS & COC)

9.Enlist + Select Max 9 oz + Dual + (AMS & COC)

10.Enlist + Glyphosate + Assure II 4 oz + (AMS & COC)

11.Enlist + Glyphosate + Assure II 4 oz + Dual + (AMS & COC)

12.Enlist + Glyphosate + Assure II 12 oz + (AMS & COC)

13.Enlist + Glyphosate + Assure II 12 oz + Dual + (AMS & COC)

14.Enlist + Assure II 4 oz + (AMS & COC)

15.Enlist + Assure II 4 oz + Dual + (AMS & COC)

16.Enlist + Assure II 12 oz + (AMS & COC)

17.Enlist + Assure II 12 oz + Dual + (AMS & COC)

18.Enlist + Glyphosate+ (AMS) fb1 Select Max 6 oz + (COC & AMS)

19.Enlist + Glyphosate + (AMS) fb Assure II 4 oz + (COC & AMS)

20.WEED FREE

*1= graminicide in a sequential treatment 5-7 days after initial POST treatment COC = SuperbHC® NIS = Preference®

HERBICIDE RATES

Enlist One at 2 Pints per acre Glyphosate as Roundup PowerMax3 at 30 ounces per acre *S*-metolachlor as Dual II Magnum at 1 pint per acre

Clethodim as SelectMax; High rate 9 oz per acre, Low rate 6 oz per acre Quizalofop-ethyl as Assure II; High rate 12 oz per acre, Low rate 4 oz per acre

ADDITIVE RATES

AMS as Amsol AMS rate for first POST treatment in the sequential treatments (#18and #19): 2.5% v/v AMS in all other mixes was at 5% v/v

COC as SuperbHC® at 1 quart per acre NIS as Preference® at 0.25% v/v

SPRAYER INFO

Tractor mounted sprayer with 15 GPA using AIXR spray tips.





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RESULTS

•At Rochester, the low rates of quizalofop-ethyl in tank-mixes with or without glyphosate resulted in reduced volunteer corn (VC) control (Figure 1)

• At Waseca, the low rates of clethodim and quizalofop-ethyl in tank-mixes with or without glyphosate resulted in reduced VC control, although differences were more pronounced with low rates of quizalofop-ethyl (Figure 2)

•Addition of glyphosate did not play a role in antagonism and was marginally beneficial when added to tank-mixes with quizalofop-ethyl (Figures 1 and 2)

•S-metolachlor did not show a consistent VC control response between sites (Figures 1 and 2)

•Sequential applications with the low rate of either graminicide adequately controlled VC (Figures 1 and 2)

•At Rochester, the low rates of quizalofop-ethyl in tank-mixes with or without glyphosate resulted in reduced yield and the addition of glyphosate to the high rates of quizalofop-ethyl was slightly beneficial to yield (Figure 3)

•Treatments did not have clear impact on yield at Waseca (Figure 4)

Photos of what antagonism looked like (4oz of Assure II in tank mix vs. 4 oz of Assure II applied sequentially): Trt. #10

For Additional Information: *Ryan Miller, mill*0869@umn.edu

Rochester Data August 5th rating date, Percent Volunteer Corn Control

Rat	ing Date		Aug-5-2022	Rating Date		Aug-5-2022
٢rt	Treatment	Rate Appl	12*	Trt Treatment	Rate Appl	12*
10.	Name	Rate Unit Code		No. Name	Rate Unit Code	
	UNTREATED		0.0e	12 Enlist One	2pt/a A	94.5a
8	Enlist One	2pt/a A	90.8ab	PowerMax 3	30fl oz/a A	256 2000 006629
	PowerMax 3	30fl oz/a A		Assure II	12fl oz/a A	
	Select Max	6fl oz/a A		Amsol	3qt/a A	
	Amsol	3qt/a A		COC	1qt/a A	
	NIS	0.25% v/v A		13 Enlist One	2pt/a A	97.0a
3	Enlist One	2pt/a A	83.0b	PowerMax 3	30fl oz/a A	
	PowerMax 3	30fl oz/a A		Assure II	12fl oz/a A	
	Select Max	6fl oz/a A		Dual	1nt/o A	
	Dual	1nt/a A		Magnum	ipua A	
	Magnum	ipud //		Amsol	3qt/a A	
	Amsol	3qt/a A		COC	1qt/a A	
_	NIS	0.25% v/v A		14 Enlist One	2pt/a A	10.0d
	Enlist One	2pt/a A	93.5a	Assure II	4fl oz/a A	
	PowerMax 3	30fl oz/a A		Amsol	3qt/a A	
	Select Max	9fl oz/a A		COC	1qt/a A	
	Amsol	3qt/a A		15 Enlist One	2pt/a A	6.3de
_	NIS	0.25% v/v A		Assure II	4fl oz/a A	00000000000
	Enlist One	2pt/a A	93.0a	Dual	1nt/a A	
	PowerMax 3	30fl oz/a A		Magnum	ipua A	
	Select Max	9fl oz/a A		Amsol	3qt/a A	
	Dual	1nt/a A		COC	1qt/a A	
	Magnum	ipud /i		16 Enlist One	2pt/a A	95.3a
	Amsol	3qt/a A		Assure II	12fl oz/a A	
	NIS	0.25% v/v A		Amsol	3qt/a A	
	Enlist One	2pt/a A	92.3a	COC	1qt/a A	c :
	Select Max	6fl oz/a A		17 Enlist One	2pt/a A	97.0a
	Amsol	3qt/a A		Assure II	12fl oz/a A	
_	COC	1qt/a A		Dual	1nt/a A	
	Enlist One	2pt/a A	91.8ab	Magnum	ipua A	
	Select Max	6fl oz/a A		Amsol	3qt/a A	
	Dual	1pt/a A		COC	1qt/a A	
	Magnum	ipud it		18 Enlist One	2pt/a A	95.0a
	Amsol	3qt/a A		PowerMax 3	30fl oz/a A	
_	COC	1qt/a A		Amsol	2.5% v/v A	
	Enlist One	2pt/a A	97.5a	Select Max	6fl oz/a B	
	Select Max	911 oz/a A		Amsol	3qt/a B	
	Amsol	3qt/a A		COC	1qt/a B	
_	COC	1qt/a A		19 Enlist One	2pt/a A	98.0a
ġ.	Enlist One	2pt/a A	96.3a	PowerMax 3	30fl oz/a A	
	Select Max	9fl oz/a A		Amsol	2.5% v/v A	
	Dual	1pt/a A		Assure II	4fl oz/a B	
	Magnum			Amsol	3qt/a B	
	Amsol	3qt/a A		COC	1qt/a B	
_	COC	1qt/a A		20 WEED FREE		99.0a
0	Enlist One	2pt/a A	31.3c			
	PowerMax 3	30fl oz/a A				
	Assure II	4fl oz/a A				
	Amsol	3qt/a A				
	COC	1qt/a A				
1	Enlist One	2pt/a A	15.0d			
	PowerMax 3	30fl oz/a A				
	Assure II	4fl oz/a A				
	Dual	1pt/a A				
	Magnum	iped A				
	Amsol	3qt/a A				
	COC	1 at/a A				

