2024 Wisconsin Weed Science Research Report

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Cropping Systems Weed Science
UNIVERSITY OF WISCONSIN–MADISON

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The purpose of this report is to share annual research results with crop production clientele of Wisconsin. Information herein does not constitute a recommendation or endorsement of any particular product or practice. Information herein also does not replace any information presented on pesticide labels. More complete product use guidelines are given through the University of Wisconsin-Madison Division of Extension publication:

A3646, Pest Management in Wisconsin Field Crops
Available at https://patstore.wisc.edu

Despite careful proof reading, there may be some typing or compilation errors in the report. Should you find any information presented to be unreasonably questionable, please contact:

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Trial: Weed Management in Short Statured Corn **24-ROK-CN02**

Project Goal: Evaluate Bayer Crop Science corn herbicide recommendations in short statured corn.

Site Description:

Location:	Janesville, WI	**Crop:**	Short Statured Corn
Field #:	1	**Hybrid:**	PR105-20SSC
Soil type:	Plano silt loam	**Planting Date:**	5/6
% OM:	3.5	**Emergence Date:**	5/17
pH:	6.4	**Population:**	36,000 seeds/acre
Fertilization:	181 lbs N/acre	**Depth:**	2 in
Previous crop:	Soybean	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	giant ragweed (AMBTR)		

Herbicide Application Information:

Date:	5/6	6/6
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	66	64
2" Soil Temp (°F):	-	63
Soil moisture [surface]:	moist	wet
RH %:	52	74
Cloud cover %	10	0
Wind speed (mph)/direction	4-10/NE	3-10/WNW
Rainfall (in) 1 wk after APP:	1.22"	0.40"
GPA:	15	15
PSI:	38	38
Nozzle:	TTI 110015	TTI 110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	24

Crop and weed information at application:

		Date: 5/6	6/6
corn	Height:	-	5-7"
	Stage:	-	V4/V5
giant ragweed	Height:	-	1-4" Avg=3"
	Density:	-	12-76/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Harness	7 lb/gal	15	2 pt/a	PRE	A
	AAtrex	4 lb/gal	5	2 pt/a	PRE	A
3	TripleFlex II	4.25 lb/gal	2, 4, 15	3 pt/a	PRE	A
	AAtrex	4 lb/gal	5	2 pt/a	PRE	A
4	Harness MAX	3.85 lb/gal	15, 27	64 fl oz/a	PRE	A
	AAtrex 4L	4 lb/gal	5	2 pt/a	PRE	A
5	TriVolt SC	3.65 lb/gal	2, 15, 27	20 fl oz/a	PRE	A
	AAtrex 4L	4 lb/gal	5	2 pt/a	PRE	A
6	Harness	7 lb/gal	15	2 pt/a	PRE	A
	AAtrex	4 lb/gal	5	2 pt/a	PRE	A
	Laudis	3.5 lb/gal	27	3 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	MSO			1% v/v	POST	B
	AMSOL			2.5% v/v	POST	B
7	TripleFlex II	4.25 lb/gal	2, 4, 15	1.5 pt/a	PRE	A
	AAtrex	4 lb/gal	5	2 pt/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	COC			1% v/v	POST	B
	Class Act Ridion			1% v/v	POST	B
8	Harness MAX	3.85 lb/gal	15, 27	55 fl oz/a	PRE	A
	AAtrex	4 lb/gal	5	2 pt/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	COC			1% v/v	POST	B
	Class Act Ridion			1% v/v	POST	B
9	TriVolt SC	3.65 lb/gal	2, 15, 27	12 fl oz/a	PRE	A
	AAtrex	4 lb/gal	5	2 pt/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	Warrant	3 lb/gal	15	3 pt/a	POST	B
	COC			1% v/v	POST	B
	Class Act Ridion			1% v/v	POST	B
10	Verdict	5.57 lb/gal	14, 15	16 fl oz/a	PRE	A
	AAtrex	4 lb/gal	5	2 pt/a	PRE	A
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	Status	56% w/w	2, 4	5 oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMSOL			2.5% v/v	POST	B

Adjuvants: AMSOL = AMS (liquid); Class Act Ridion = non-AMS water conditioner + NIS; COC = CropOil; MSO = Upland MSO, NIS = Prefer 90

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to evaluate Bayer CropScience corn herbicide recommendations in short statured corn. Giant ragweed was the predominant species in the trial area. Giant ragweed at this research location is a biotype with a prolonged emergence pattern as emergence typically starts in mid- to late-April and continues well into June.

None of the PRE herbicides caused visible corn injury symptoms 22 days after application (data not shown). Corn leaning was observed 6 days after the POST application in all treatments containing DiFlexx and Status. Average severity ranged from 17-21%; however, corn quickly grew out of any visible injury symptoms and no leaning was evident by 15 DAT.

The average control of giant ragweed was impacted by herbicide program at all rating timings (Table 1). Most of the PRE herbicides evaluated provided good control (>80%) up to 31 days after application. All but one of the 2-pass (PRE followed by POST) programs provided excellent (>90%) giant ragweed control at corn harvest. Giant ragweed control was poor (<50%) for all the 1-pass (PRE) programs at corn harvest. Averaged across all treatments, giant ragweed control at corn harvest of the 2-pass PRE *fb* POST programs = 94% and 1-pass PRE only = 30%.

Corn yield was significantly impacted by herbicide program (Table 1). Averaged across all treatments, the yield of the 2-pass PRE *fb* POST programs = 237 bu/acre and 1-pass PRE only = 64 bu/acre. The untreated check yield = 3 bu/acre.

Plot photos from throughout the growing season are available at **Weed Management in Short Statured Corn** published on **wiscweeds.info**

Table 1. Giant ragweed control ratings and corn grain yield for trial #24-ROK-CN02 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Giant Ragweed (%) 5/28	6/6	6/21	10/18	Yield[b] bu acre^{-1}
1	Untreated Check	0	0	0	0	3 e
One-Pass – PRE (5/6)						
2	Harness (2 pt) + AAtrex (2 pt)	79	82	58	11	18 e
3	TripleFlex II (3 pt) + AAtrex (2 pt)	88	88	71	23	41 d
4	Harness MAX (64 oz) + AAtrex (2 pt)	88	94	85	50	112 b
5	TriVolt (20 ox) + AAtrex (2 pt)	78	88	77	35	77 c
Two-Pass – PRE (5/6) *fb* POST (6/6)				**POST**		
6	Harness (2 pt) + AAtrex (2 pt) ***fb*** Laudis (3 oz) + Roundup PM3 (30 oz) + MSO (1%) + AMSOL (2.5%)	81	77	93	88	229 a
7	TripleFlex II (1.5 pt) + AAtrex (2 pt) ***fb*** DiFlexx (8 oz) + Roundup PM3 (30 oz) + COC (1%) + Class Act Ridion (1%)	79	73	97	96	238 a
8	Harness MAX (55 oz) + AAtrex (2 pt) ***fb*** DiFlexx (8 oz) + Roundup PM3 (30 oz) + COC (1%) + Class Act Ridion (1%)	90	92	97	95	241 a
9	TriVolt (12 oz) + AAtrex (2 pt) ***fb*** DiFlexx (8 oz) + RU PM3 (30 oz) + Warrant (3 pt) + COC (1%) + Class Act Ridion (1%)	69	78	98	95	233 a
10	Verdict (16 oz) + AAtrex (2 pt) ***fb*** Status (5 oz) + Roundup PM3 (30 oz) + NIS (0.25%) + AMSOL (2.5%)	95	91	98	95	244 a
	LSD (α=0.10)	**7**	**7**	**4**	**11**	**22**
	p value	**<.001**	**<.001**	**<.001**	**<.001**	**<0.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

Project Goal: Evaluate multiple one- and two-pass corn herbicide programs for giant ragweed control and crop safety.

Site Description:

Location:	Janesville, WI	**Crop:**	Corn
Field #:	2	**Hybrid:**	202-24STX RIB
Soil type:	Plano silt loam	**Planting Date:**	5/6
% OM:	3.5	**Emergence Date:**	5/17
pH:	6.4	**Population:**	34,000 seeds/acre
Fertilization:	181 lbs N/acre	**Depth:**	2 in
Previous crop:	Soybean	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	giant ragweed (AMBTR)		

Herbicide Application Information:

Date:	5/6	5/29	6/6
Treatment:	PRE (A)	EPOST (B)	POST (C)
Air Temp (°F):	66	67	64
2" Soil Temp (°F):	-	68	63
Soil moisture [surface]:	moist	wet	wet
RH %:	52	69	74
Cloud cover %	10	40	0
Wind speed (mph)/direction	4-10/NE	4-10/NW	3-10/WNW
Rainfall (in) 1 wk after APP:	1.22"	2.8"	0.40"
GPA:	15	15	15
PSI:	38	39	38
Nozzle:	TTI 110015	TT 110015	AIXR110015
Nozzle spacing (in):	20	20	20
Boom Height (in):	20	24	24

Crop and weed information at application:

	Date:	5/6	5/29	6/6
corn	Height:	-	3-4"	5-7"
	Stage:	-	V2/V3	V5
giant ragweed	Height:	-	0.5-3"	0.5-6"
	Density:	-	44-184/m^2	96-176/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Storen	3.25 lb/gal	15, 27	2.4 qt/a	PRE	A
	AAtrex 4L	4 lb/gal	5	1.5 pt/a	PRE	A
3	TriVolt SC	3.65 lb/gal	2, 15, 27	20 fl oz/a	PRE	A
	AAtrex 4L	4 lb/gal	5	2 pt/a	PRE	A
4	Harness MAX	3.85 lb/gal	15, 27	64 fl oz/a	PRE	A
	AAtrex 4L	4 lb/gal	5	2 pt/a	PRE	A
5	Acuron GT	4.3 lb/gal	9, 15, 27	3.75 pt/a	EPOST	B
	AAtrex 4L	4 lb/gal	5	1 pt/a	EPOST	B
	NIS			0.25% v/v	EPOST	B
	AMSOL			2.5% v/v	EPOST	B
6	Priority MA	3.6 lb/gal	5, 15, 27	3.5 qt/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	EPOST	B
	NIS			0.25% v/v	EPOST	B
	AMSOL			2.5% v/v	EPOST	B
7	Priority S MA	3.6 lb/gal	5, 15, 27	3.5 qt/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	EPOST	B
	NIS			0.25% v/v	EPOST	B
	AMSOL			2.5% v/v	EPOST	B
8	Storen	3.25 lb/gal	15, 27	1.3 qt/a	PRE	A
	AAtrex 4L	4 lb/gal	5	0.75 pt/a	PRE	A
	Storen	3.25 lb/gal	15, 27	1.1 qt/a	POST	C
	AAtrex 4L	4 lb/gal	5	0.75 pt/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	C
	AMSOL			2.5% v/v	POST	C
9	Acuron	3.44 lb/gal	5, 15, 27	1.5 qt/a	PRE	A
	Halex GT	4.39 lb/gal	9, 15, 27	3.6 pt/a	POST	C
	AAtrex 4L	4 lb/gal	5	0.75 pt/a	POST	C
	NIS			0.25% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
10	Lumax EZ	3.67 lb/gal	5, 15, 27	1.5 qt/a	PRE	A
	Acuron GT	4.3 lb/gal	9, 15, 27	3.75 pt/a	POST	C
	AAtrex 4L	4 lb/gal	5	0.75 pt/a	POST	C
	NIS			0.25% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
11	Callisto	4 lb/gal	27	3 fl oz/a	PRE	A
	AAtrex 4L	4 lb/gal	5	0.75 pt/a	PRE	A
	Acuron GT	4.3 lb/gal	9, 15, 27	3.75 pt/a	POST	C
	AAtrex 4L	4 lb/gal	5	0.75 pt/a	POST	C
	NIS			0.25% v/v	POST	C
	AMSOL			2.5% v/v	POST	C

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
12	Harness	7 lb/gal	15	2 pt/a	PRE	A
	AAtrex 4L	4 lb/gal	5	2 pt/a	PRE	A
	Laudis	3.5 lb/gal	27	3 fl oz/a	POST	C
	DiFlexx	4 lbae/gal	4	8 fl oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	MSO			1% v/v	POST	C
	Class Act Ridion			1% v/v	POST	C
13	TripleFlex II	4.25 lb/gal	2, 4, 15	1.5 pt/a	PRE	A
	AAtrex 4L	4 lb/gal	5	2 pt/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	COC			1% v/v	POST	C
	Class Act Ridion			1% v/v	POST	C
14	Harness MAX	3.85 lb/gal	15, 27	55 fl oz/a	PRE	A
	AAtrex 4L	4 lb/gal	5	2 pt/a	PRE	A
	Laudis	3.5 lb/gal	27	3 fl oz/a	POST	C
	DiFlexx	4 lbae/gal	4	8 fl oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	MSO			1% v/v	POST	C
	Class Act Ridion			1% v/v	POST	C
15	TriVolt SC	3.65 lb/gal	2, 15, 27	12 fl oz/a	PRE	A
	AAtrex 4L	4 lb/gal	5	2 pt/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	Warrant	3 lb/gal	15	3 pt/a	POST	C
	MSO			1% v/v	POST	C
	Class Act Ridion			1% v/v	POST	C
16	Verdict	5.57 lb/gal	14, 15	16 fl oz/a	PRE	A
	Armezon PRO	5.35 lb/gal	15, 27	16 fl oz/a	POST	C
	AAtrex 4L	4 lb/gal	5	1 pt/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	15 fl oz/a	POST	C
	COC			1% v/v	POST	C
	AMS			8.5 lb/100 gal	POST	C
17	Verdict	5.57 lb/gal	14, 15	12 fl oz/a	PRE	A
	Callisto	4 lb/gal	27	3 fl oz/a	PRE	A
	AAtrex	4 lb/gal	5	1 pt/a	PRE	A
	Status	56% w/w	4, 19	5 oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	COC			1% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
18	Surtain	1.63 lb/gal	14, 15	14 fl oz/a	PRE	A
	Status	56% w/w	4, 19	5 oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	COC			1% v/v	POST	C
	AMSOL			2.5% v/v	POST	C

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
19	Surtain	1.63 lb/gal	14, 15	14 fl oz/a	PRE	A
	Liberty ULTRA*	1.76 lb/gal	10	24 fl oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	AAtrex 4L	4 lb/gal	5	1 pt/a	POST	C
	AMS			3 lb/a	POST	C
20	**Intrava DX****	3.3 lb/gal	5	21 fl oz/a	PRE	A
	Moccasin II Plus	7.64 lb/gal	15	1.33 pt/a	PRE	A
	InterMoc	3.57 lb/gal	10, 15	64 fl oz/a	POST	C
	AMS			3 lb/a	POST	C
21	**Intrava DX****	3.3 lb/gal	5	16 fl oz/a	PRE	A
	Motif	4 lb/gal	27	4.5 fl oz/a	PRE	A
	InterMoc	3.57 lb/gal	10, 15	64 fl oz/a	POST	C
	AMS			3 lb/a	POST	C
22	**Intrava DX****	3.3 lb/gal	5	16 fl oz/a	PRE	A
	Coyote	3.67 lb/gal	15, 27	2.4 qt/a	PRE	A
	InterMoc	3.57 lb/gal	10, 15	64 fl oz/a	POST	C
	AMS			3 lb/a	POST	C

Adjuvants: AMSOL = AMS (liquid); AMS = AMSOL/Dry spray grade ammonium sulfate; Class Act Ridion = non-AMS water conditioner + NIS; COC = CropOil; MSO = Upland MSO, NIS = Prefer 90

Liberty ULTRA** is a new formulation of glufosinate (Liberty) powered by Glu-L™ Technology offered by BASF. ***24 fl oz of Liberty ULTRA is equivalent to 32 fl oz of Liberty 280 SL.

****Intrava DX** is an experimental corn herbicide pre-mix developed by UPL NA, Inc., consisting of two active ingredients from group 5, amicarbazone and metribuzin. ***Intrava DX is not registered for use by the EPA at the time of publication.***

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to evaluate the weed control and crop safety of various corn herbicide programs containing atrazine. Giant ragweed was the predominant species in the trial area. Giant ragweed at this research location is a biotype with a prolonged emergence pattern as emergence typically starts in mid- to late-April and continues well into June.

None of the PRE herbicides caused visible corn injury symptoms 22 days after application (data not shown). Minor (<5%) leaf necrosis was observed 8 days after the EPOST application of Priority MA and Priority S MA (trts 6, 7). Corn leaning was observed 6 days after the POST application in all treatments containing DiFlexx. Average severity ranged from 13-15%. Corn quickly grew out of any visible injury symptoms and no leaning was evident by 15 DAT. Treatment 16 caused 11% and 5% leaf necrosis at 6 and 15 DAT, respectively.

The average control of giant ragweed was impacted by herbicide program at all rating timings (Table 2). Several of the PRE herbicides evaluated provided good control (>80%) up to 31 days after application. Most of the top performing PRE herbicide programs contained mesotrione (Callisto) and atrazine. All of the 1-pass (EPOST) and 2-pass (PRE followed by POST) programs provided excellent (>90%) giant ragweed control at corn harvest. Giant ragweed control was poor for all the 1-pass (PRE) programs at corn harvest. Averaged across all treatments, giant ragweed control at corn harvest of the 2-pass PRE *fb* POST programs = 98%, 1-pass EPOST = 97%, and 1-pass PRE only = 60%.

Corn yield was significantly impacted by herbicide program (Table 2). Averaged across all treatments, yield of the 2-pass PRE *fb* POST programs = 230 bu/acre, 1-pass EPOST = 227 bu/acre, and 1-pass PRE only = 154 bu/acre. The untreated check yield = 16 bu/acre.

Plot photos from throughout the growing season are available at **Corn Herbicide Showcase: 1 and 2-Pass Programs with Atrazine** published on **wiscweeds.info**.