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Waseca Data August 3rd rating date, Percent Volunteer Corn Control

Rating Date Aug-3- Trt Treatment Rate Unit Code 1 UNTREATED 0.0 2 Enlist One 2pt/a A 90werMax 3 30fl oz/a A 91.0 Select Max 6fl oz/a A Amsol 3qt/a A NIS 0.25% v/v A 3 3 Enlist One 2pt/a A PowerMax 3 30fl oz/a A 88.6 PowerMax 3 30fl oz/a A A Select Max 6fl oz/a A A Dual 1pt/a A Magnum 1pt/a A Amsol 3qt/a 99.0 PowerMax 3 30fl oz/a A 99.0 PowerMax 3 30fl oz/a A 99.0 PowerMax 3 30fl oz/a A 99.0	2022 * Di Docde Be
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6 Enlist One 2pt/a A 92.5	b-e
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8 Enlist One 2pt/a A 99.0)a
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9 Enlist One 2pt/a A 98.0)a
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11 Enlist One 2pt/a A 13.8	ßg
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Assure II 4fl oz/a A	
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Magnum 1pt/a A	
Amsol 3at/a A	
COC 1at/a A	
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Pes	Pest Name VC							
Rat	ing Date			Aug-3-2022				
Trt	Treatment	Rate	Appl	10*				
No.	Name	Rate Unit	Code					
12	Enlist One	2pt/a	A	91.0cde				
L	PowerMax 3	30fl oz/a	A					
L	Assure II	12fl oz/a	A					
L	Amsol	3qt/a	A					
	COC	1qt/a	A					
13	Enlist One	2pt/a	A	95.3abc				
L 1	PowerMax 3	30fl oz/a	A					
L	Assure II	12fl oz/a	A					
L	Dual	1nt/a	Δ					
L	Magnum	ipua	^					
L	Amsol	3qt/a	A					
	COC	1qt/a	A					
14	Enlist One	2pt/a	A	6.3h				
L	Assure II	4fl oz/a	A					
L	Amsol	3qt/a	A					
	COC	1qt/a	A					
15	Enlist One	2pt/a	A	3.8hi				
L	Assure II	4fl oz/a	A					
L	Dual	1nt/a	Δ					
L	Magnum	ipea	2					
L	Amsol	3qt/a	A					
	COC	1qt/a	A					
16	Enlist One	2pt/a	A	61.3f				
L	Assure II	12fl oz/a	A					
L	Amsol	3qt/a	A					
	COC	1qt/a	A					
17	Enlist One	2pt/a	A	88.7e				
L	Assure II	12fl oz/a	A					
L	Dual	1nt/a	Δ					
L	Magnum	ipeu	~					
L	Amsol	3qt/a	A					
	COC	1qt/a	A					
18	Enlist One	2pt/a	A	90.0de				
L	PowerMax 3	30fl oz/a	A					
L	Amsol	2.5% v/v	A					
L	Select Max	6fl oz/a	в					
L	Amsol	3qt/a	в					
-	COC	1qt/a	В					
19	Enlist One	2pt/a	A	94.3a-d				
1	PowerMax 3	30fl oz/a	A					
L	Amsol	2.5% v/v	A					
L	Assure II	4fl oz/a	В					
L	Amsol	3qt/a	В					
	COC	1qt/a	В					
20	WEED FREE			99.0a				

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