Table 2. Giant ragweed control ratings and corn grain yield for trial #24-ROK-CN03 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Giant Ragweed (%) 5/28	6/6	6/21	10/18	Yield[b] bu acre^{-1}
1	Untreated Check	0	0	0	0	16 d
One-Pass – PRE (5/6)						
2	Storen (2.4 qt) + AAtrex (1.5 pt)	89	89	81	73	192 a
3	TriVolt (20 oz) + AAtrex (2 pt)	79	82	70	44	110 c
4	Harness MAX (64 oz) + AAtrex (2 pt)	90	88	75	62	161 b
One-Pass – EPOST (5/29)		**EPOST**				
5	Acuron GT (3.75 pt) + AAtrex (1 pt) + NIS (0.25% v/v) + AMS[c]	0	96	93	97	232 a
6	Priority MA (3.5 qt) + Roundup PM3 (30 oz) + NIS (0.25% v/v) + AMS[c]	0	98	93	98	228 a
7	Priority S MA (3.5 qt) + Roundup PM3 (30 oz) + NIS (0.25% v/v) + AMS[c]	0	97	94	97	222 a
Two-Pass – PRE (5/6) *fb* POST (6/6)				**POST**		
8	Storen (1.3 qt) + AAtrex (0.75 pt) ***fb*** Storen (1.1 qt) + AAtrex (0.75 pt) + Roundup PM3 (26 oz) + AMS[c]	76	74	96	100	237 a
9	Acuron (1.5 qt) ***fb*** Halex GT (3.6 pt) + AAtrex (0.75 pt) + NIS (0.25% v/v) + AMS[c]	78	77	95	99	236 a
10	Lumax EZ (1.5 qt) ***fb*** Acuron GT (3.75 pt) + AAtrex (0.75 pt) + NIS (0.25% v/v) + AMS[c]	64	66	96	100	233 a
11	Callisto (3 oz) + AAtrex (0.75 pt) ***fb*** Acuron GT (3.75 pt) + AAtrex (0.75 pt) + NIS (0.25% v/v) + AMS[c]	70	68	96	100	229 a
12	Harness (2 pt) + AAtrex (2 pt) ***fb*** Laudis (3 oz) + DiFlexx (8 oz) + RU PM3 (30 oz) + MSO (1%) + Class Act Ridion (1%)	82	83	97	99	230 a
13	TripleFlex II (1.5 pt) + AAtrex (2 pt) ***fb*** DiFlexx (8 oz) + Roundup PM3 (30 oz) + COC (1% v/v) + Class Act Ridion (1% v/v)	68	60	96	96	227 a
14	Harness MAX (55 oz) + AAtrex (2 pt) ***fb*** Laudis (3 oz) + DiFlexx (8 oz) + RU PM3 (30 oz) + MSO (1%) + Class Act Ridion (1%)	93	94	98	99	237 a
15	TriVolt (12 oz) + AAtrex (2 pt) ***fb*** DiFlexx (8 oz) + RU PM3 (30 oz) + Warrant (3 pt) + COC (1%) + Class Act Ridion (1%)	74	71	97	98	226 a
16	Verdict (16 oz) ***fb*** Armezon PRO (16 oz) + AAtrex (1 pt) + Roundup PM3 (15 oz) + COC (1% v/v) + AMS[d]	94	83	98	98	223 a
17	Verdict (12 oz) + Callisto (3 oz) + AAtrex (1 pt) ***fb*** Status (5 oz) + Roundup PM3 (30 oz) + COC (1% v/v) + AMS[c]	94	90	96	97	240 a
18	Surtain (14 oz) ***fb*** Status (5 oz) + Roundup PM3 (30 oz) + COC (1% v/v) + AMS[c]	45	30	98	96	231 a
19	Surtain (14 oz) ***fb*** Liberty ULTRA (24 oz) + Roundup PM3 (30 oz) + AAtrex (1 pt) + AMS (3 lb)	38	20	97	97	232 a
20	Intrava DX (21 fl oz) + Moccasin II Plus (1.33 pt) ***fb*** InterMoc (64 fl oz) + AMS (3 lb)	38	45	90	93	218 a
21	Intrava DX (16 fl oz) + Motif (4.5 fl oz) ***fb*** InterMoc (64 fl oz) + AMS (3 lb)	83	83	93	95	219 a
22	Intrava DX (16 fl oz) + Coyote (2.4 qt) ***fb*** InterMoc (64 fl oz) + AMS (3 lb)	88	88	94	98	232 a
	LSD (α=0.10)	**12**	**10**	**4**	**8**	**27**
	p value	**<.001**	**<.001**	**<.001**	**<.001**	**<0.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

[c]Liquid AMS (AMSOL) applied at 2.5% v/v

[d]Dry AMS (AMSOL/Dry) applied at 8.5 lb/100 gal

Project Goal: Evaluate multiple one- and two-pass corn herbicide programs without atrazine for weed control and crop safety.

Site Description:

Location:	Arlington, WI	**Crop:**	Corn
Field #:	360	**Hybrid:**	NK9777-DV-EZ1
Soil type:	Plano silt loam	**Planting Date:**	5/1
% OM:	3.6	**Emergence Date:**	5/14
pH:	6.8	**Population:**	35,000 seeds/acre
Fertilization:	140 lbs N/acre	**Depth:**	2.25 in
Previous crop:	Soybean	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	common ragweed (AMBEL), giant foxtail (SETFA)		

Herbicide Application Information:

Date:	5/1	5/23	6/10
Treatment:	PRE (A)	EPOST (B)	POST (C)
Air Temp (°F):	70	77	66
2" Soil Temp (°F):	63	-	63
Soil moisture [surface]:	moist	moist	dry
RH %:	34	60	55
Cloud cover %	75	0	0
Wind speed (mph)/direction	5-12/NW	3-8/W	3-8/NW
Rainfall (in) 1 wk after APP:	1.05"	3.17"	1.44"
GPA:	15	15	15
PSI:	38	38	38
Nozzle:	TTI 110015	TTI 110015	TTI 110015
Nozzle spacing (in):	20	20	20
Boom Height (in):	20	24	30

Crop and weed information at application:

	Date:	5/1	5/23	6/10
Corn	Height:	-	2-3"	10"
	Stage:	-	V2	V5
common ragweed	Height:	-	0.5-2" Avg=1"	0.5-5" Avg=2"
	Density:	-	1-64/m^2	4-62/m^2
giant foxtail	Height:	-	0.5-2" Avg=1"	0.5-4" Avg=1"
	Density:	-	>200/m^2	2-68/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Storen	3.25 lb/gal	15, 27	2.4 qt/a	PRE	A
	Princep 4L	4 lb/gal	5	1 qt/a	PRE	A
3	TriVolt SC	3.65 lb/gal	2, 15, 27	20 fl oz/a	PRE	A
	Princep 4L	4 lb/gal	5	1 qt/a	PRE	A
4	Priority Meso	3.59 lb/gal	15, 27	2.4 qt/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	EPOST	B
	NIS			0.25% v/v	EPOST	B
	AMSOL			2.5% v/v	EPOST	B
5	Priority S Meso	3.59 lb/gal	15, 27	2.4 qt/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	EPOST	B
	NIS			0.25% v/v	EPOST	B
	AMSOL			2.5% v/v	EPOST	B
6	Harness MAX	3.85 lb/gal	15, 27	55 fl oz/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	EPOST	B
	NIS			0.25% v/v	EPOST	B
	AMSOL			2.5% v/v	EPOST	B
7	Maverick	2.04 lb/gal	4, 15, 27	18 fl oz/a	PRE	A
	Princep 4L	4 lb/gal	5	0.75 qt/a	PRE	A
	Maverick	2.04 lb/gal	4, 15, 27	14 fl oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	24 fl oz/a	POST	C
	NIS			0.25% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
8	Maverick	2.04 lb/gal	4, 15, 27	24 fl oz/a	PRE	A
	Roundup PowerMAX3	4.8 lbae/gal	9	24 fl oz/a	POST	C
	Status	56% w/w	2, 4	5 oz/a	POST	C
	NIS			0.25% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
9	Maverick	2.04 lb/gal	4, 15, 27	18 fl oz/a	PRE	A
	Maverick	2.04 lb/gal	4, 15, 27	14 fl oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	24 fl oz/a	POST	C
	NIS			0.25% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
10	Storen	3.25 lb/gal	15, 27	1.2 qt/a	PRE	A
	Storen	3.25 lb/gal	15, 27	1.2 qt/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	24 fl oz/a	POST	C
	AMSOL			2.5% v/v	POST	C
11	Callisto	4 lb/gal	27	3 fl oz/a	PRE	A
	Princep 4L	4 lb/gal	5	1 qt/a	PRE	A
	Acuron GT	4.3 lb/gal	9, 15, 27	3.75 pt/a	POST	C
	NIS			0.25% v/v	POST	C
	AMSOL			2.5% v/v	POST	C

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
12	TriVolt SC	3.65 lb/gal	2, 15, 27	12 fl oz/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	Warrant	3 lb/gal	15	3 pt/a	POST	C
	COC			1% v/v	POST	C
	Class Act Ridion			1% v/v	POST	C
13	Harness	7 lb/gal	15	2 pt/a	PRE	A
	Laudis	3.5 lb/gal	27	3 fl oz/a	POST	C
	DiFlexx	4 lbae/gal	4	8 fl oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	MSO			1% v/v	POST	C
	Class Act Ridion			1% v/v	POST	C
14	Verdict	5.57 lb/gal	14, 15	16 fl oz/a	PRE	A
	Status	56% w/w	2, 4	5 oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	C
	COC			1% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
15	Surtain	1.63 lb/gal	14, 15	14 fl oz/a	PRE	A
	Status	56% w/w	2, 4	5 oz/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	C
	COC			1% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
16	**Intrava DX***	3.3 lb/gal	5	21 fl oz/a	PRE	A
	Moccasin II Plus	7.64 lb/gal	15	1.33 pt/a	PRE	A
	Intermoc	3.57 lb/gal	10, 15	64 fl oz/a	POST	C
	AMS			3 lb/a	POST	C

Adjuvants: AMSOL = AMS (liquid); AMS = AMSOL/Dry spray grade ammonium sulfate; Class Act Ridion = non-AMS water conditioner + NIS; COC = CropOil; MSO = Upland MSO, NIS = Prefer 90

Intrava DX** is an experimental corn herbicide pre-mix developed by UPL NA, Inc., consisting of two active ingredients from group 5, amicarbazone and metribuzin. ***Intrava DX is not registered for use by the EPA at the time of publication.

Trial Summary:

The trial was established at the Arlington Ag Research Station near Arlington, WI to evaluate multiple one- and two-pass corn herbicide programs from several chemical manufacturer portfolios for weed control and crop safety. Atrazine was not included in any treatment since this trial was conducted in an atrazine prohibition area at the Arlington Ag Research Station. The main goal of this study was to evaluate corn herbicide performance on weed species other than giant ragweed and waterhemp. The trial was located in a field with a heavy population density of giant foxtail and moderate population density of common ragweed,

None of the PRE herbicide programs we evaluated caused visible corn injury symptoms 21 days after application (data not shown). Minor (<5%) leaf necrosis was observed 8 days after the EPOST applications of Priority Meso and Priority S Meso and Harness MAX (trts 4, 5, 6). Priority S Meso caused slightly greater leaf necrosis (4.3%) than either Priority Meso (2.6%) or Harness Max (2.3%)

Most of the herbicide programs provided excellent end of season control of common ragweed and giant foxtail; however, early season residual control did differ amongst the PRE herbicides we evaluated (Table 3). All of the one-pass EPOST herbicide programs failed to adequately control giant foxtail later in the growing season (Table 3).

Corn grain yield did not differ amongst treatments (Tables 3). Averaged across all treatments, yield of the 2-pass PRE *fb* POST programs = 222 bu acre^{-1}, 1-pass EPOST = 202 bu acre^{-1}, and 1-pass PRE only = 213 bu acre^{-1}. The untreated check yield = 41 bu acre^{-1}.

Plot photos from throughout the growing season are available at **Corn Herbicide Showcase: 1 and 2-Pass Programs without Atrazine** published on **wiscweeds.info**.

Table 3. Weed control ratings and corn yield for trial #24-ARL-CN04 at Arlington, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Common Ragweed (%)				Giant Foxtail (%)				Yield[b] bu acre^{-1}
		5/22	6/10	6/26	10/8	5/22	6/10	6/26	10/8	
1	Untreated Check	0	0	0	0	0	0	0	0	41 b
One-Pass – PRE (5/1)										
2	Storen (2.4 qt) + Princep 4L (1 qt)	100	99	100	100	99	100	97	96	212 a
3	TriVolt (20 oz) + Princep 4L (1 qt)	98	99	98	98	98	100	92	93	213 a
One-Pass – EPOST (5/23)		EPOST				EPOST				
4	Priority Meso (2.4 qt) + Roundup PM3 (30 oz) + NIS (0.25%) + AMSOL (2.5%)	0	97	87	87	0	99	89	82	190 a
5	Priority S Meso (2.4 qt) + Roundup PM3 (30 oz) + NIS (0.25%) + AMSOL (2.5%)	0	97	82	82	0	99	89	84	208 a
6	Harness MAX (55 oz) + Roundup PM3 (30 oz) + NIS (0.25%) + AMSOL (2.5%)	0	98	91	91	0	100	86	76	205 a
Two-Pass – PRE (5/1) *fb* POST (6/10)		POST				POST				
7	Maverick (18 oz) + Princep 4L (0.75 qt) ***fb*** Maverick (14 oz) + Roundup PM3 (24 oz) + NIS (0.25%) + AMSOL (2.5%)	100	98	100	100	88	95	99	99	213 a
8	Maverick (24 oz) ***fb*** Roundup PM3 (24 oz) + Status (5 oz) + NIS (0.25%) + AMSOL (2.5%)	98	94	100	100	88	94	94	95	227 a
9	Maverick (18 oz) ***fb*** Maverick (14 oz) + Roundup PM3 (24 oz) + NIS (0.25%) + AMSOL (2.5%)	94	89	100	100	85	89	97	96	223 a
10	Storen (1.2 qt) ***fb*** Storen (1.2 qt) + Roundup PM3 (24 oz) + AMSOL (2.5%)	95	95	100	100	96	97	99	99	217 a
11	Callisto (3 oz) + Princep 4L (1 qt) ***fb*** Acuron GT (3.75 pt) + NIS (0.25%) + AMSOL (2.5%)	98	96	100	100	60	65	90	98	231 a
12	TriVolt (12 oz) ***fb*** DiFlexx (8 oz) + Roundup PM3 (30 oz) + Warrant (3 pt) + COC (1%) + Class Act Ridion (1%)	90	97	99	100	97	98	98	98	216 a
13	Harness (2 pt) ***fb*** Laudis (3 oz) + DiFlexx (8 oz) + Roundup PM3 (30 oz) + MSO (1%) + Class Act Ridion (1%)	82	67	100	100	99	97	91	85	222 a
14	Verdict (16 fl oz) ***fb*** Roundup PM3 (30 fl oz) + Status (5 oz) + Zidua SC (2.5 fl oz) + COC (1%) + AMSOL (2.5%)	99	88	100	100	98	93	97	99	221 a
15	Surtain (14 fl oz) ***fb*** Roundup PM3 (30 fl oz) + Status (5 oz) + Zidua SC (2.5 fl oz) + COC (1%) + AMSOL (2.5%)	95	93	100	100	90	94	99	99	216 a
16	Intrava DX (21 fl oz) + Moccasin II Plus (1.33 pt) ***fb*** Intermoc (64 fl oz) + AMS (3 lb)	92	92	99	100	98	99	99	99	234 a
	LSD (α=0.10)	**4**	**4**	**1**	**3**	**4**	**3**	**3**	**3**	**27**
	p value	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<0.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

Project Goal: Evaluate weed control and crop safety of PRE and POST applications of ***Surtain**.

***Surtain** is a new corn herbicide pre-mix, developed by BASF, containing encapsulated saflufenacil (Sharpen) and pyroxasulfone (Zidua).

Site Description:

Location:	Janesville, WI	**Crop:**	Corn
Field #:	2	**Hybrid:**	202-24STX RIB
Soil type:	Plano silt loam	**Planting Date:**	5/6
% OM:	3.5	**Emergence Date:**	5/17
pH:	6.4	**Population:**	34,000 seeds/acre
Fertilization:	181 lbs N/acre	**Depth:**	2 in
Previous crop:	Soybean	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	giant ragweed (AMBTR)		

Herbicide Application Information:

Date:	5/6	5/29	6/6
Treatment:	PRE (A)	EPOST (B)	POST (C)
Air Temp (°F):	66	67	64
2" Soil Temp (°F):	-	68	63
Soil moisture [surface]:	moist	wet	moist
RH %:	52	69	74
Cloud cover %	10	40	0
Wind speed (mph)/direction	4-10/NE	4-10/NW	3-12/WNW
Rainfall (in) 1 wk after APP:	1.22"	2.8"	0.4"
GPA:	15	15	15
PSI:	38	36	38
Nozzle:	TTI 110015	AIXR 110015	AIXR 110015
Nozzle spacing (in):	20	20	20
Boom Height (in):	20	23	23

Crop and weed information at application:

	Date:	5/6	5/29	6/6
Corn	Height:	-	3-4"	4-6"
	Stage:	-	V3	V5
giant ragweed	Height:	-	0.5-3" Avg=2"	1-6" Avg=4"
	Density:	-	68-180/m^2	20-52/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Acuron	3.44 lb/gal	5, 15, 27	1.5 qt/a	PRE	A
3	Resicore	3.29 lb/gal	4, 15, 27	1.25 qt/a	PRE	A
4	Trivolt SC	3.65 lb/gal	2, 15, 27	12 fl oz/a	PRE	A
5	Storen	3.25 lb/gal	15, 27	1.2 qt/a	PRE	A
6	Surtain	1.62 lb/gal	14, 15	11 fl oz/a	PRE	A
7	Surtain	1.62 lb/gal	14, 15	11 fl oz/a	PRE	A
	AAtrex 4L	4 lb/gal	5	2 pt/a	PRE	A
8	Surtain	1.62 lb/gal	14, 15	14 fl oz/a	PRE	A
9	Surtain	1.62 lb/gal	14, 15	14 fl oz/a	PRE	A
	AAtrex 4L	4 lb/gal	5	2 pt/a	PRE	A
10	Surtain	1.62 lb/gal	14, 15	17 fl oz/a	PRE	A
11	Surtain	1.62 lb/gal	14, 15	14 fl oz/a	EPOST	B
	Clarity	4 lbae/gal	4	8 fl oz/a	EPOST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	30 fl oz/a	EPOST	B
	NIS			0.25% v/v	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B
12	Surtain	1.62 lb/gal	14, 15	14 fl oz/a	EPOST	B
	Armezon	2.8 lb/gal	27	0.75 fl oz/a	EPOST	B
	AAtrex 4L	4 lb/gal	5	2 pt/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	EPOST	B
	COC			1% v/v	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B
13	Surtain	1.62 lb/gal	14, 15	14 fl oz/a	PRE	A
	Armezon PRO	5.35 lb/gal	15, 27	16 fl oz/a	POST	C
	AAtrex 4L	4 lb/gal	5	1 pt/a	POST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	COC			1% v/v	POST	C
	AMS			8.5 lb/100 gal	POST	C
14	Surtain	1.62 lb/gal	14, 15	14 fl oz/a	PRE	A
	Status	56% w/w	4	5 oz/a	POST	C
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	NIS			0.25% v/v	POST	C
	AMS			8.5 lb/100 gal	POST	C

Adjuvants: AMS = AMSOL/Dry spray grade ammonium sulfate; COC = CropOil; NIS = Induce

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to evaluate weed control and crop safety of PRE and POST applications of **Surtain. Surtain** is a new corn herbicide pre-mix, developed by BASF, containing encapsulated saflufenacil (Sharpen) and pyroxasulfone (Zidua). The encapsulation of saflufenacil enables the safe application to emerged corn, thus increasing the application flexibility relative to Verdict.

There was no significant injury from any of the PRE herbicide programs evaluated (Table 4). EPOST and POST applications of tank mixes containing Surtain caused corn leaf necrosis (burn) 1-2 weeks after application (Table 4). The addition of topramezone (Armezon PRO, Armezon) and atrazine increased the severity of leaf burn; however, injury did not persist as corn continued to grow.

Giant ragweed was the predominant species in the trial area. Giant ragweed at this research location is a biotype with a prolonged emergence pattern as emergence typically starts in mid- to late-April and continues well into June. PRE applications of Surtain provided some suppression of giant ragweed up to 4 weeks (Table 4). Products containing mesotrione (Acuron, Storen, Resicore) provided greater residual control. Residual control decreased over time and by 56 days after application control was <50% for all PRE only treatments. The EPOST and PRE fb POST herbicide programs provided good (>80%) late season control (Table 4). Of note, Surtain does not have any POST or burndown activity. POST applications of Surtain will need to be paired with effective tank-mix partners, like glyphosate, dicamba, atrazine, and/or a group 27 herbicide to control emerged weeds.

Plot photos from throughout the growing season are available at **Weed Control and Crop Safety with Surtain** published on **wiscweeds.info**.

A similar trial was conducted in 2023. See trial #23-ROK-CN07 in the **2023 Wisconsin Weed Science Research Report**.

Table 4. Giant ragweed control ratings and corn injury for trial #24-ROK-CN05 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Corn Injury[b] (%)				Giant Ragweed (%)				
		5/28	6/4	6/11	6/17	5/28	6/4	6/11	6/17	7/1
1	Check Untreated	0	0	0	0	0	0	0	0	0
One-Pass – PRE (5/6)										
2	Acuron (1.5 qt)	0	0	0	0	86	82	78	70	45
3	Resicore (1.25 qt)	0	0	0	0	91	84	82	72	49
4	Trivolt SC (12 fl oz)	0	0	0	0	64	70	61	33	8
5	Storen (1.2 qt)	0	0	0	0	86	84	78	69	54
6	Surtain (11 fl oz)	0	0	0	0	56	57	42	30	11
7	Surtain (11 fl oz) + AAtrex (2 pt)	0	0	0	0	69	67	50	29	8
8	Surtain (14 fl oz)	0	0	0	0	70	63	46	34	10
9	Surtain (14 fl oz) + AAtrex (2 pt)	0	0	0	0	64	66	51	33	26
10	Surtain (17 fl oz)	0	0	0	0	62	68	57	46	29
One-Pass – EPOST (5/29)		**EPOST**				**EPOST**				
11	Surtain (14 fl oz) + Clarity (8 fl oz) + Roundup PM3 (30 fl oz) + NIS (0.25%) + AMS[c]	0	3.5	2.5	0	0	95	97	94	88
12	Surtain (14 oz) + Armezon (0.75 oz) + AAtrex (2 pt) + RU PM3 (30 oz) + COC (1%) + AMS[c]	0	8.8	5.5	0	0	98	99	94	85
Two-Pass – PRE (5/6) *fb* POST (6/6)		**POST**				**POST**				
13	Surtain (14 fl oz) ***fb*** Armezon PRO (16 fl oz) + AAtrex (1 pt) + Roundup PM3 (30 fl oz) + COC (1%) + AMS[c]	0	0	11.0	8.5	69	63	80	98	97
14	Surtain (14 fl oz) ***fb*** Status (5 oz) + Zidua SC (2.5 fl oz) + Roundup PM3 (30 fl oz) + NIS (0.25%) + AMS[c]	0	0	4.3	0	71	73	93	100	99
	LSD (α=0.10)	**ns**	**0.4**	**0.6**	**1.1**	**14**	**11**	**17**	**21**	**19**
	p value	**-**	**<.001**	**<.001**	**<.001**	**0.005**	**<.001**	**<.001**	**<.001**	**<.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Corn injury = % leaf necrosis (burn)

[c]Dry AMS applied at 8.5 lb/100 gal

Project Goal: Evaluate early-post applications of tank mixes containing Status for giant ragweed control.

Site Description:

Location:	Janesville, WI	**Crop:**	Corn
Field #:	1	**Hybrid:**	202-24STX RIB
Soil type:	Plano silt loam	**Planting Date:**	5/6
% OM:	3.5	**Emergence Date:**	5/17
pH:	6.4	**Population:**	34,000 seeds/acre
Fertilization:	181 lbs N/acre	**Depth:**	2 in
Previous crop:	Soybean	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	giant ragweed (AMBTR)		

Herbicide Application Information:

Date:	5/10	5/29
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	58	67
2" Soil Temp (°F):	-	68
Soil moisture [surface]:	wet	wet
RH %:	70	69
Cloud cover %	100	40
Wind speed (mph)/direction	2-6/SSW	4-10/NW
Rainfall (in) 1 wk after APP:	0.09"	2.80"
Rainfall (in) 2 wk after APP:	1.91"	3.03"
GPA:	13.6	15
PSI:	-	38
Nozzle:	TTI 11002	AIXR110015
Nozzle spacing (in):	20	
Boom Height (in):	20	

Crop and weed information at application:

	Date:	5/10	5/29
corn	Height:	-	3-4"
	Stage:	-	V2/V3
giant ragweed	Height:	-	0.5-3" Avg=2"
	Density:	-	8-44/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Check					
	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
2	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Status	56% w/w	2, 4	5 oz/a	EPOST	B
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	EPOST	B
	COC			1% v/v	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B
3	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Status	56% w/w	2, 4	5 oz/a	EPOST	B
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	EPOST	B
	Argos	4 lb/gal	27	3 fl oz/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	EPOST	B
	COC			1% v/v	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B
4	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Halex GT	4.39 lb/gal	9, 15, 27	3.75 pt/a	EPOST	B
	NIS			0.25% v/v	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B
5	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Acuron GT	4.3 lb/gal	9, 15, 27	3.75 pt/a	EPOST	B
	COC			1% v/v	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B
6	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Resicore	3.29 lb/gal	4, 15, 27	1.6 qt/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	EPOST	B
	COC			1% v/v	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B
7	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Halex GT	4.39 lb/gal	9, 15, 27	3.75 pt/a	EPOST	B
	Status	56% w/w	2, 4	5 oz/a	EPOST	B
	NIS			0.25% v/v	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B
8	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Acuron GT	4.3 lb/gal	9, 15, 27	3.75 pt/a	EPOST	B
	Status	56% w/w	2, 4	5 oz/a	EPOST	B
	COC			1% v/v	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
9	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Argos	4 lb/gal	27	3 fl oz/a	EPOST	B
	Sequence	5.25 lb/gal	9, 15	1 qt/a	EPOST	B
	Status	56% w/w	2, 4	5 oz/a	EPOST	B
	COC			1% v/v	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B
10	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Status	56% w/w	2, 4	5 oz/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	EPOST	B
	COC			1% v/v	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B

Adjuvants: AMS = AMSOL/Dry spray grade ammonium sulfate; COC = CropOil; NIS = Induce

*Verdict (5 fl oz/a) was applied over the entire trial area to suppress giant ragweed but allow enough escapes to evaluate postemergence control.

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to evaluate early-post applications of tank mixes containing Status for giant ragweed control. Giant ragweed was the predominant species in the trial area. Giant ragweed at this research location is a biotype with a prolonged emergence pattern as emergence typically starts in mid- to late-April and continues well into June. Verdict (5 fl oz/a) was applied over the entire trial area to suppress giant ragweed but allow enough escapes to evaluate postemergence control.

Leaf necrosis (burn) was observed at 8 and 12 days after the EPOST herbicide application in some treatments (Table 5). Treatments with Acuron GT and Resicore caused the greatest level of necrosis. Very minor corn leaning was observed 12 DAT in all treatments containg Status.

Most of the EPOST herbicide programs we evaluated provided excellent (>90%) burndown control of giant ragweed (Table 5). Treatments without mesotrione (trts 2, 10) had reduced levels of control at 61 DAT. This is likely due to the lack of an effective residual herbicide in these tank mixes as escapes were giant ragweed plants that emerged after the EPOST application. While Status did not appear to significantly increase giant ragweed control in this trial, it does provide another effective mode of action to reduce the selection pressure for resistance to mesotrione and glyphosate.

Plot photos from throughout the growing season are available at **Corn Herbicide Tank Mixtures with Status** published on **wiscweeds.info**.

Table 5. Giant ragweed control and corn injury ratings for trial #24-ROK-CN06 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Injury[b] (%)		Giant Ragweed (%)			
		8 DAT	12 DAT	12 DAT	23 DAT	35 DAT	61 DAT
1	Treated Check[c]	0	0	0	0	0	0
Two-Pass – PRE[c] (5/10) *fb* EPOST (5/29)							
2	Status (5 oz) + Zidua SC (2.5 fl oz) + Roundup PM3 (30 oz) + COC (1%) + AMS[d]	1.8	2.0	98	91	86	82
3	Status (5 oz) + Zidua SC (2.5 fl oz) + Argos (3 oz) + RU PM3 (30 oz) + COC (1%) + AMS[d]	0.8	1.8	99	94	91	88
4	Halex GT (3.75 pt) + NIS (0.25%) + AMS[d]	1.8	0.0	98	96	91	90
5	Acuron GT (3.75 pt) + COC (1%) + AMS[d]	6.8	3.5	99	99	97	97
6	Resicore (1.6 qt) + Roundup PM3 (30 oz) + COC (1%) + AMS[d]	8.5	4.5	99	99	97	96
7	Halex GT (3.75 pt) + Status (5 oz) + NIS (0.25%) + AMS[d]	1.3	0.8	99	98	96	91
8	Acuron GT (3.75 pt) + Status (5 oz) + COC (1%) + AMS[d]	3.8	2.8	100	99	98	97
9	Argos (3 oz) + Sequence (1 qt) + Status (5 oz) + COC (1%) + AMS[d]	2.5	1.3	99	98	95	90
10	Status (5 oz) + Roundup PM3 (30 oz) + COC (1%) + AMS[d]	2.3	1.8	98	86	80	81
	LSD (α=0.10)	**1.5**	**1.1**	**ns**	**3**	**4**	**5**
	p value	**<.001**	**<.001**	**0.466**	**<.001**	**<.001**	**<.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Corn injury: 8 DAT = % leaf necrosis (burn); 12 DAT = % leaf necrosis + minor leaning in Status treatments

[c]Verdict (5 fl oz/a) was applied PRE over the entire trial area including the treated check (treatment #1)

[d]Dry AMS applied at 8.5 lb/100 gal

Project Goal: Evaluate the residual weed control and crop safety of ***Storen** compared to other competitor premium corn herbicide offerings.

***Storen** is new corn herbicide pre-mix, developed by Syngenta, containing mesotrione (Callisto), *S*-metolachlor (Dual), pyroxasulfone (Zidua), and bicyclopyrone plus the crop safener benoxacor.

Site Description:

Location:	Arlington, WI	**Crop:**	Corn
Field #:	360	**Hybrid:**	NK9777-DV-EZ1
Soil type:	Plano silt loam	**Planting Date:**	5/1
% OM:	3.6	**Emergence Date:**	5/14
pH:	6.8	**Population:**	35,000 seeds/acre
Fertilization:	140 lbs N/acre	**Depth:**	2.25 in
Previous crop:	Soybean	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	commong ragweed (AMBEL); giant foxtail (SETFA)		

Herbicide Application Information:

Date:	5/1	5/31
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	70	80
2" Soil Temp (°F):	63	68
Soil moisture [surface]:	moist	dry
RH %:	34	47
Cloud cover %	75	15
Wind speed (mph)/direction	5-12/NW	3-9/S
Rainfall (in) 1 wk after APP:	1.05"	2.03"
GPA:	15	15
PSI:	38	38
Nozzle:	TTI 110015	AIXR110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	23

Crop and weed information at application:

	Date:	5/1	5/31
corn	Height:	-	3-4"
	Stage:	-	V3
common ragweed	Height:	-	0.25-3" Avg=0.25"
	Density:	-	0-44/m^2
giant foxtail	Height:	-	0.25-3" Avg=0.5"
	Density:	-	8-148/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Storen	3.25 lb/gal	15, 27	2.1 qt/a	PRE	A
3	Storen	3.25 lb/gal	15, 27	2.4 qt/a	PRE	A
4	Acuron Flexi	3.26 lb/gal	15, 27	2.25 qt/a	PRE	A
5	Resicore	3.29 lb/gal	4, 15, 27	2.5 qt/a	PRE	A
6	Resicore	3.29 lb/gal	4, 15, 27	3 qt/a	PRE	A
7	Trivolt SC	3.65 lb/gal	2, 15, 27	17.5 fl oz/a	PRE	A
8	Trivolt SC	3.65 lb/gal	2, 15, 27	20 fl oz/a	PRE	A
9	Maverick	2.04 lb/gal	4, 15, 27	24 fl oz/a	PRE	A
10	Maverick	2.04 lb/gal	4, 15, 27	32 fl oz/a	PRE	A
11	Storen	3.25 lb/gal	15, 27	1.05 qt/a	PRE	A
	Storen	3.25 lb/gal	15, 27	1.05 qt/a	POST	B
	Clarity	4 lbae/gal	4	8 fl oz/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	24 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
12	Storen	3.25 lb/gal	15, 27	1.2 qt/a	PRE	A
	Storen	3.25 lb/gal	15, 27	1.2 qt/a	POST	B
	Clarity	4 lbae/gal	4	8 fl oz/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	24 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
13	Storen	3.25 lb/gal	15, 27	1.7 qt/a	PRE	A
	Halex GT	4.39 lb/gal	9, 15, 27	3.6 pt/a	POST	B
	Clarity	4 lbae/gal	4	8 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMSOL			2.5% v/v	POST	B
14	Storen	3.25 lb/gal	15, 27	2.1 qt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	24 fl oz/a	POST	B
	Clarity	4 lbae/gal	4	8 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
15	Storen	3.25 lb/gal	15, 27	2.4 qt/a	PRE	A
	Princep 4L	4 lb/gal	5	1 qt/a	PRE	A

Adjuvants: AMSOL = AMS (liquid); NIS = Prefer 90

Trial Summary:

The trial was established at the Arlington Ag Research Station near Arlington, WI to evaluate the residual weed control and crop safety of Storen compared to other competitor premium corn herbicide offerings. Split (PRE fb POST) applications of Storen were also evaluated. The trial was located in a field with a heavy population density of giant foxtail and moderate population density of common ragweed.

None of the PRE herbicides we evaluated caused visible corn injury symptoms at any point in the growing season (data not shown). All of the POST herbicide treatments caused minor (<3%) corn leaf necrosis at 7 DAT (data not shown). Only treatment 14 exhbited leaf necrosis by 14 DAT at 8%.

Both full and reduced rates of Storen provided good (>90%) residual control of both common ragweed and giant foxtail 29 days after PRE application (Table 6). Furthermore, full rates of Storen had good control of both species up to 60 days after application. Adding 1 qt/a of Princep 4L to 2.4 qt/a of Storen improved control of common ragweed later in the season. Split-applications of Storen or Storen followed by Halex GT provided near complete control of both common ragweed and giant foxtail.

Corn yield was statistically similar amongst most of the herbicide programs (Table 6). Reduced corn yield was observed in the 1-pass POST program (trt 14) and the Maverick treatments. This suggests that weed competion both early in the season (POST only) and later in the season (PRE only) can result in corn yield loss.

Plot photos from throughout the growing season are available at **Storen Weed Control and Crop Safety** published on **wiscweeds.info**.

Table 6. Weed control ratings and corn yield for trial #24-ARL-CN09 at Arlington, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Common Ragweed (%)				Giant Foxtail (%)				Yield[b] bu acre^{-1}
		5/30	6/14	6/28	7/29	5/30	6/14	6/28	7/29	
1	Untreated Check	0	0	0	0	0	0	0	0	71 -
One-Pass – PRE (5/1)										
2	Storen (2.1 qt)	96	95	90	90	98	98	91	88	213 abc
3	Storen (2.4 qt)	96	96	91	92	99	98	92	89	214 abc
4	Acuron Flexi (2.25 qt)	95	88	82	85	98	96	83	78	210 abc
5	Resicore (2.5 qt)	97	90	80	83	98	94	78	71	205 bc
6	Resicore (3 qt)	98	93	86	83	99	96	82	73	213 abc
7	Trivolt SC (17.5 fl oz)	96	97	89	89	99	98	90	82	223 ab
8	Trivolt SC (20 fl oz)	97	98	93	93	99	99	91	86	217 abc
9	Maverick (24 fl oz)	98	87	79	78	83	85	67	56	195 c
10	Maverick (32 fl oz)	98	89	78	79	90	91	76	70	201 bc
15	Storen (2.4 qt) + Princep 4L (1 qt)	98	99	99	99	99	99	96	94	232 a
One-Pass – POST (5/31)		**POST**				**POST**				
14	Storen (2.1 qt) + Clarity (8 oz) + Roundup PM3 (24 oz) + AMS[c]	0	100	100	100	0	98	97	92	195 c
Two-Pass – PRE (5/1) *fb* POST (5/31)		**POST**				**POST**				
11	Storen (1.05 qt) ***fb*** Storen (1.05 qt) +Clarity (8 oz) +Roundup PM3 (24 fl oz) +AMS[c]	91	100	100	100	90	100	99	99	221 ab
12	Storen (1.2 qt) ***fb*** Storen (1.2 qt) + Clarity (8 oz) Roundup PM3 (24 fl oz) + AMS[c]	90	100	98	100	94	100	100	99	214 abc
13	Storen (1.7 qt) ***fb*** Halex GT (3.6 pt) + Clarity (8 oz) + NIS (0.25%) + AMS[c]	94	100	100	100	97	100	99	99	213 abc
	LSD (α=0.10)	**3**	**3**	**5**	**6**	**2**	**2**	**5**	**7**	**13**
	p value	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<0.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different. The untreated check was excluded from the analysis.

[c]AMS liquid applied at 2.5% v/v

Project Goal: Compare two-pass herbicide applications of Maverick to other competitor corn herbicide offerings.

Site Description:

Location:	Janesville, WI	**Crop:**	Corn
Field #:	9	**Hybrid:**	NK9777-DV-EZ1
Soil type:	Plano silt loam	**Planting Date:**	5/13
% OM:	3.5	**Emergence Date:**	5/20
pH:	6.9	**Population:**	34,000 seeds/acre
Fertilization:	181 lbs N/acre	**Depth:**	2 in
Previous crop:	Soybean	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 25 ft
Weed species:	giant ragweed (AMBTR); gly-R waterhemp (AMATA); giant foxtail (SETFA)		

Herbicide Application Information:

Date:	5/13	6/11
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	73	77
2" Soil Temp (°F):	66	84
Soil moisture [surface]:	moist	dry
RH %:	71	47
Cloud cover %	90	40
Wind speed (mph)/direction	3-7/NE	3-6/SW
Rainfall (in) 1 wk after APP:	0.22"	0.54"
Rainfall (in) 2 wks after APP:	2.33"	5.55"
GPA:	15	15
PSI:	38	38
Nozzle:	TTI 110015	AIXR110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	23

Crop and weed information at application:

	Date:	5/13	6/11
corn	Height:	-	-
	Stage:	-	V4
giant ragweed	Height:	-	0.25-3" Avg=1.5"
	Density:	-	32-188/m^2
waterhemp	Height:		0.25"
	Density:		0-12/m^2
giant foxtail	Height:	-	0.25-0.5" Avg=0.25"
	Density:	-	0-20/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Bicep II Magnum	5.5 lb/gal	5, 15	1.8 qt/a	PRE	A
	Halex GT	4.39 lb/gal	9, 15, 27	3.6 pt/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
3	Bicep II Magnum	5.5 lb/gal	5, 15	1.8 qt/a	PRE	A
	Maverick	2.04 lb/gal	4, 15, 27	14 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
4	Harness XTRA 5.6L	5.6 lb/gal	5, 15	2 qt/a	PRE	A
	Kyro	3.07 lb/gal	4, 15, 27	45 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
5	Harness XTRA 5.6L	5.6 lb/gal	5, 15	2 qt/a	PRE	A
	Maverick	2.04 lb/gal	4, 15, 27	14 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
6	Verdict	5.57 lb/gal	14, 15	12 fl oz/a	PRE	A
	Armezon PRO	5.35 lb/gal	15, 27	14 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
7	Verdict	5.57 lb/gal	14, 15	12 fl oz/a	PRE	A
	Maverick	2.04 lb/gal	4, 15, 27	14 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
8	Resicore XL	3.26 lb/gal	4, 15, 27	1.4 qt/a	PRE	A
	Resicore XL	3.26 lb/gal	4, 15, 27	1.4 qt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
9	Acuron	3.44 lb/gal	5, 15, 27	1.5 qt/a	PRE	A
	Acuron	3.44 lb/gal	5, 15, 27	1.5 qt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
10	Maverick	2.04 lb/gal	4, 15, 27	18 fl oz/a	PRE	A
	Maverick	2.04 lb/gal	4, 15, 27	14 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
11	Maverick	2.04 lb/gal	4, 15, 27	18 fl oz/a	PRE	A
	AAtrex	4 lb/gal	5	1.5 pt/a	PRE	A
	Maverick	2.04 lb/gal	4, 15, 27	14 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
12	Maverick	2.04 lb/gal	4, 15, 27	18 fl oz/a	PRE	A
	Princep 4L	4 lb/gal	5	1.5 pt/a	PRE	A
	Maverick	2.04 lb/gal	4, 15, 27	14 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
13	Maverick	2.04 lb/gal	4, 15, 27	24 fl oz/a	PRE	A
	AAtrex	4 lb/gal	5	1.5 pt/a	PRE	A
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	B
	Status	56% w/w	2, 4	5 oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B

Adjuvants: AMS = AMSOL/Dry spray grade ammonium sulfate; NIS = Prefer 90

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to compare two-pass herbicide applications of Maverick to other competitor corn herbicide offerings. Glyphosate-resistant waterhemp, giant ragweed, and giant foxtail were the predominant species in the trial area. Giant ragweed at this research location is a biotype with a prolonged emergence pattern as emergence typically starts in mid- to late-April and continues well into June.

None of the herbicide programs we evaluated caused significant corn injury symptoms at any point in the growing season (data not shown). All of the of the PRE herbicides provided excellent waterhemp control (>95%) up to 29 days after application (Table 7). The addition of either simazine or atrazine at 0.75 lb ai acre^{-1} to Maverick applied PRE improved giant ragweed residual control. All POST tank mixes with Maverick had excellent late season giant foxtail control. Corn grain yield did not significantly differ amongst herbicide programs (Table 7). Averaged across all treatments, yield = 229 bu acre^{-1}, while the untreated check yield = 31 bu acre^{-1}.

Plot photos from throughout the growing season are available at **Two-Pass Corn Herbicide Programs with Maverick** published on **wiscweeds.info**.

Table 7. Weed control ratings and corn grain yield for trial #24-ROK-CN10 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Giant Ragweed (%)				Waterhemp (%)			Giant Foxtail (%)				Yield[b] bu acre^{-1}
		6/4	6/11	6/25	10/17	6/11	6/25	10/17	6/4	6/11	6/25	7/8	
1	Untreated Check	0	0	0	0	0	0	0	0	0	0	0	31 b
Two-Pass – PRE (5/13) *fb* POST (6/11)		**POST**				**POST**			**POST**				
2	Bicep II Magnum (1.8 qt) ***fb*** Halex GT (3.6 pt) + NIS (0.25%) + AMS (3 lb)	71	59	82	93	98	90	89	94	87	93	84	217 a
3	Bicep II Magnum (1.8 qt) ***fb*** Maverick (14 oz) + Roundup PM3 (22 oz) + NIS (0.25%) + AMS (3 lb)	63	39	89	94	100	90	90	95	93	97	98	218 a
4	Harness XTRA 5.6L (2 qt) ***fb*** Kyro (45 oz) + Roundup PM3 (22 oz) + NIS (0.25%) + AMS (3 lb)	80	68	89	95	100	100	99	100	100	99	92	237 a
5	Harness XTRA 5.6L (2 qt) ***fb*** Maverick (14 oz) + Roundup PM3 (22 oz) + NIS (0.25%) + AMS (3 lb)	81	68	89	96	100	100	100	99	99	98	100	220 a
6	Verdict (12 oz) ***fb*** Armezon PRO (14 oz) + Roundup PM3 (22 oz) + NIS (0.25%) + AMS (3 lb)	85	70	85	87	100	93	93	86	70	91	81	222 a
7	Verdict (12 oz) ***fb*** Maverick (14 oz) + Roundup PM3 (22 oz) + NIS (0.25%) + AMS (3 lb)	84	67	88	96	99	99	96	80	71	97	96	227 a
8	Resicore XL (1.4 qt) ***fb*** Resicore XL (1.4 qt) + Roundup PM3 (22 oz) + NIS (0.25%) + AMS (3 lb)	76	76	92	98	100	100	100	96	88	98	90	242 a
9	Acuron (1.5 qt) ***fb*** Acuron (1.5 qt) + Roundup PM3 (22 oz) + NIS (0.25%) + AMS (3 lb)	74	71	90	98	100	100	100	80	68	90	83	230 a
10	Maverick (18 oz) ***fb*** Maverick (14 oz) + Roundup PM3 (22 oz) + NIS (0.25%) + AMS (3 lb)	73	76	86	97	100	100	100	97	99	99	100	227 a
11	Maverick (18 oz) + AAtrex (1.5 pt) ***fb*** Maverick (14 oz) + Roundup PM3 (22 oz) + NIS (0.25%) + AMS (3 lb)	86	88	91	99	100	100	100	99	100	98	100	240 a
12	Maverick (18 oz) + Princep 4L (1.5 pt) ***fb*** Maverick (14 oz) + Roundup PM3 (22 oz) + NIS (0.25%) + AMS (3 lb)	85	86	89	98	100	99	100	98	99	99	100	228 a
13	Maverick (24 oz) + AAtrex (1.5 pt) ***fb*** Status (5 oz) + Roundup PM3 (22 oz) + NIS (0.25%) + AMS (3 lb)	87	90	87	93	100	100	100	99	100	93	89	237 a
	LSD (α=0.10)	**8**	**9**	**4**	**3**	**ns**	**3**	**3**	**8**	**9**	**3**	**6**	**18**
	p value	**<.001**	**<.001**	**0.014**	**<.001**	**0.145**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<0.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

Project Goal: Evaluate various corn herbicide programs without glyphosate and atrazine for season long weed control in conventional corn.

Site Description:

Location:	Brooklyn, WI	**Crop:**	Corn
Field #:	OB-9	**Hybrid:**	OB 1105
Soil type:	Kegonsa loam	**Planting Date:**	5/23
% OM:	1.6	**Emergence Date:**	6/3
pH:	6.9	**Population:**	34,000 seeds/acre
Fertilization:	125 lbs N/acre	**Depth:**	2 in
Previous crop:	Soybean	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	waterhemp (AMATA); fall panicum (PANDI)		

Herbicide Application Information:

Date:	5/23	6/10	6/24
Treatment:	PRE (A)	EPOST (B)	POST (C)
Air Temp (°F):	81	74	87
2" Soil Temp (°F):	72	65	-
Soil moisture [surface]:	moist	dry	moist
RH %:	32	42	58
Cloud cover %	0	0	30
Wind speed (mph)/direction	0-4/W	4-10/W	3-8/SW
Rainfall (in) 1 wk after APP:	2.44"	0.62"	0.86"
GPA:	15	15	15
PSI:	38	38	38
Nozzle:	TTI 110015	AIXR110015	AIXR110015
Nozzle spacing (in):	20	20	20
Boom Height (in):	20	24	25

Crop and weed information at application:

	Date:	5/23	6/10	6/24
corn	Height:	-	3-4"	18"
	Stage:	-	V2	V5/V6
waterhemp	Height:	-	0.1-0.25" Avg=0.25"	0.5-4" Avg=2"
	Density:	-	50-504/m^2	14-70/m^2
fall panicum*	Height:	-	-	-
	Density:	-	-	-

*Overall density in the trial area was quite low at the time of herbicide applications.

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Harness MAX	3.85 lb/gal	15, 27	2 qt/a	PRE	A
	DiFlexx Duo	2.13 lb/gal	4, 27	28 fl oz/a	POST	C
	COC			1% v/v	POST	C
	AMS			2 lb/a	POST	C
3	TriVolt SC	3.65 lb/gal	2, 15, 27	20 fl oz/a	PRE	A
	Laudis	3.5 lb/gal	27	3 fl oz/a	POST	C
	DiFlexx	4 lbae/gal	4	8 fl oz/a	POST	C
	Destiny HC			0.5% v/v	POST	C
	AMS			2 lb/a	POST	C
4	Verdict	5.57 lb/gal	14, 15	10 fl oz/a	PRE	A
	Callisto	4 lb/gal	27	3 fl oz/a	POST	C
	Armezon	2.8 lb/gal	27	1 fl oz/a	POST	C
	Status	56% w/w	2, 4	5 oz/a	POST	C
	MSO			1% v/v	POST	C
	AMS			2 lb/a	POST	C
5	Dual II Magnum	7.64 lb/gal	15	1.67 pt/a	PRE	A
	Princep 4L	4 lb/gal	5	1 qt/a	PRE	A
	Laudis	3.5 lb/gal	27	3 fl oz/a	POST	C
	Destiny HC			0.5% v/v	POST	C
	AMS			2 lb/a	POST	C
6	Surpass NXT	7 lb/gal	15	2 pt/a	PRE	A
	Kyro	3.1 lb/gal	4, 15, 27	45 fl oz/a	POST	C
	Accent Q	54.5% w/w	2	0.9 oz/a	POST	C
	COC			1% v/v	POST	C
	AMS			2 lb/a	POST	C
7	Storen	3.25 lb/gal	15, 27	1.2 qt/a	PRE	A
	Princep 4L	4 lb/gal	5	1 qt/a	PRE	A
	Storen	3.25 lb/gal	15, 27	1.2 qt/a	POST	C
	Accent Q	54.5% w/w	2	0.9 oz/a	POST	C
	NIS			0.25% v/v	POST	C
	AMS			2 lb/a	POST	C
8	Maverick	2.04 lb/gal	4, 15, 27	24 fl oz/a	PRE	A
	Accent Q	54.5% w/w	2	0.9 oz/a	POST	C
	Status	56% w/w	2, 4	5 oz/a	POST	C
	COC			1% v/v	POST	C
	AMS			2 lb/a	POST	C
9	**Intrava DX***	3.3 lb/gal	5	21 fl oz/a	PRE	A
	Moccasin II Plus	7.64 lb/gal	15	1.33 pt/a	PRE	A
	Coyote	3.67 lb/gal	15, 27	2 qt/a	POST	C
	Accent Q	54.5% w/w	2	0.9 oz/a	POST	C
	NIS			0.25% v/v	POST	C
	AMS			3 lb/a	POST	C

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
10	**Intrava DX***	3.3 lb/gal	5	16 fl oz/a	PRE	A
	Motif	4 lb/gal	27	3.5 fl oz/a	PRE	A
	Coyote	3.67 lb/gal	15, 27	1.6 qt/a	POST	C
	Accent Q	54.5% w/w	2	0.9 oz/a	POST	C
	NIS			0.25% v/v	POST	C
	AMS			3 lb/a	POST	C
11	**Intrava DX***	3.3 lb/gal	5	16 fl oz/a	PRE	A
	Coyote	3.67 lb/gal	15, 27	1 qt/a	PRE	A
	Coyote	3.67 lb/gal	15, 27	1.4 qt/a	POST	C
	Accent Q	54.5% w/w	2	0.9 oz/a	POST	C
	NIS			0.25% v/v	POST	C
	AMS			3 lb/a	POST	C
12	**Intrava DX***	3.3 lb/gal	5	21 fl oz/a	PRE	A
	Callisto	4 lb/gal	27	5 fl oz/a	PRE	A
	Dual II Magnum	7.64 lb/gal	15	1.5 pt/a	PRE	A
13	Harness MAX	3.85 lb/gal	15, 27	64 fl oz/a	EPOST	B
	Status	56% w/w	2, 4	5 oz/a	EPOST	B
	Accent Q	54.5% w/w	2	0.9 oz/a	EPOST	B
	NIS			0.25% v/v	EPOST	B
	AMS			2 lb/a	EPOST	B

Adjuvants: AMS = AMSOL/Dry spray grade ammonium sulfate; COC = CropOil; MSO = Upland MSO; NIS = Prefer 90; Destiny HC = high surfactant methylated oil concentrate (HSMOC)

Intrava DX** is an experimental corn herbicide pre-mix developed by UPL NA, Inc., consisting of two active ingredients from group 5, amicarbazone and metribuzin. ***Intrava DX is not registered for use by the EPA at the time of publication.

Trial Summary:

The trial was established in May at the O'Brien Hybrids farm located north of Brooklyn, WI. Multiple two-pass (PRE followed by POST around V5/V6 corn) herbicide programs were developed for control of waterhemp and annual grass weeds. Non-selective herbicides such as glyphosate and glufosinate were not included since treated corn did not have herbicide resistant traits. Furthermore, atrazine was not included in any treatments as the field was located in an atrazine prohibition area.

Minor corn injury symptoms were observed 22 days after the PRE herbicide applications (Table 8). Leaf chlorosis (yellowing) was evident following applications of TriVolt and Intrava DX. Injury symptoms were greater at the higher rate of Intrava DX, 21 fl oz (5%) compared to 16 fl oz (2%). The EPOST application of Harness MAX + Status + Accent Q also caused minor leaf necrosis 3 days after application. There was no significant corn injury from any of POST herbicides evaluated (data not shown).

Several of the PRE herbicides we evaluated provided good (>80%) control of waterhemp up to 32 days after application (Table 8). POST herbicide tank mixes that contained dicamba performed better than those without. Averaged across treatments, end-of-season waterhemp control following POST applications with dicamba was 98% compared to 88% without. Most of the herbicide programs provided excellent (>90%) control of fall panicum throughout the growing season.

Corn grain yield did not significantly differ amongst herbicide programs (Table 8). Averaged across all treatments, yield = 166 bu acre^{-1}, while the untreated check yield = 74 bu acre^{-1}.

Plot photos from throughout the growing season are available at **Herbicide Programs for Conventional Corn** published on **wiscweeds.info**.

Similar trials were conducted in 2021-2023 and data can be accessed via the following links.

- **2021 Wisconsin Weed Science Research Report** – Trial# CN18
- **2022 Wisconsin Weed Science Research Report** – Trial# CN12
- **2023 Wisconsin Weed Science Research Report** – Trial# CN17

Table 8. Crop injury, weed control ratings, and corn grain yield for trial #24-BRO-CN11 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Injury[c] (%)		Waterhemp %				Fall Panicum %			Yield[b] bu acre^{-1}
		6/13	6/24	6/13	6/24	7/8	10/22	6/24	7/8	10/22	
1	Untreated Check	0.0	0.0	0	0	0	0	0	0	0	74 b
One-Pass – PRE (5/23)											
12	Intrava DX (21 oz) + Callisto (5 oz) + Dual II Magnum (1.5 pt)	4.5	0.0	99	93	85	87	100	98	99	163 a
One-Pass – EPOST (6/10)											
13	Harness MAX (2 qt) + Status (5 oz) + Accent Q (0.9 oz) + NIS (0.25%) + AMS (2 lb)	4.8	0.0	66	99	98	100	95	99	98	164 a
Two-Pass – PRE (5/23) *fb* POST (6/24)					POST				POST		
2	Harness Max (2 qt) ***fb*** Diflexx Duo (28 oz) + COC (1% v/v) + AMS (2 lb)	0.5	0.0	100	86	94	99	93	96	84	160 a
3	TriVolt (20 oz) ***fb*** Laudis (3 oz) + DiFlexx (8 oz) + Destiny HC (0.5% v/v) + AMS (2 lb)	2.3	0.0	99	88	96	98	100	98	100	161 a
4	Verdict (10 oz) + Callisto (3 oz) ***fb*** Armezon (1 oz) + Status (5 oz) + MSO (1% v/v) + AMS (2 lb)	1.0	0.0	91	78	89	94	93	98	97	162 a
5	Dual II Magnum (1.67 pt) + Princep 4L (1 qt) ***fb*** Laudis (3 oz) + Destiny HC (0.5% v/v) + AMS (2 lb)	0.8	0.0	97	79	88	84	98	99	93	166 a
6	Surpass NXT (2 pt) ***fb*** Kyro (45 oz) + Accent Q (0.9 oz) + COC (1% v/v) + AMS (2 lb)	0.0	0.0	98	83	91	90	88	97	100	165 a
7	Storen (1.2 qt) + Princep 4L (1 qt) ***fb*** Storen (1.2 qt) + Accent Q (0.9 oz) + NIS (0.25% v/v) + AMS (2 lb)	0.3	0.0	100	89	92	93	97	99	100	162 a
8	Maverick (24 oz) ***fb*** Accent Q (0.9 oz) + Status (5 oz) + COC (1% v/v) + AMS (2 lb)	0.0	0.0	100	94	97	99	96	99	97	164 a
9	Intrava DX (21 oz) + Moccasin II Plus (1.33 pt) ***fb*** Coyote (2 qt) + Accent Q (0.9 oz) + NIS (0.25% v/v) + AMS (3 lb)	5.0	0.0	99	84	86	90	98	98	100	184 a
10	Intrava DX (16 oz) + Motif (3.5 oz) ***fb*** Coyote (1.6 qt) + Accent Q (0.9 oz) + NIS (0.25% v/v) + AMS (3 lb)	1.8	0.0	92	76	81	86	79	98	100	173 a
11	Intrava DX (16 oz) + Coyote (1 qt) ***fb*** Coyote (1.4 qt) + Accent Q (0.9 oz) + NIS (0.25% v/v) + AMS (3 lb)	1.8	0.0	97	80	82	84	97	98	100	164 a
	LSD (α=0.10)	**1.0**	**-**	**5**	**7**	**5**	**6**	**6**	**ns**	**4**	**29**
	p value	**<.001**	**-**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**0.509**	**<.001**	**<0.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

[c]Crop injury: Trts 3, 9-12 = leaf chlorosis; Trt 13 = leaf necrosis

Project Goal: Evaluate the efficacy of atrazine alternative PSII- and HPPD-inhibitor herbicide tank mixes for control of giant ragweed and waterhemp

Site Description

Trial #:	24-BRO-CN12	24-ROK-CN12
Location:	Brooklyn, WI	Janesville, WI
Soil Type:	Kegonsa loam	Plano silt loam
Soil Texture % sand/silt/clay:	50 / 37 / 14	7 / 71 / 22
% OM:	1.6	3.5
pH:	6.9	6.4
Fertilization:	125 lbs N/acre	181 lbs N/acre
Previous Crop:	soybean	soybean
Tillage:	conventional	conventional
Hybrid :	202-24STX RIB	202-24STX RIB
Planting Date:	5/23	5/6
Emergence Date:	6/3	5/17
Seeding Rate:	34,000 seeds/acre	34,000 seeds/acre
Depth:	2 in	2 in
Row Spacing:	30 in	30 in
Plot Size:	10 x 30 ft	10 x 30 ft

Herbicide Application Information

Trial #:	24-BRO-CN12		24-ROK-CN12	
Date:	5/24	6/24	5/10	6/6
Treatment:	PRE (A)	POST (B)	PRE (A)	POST (B)
Air Temp (°F):	64	87	58	64
2" Soil Temp (°F):	-	-	-	63
Soil moisture [surface]:	moist	moist	wet	moist
RH %:	81	58	70	74
Cloud cover %:	-	30	100	0
Wind speed (mph)/direction:	4/S	3-8/SW	2-6/SSW	5-12/WNW
Rainfall (in) 1 wk after APP:	2.44"	0.86"	0.09"	0.40"
Rainfall (in) 2 wks after APP:	3.77"	2.98"	1.91"	2.34"
GPA:	13.6	15	13.6	15
PSI:	-	36	-	38
Nozzle:	TTI 11002	AIXR110015	TTI 11002	AIXR110015

Crop and Weed Information at POST Application

	Height	Stage	Height	Stage
Corn	18"	V5/V6	5-7 in	V5
	Height	**Density**	**Height**	**Density**
waterhemp	1-8" Avg=3"	4-596/m^2	-	-
giant ragweed	-	-	1-8" Avg=4"	12-100/m^2

.

	Trt #	Treatment*	Formulation	SOA Group	Rate	App Timing	App Code
	1	Untreated Check					
	2	Weed Free Check**					
PSII Only	3	Moxy 2E	2 lbae/gal	6	1 pt/a	POST	B
		COC			1% v/v	POST	B
		AMSOL			2.5% v/v	POST	B
	4	Basagran 5L	5 lb/gal	6	1.2 pt/a	POST	B
		COC			1% v/v	POST	B
		AMSOL			2.5% v/v	POST	B
	5	Metricor DF	75% w/w	5	4 oz/a	POST	B
		COC			1% v/v	POST	B
		AMSOL			2.5% v/v	POST	B
HPPD Only	6	Callisto	4 lb/gal	27	3 fl oz/a	POST	B
		COC			1% v/v	POST	B
		AMSOL			2.5% v/v	POST	B
	7	Armezon	2.8 lb/gal	27	0.75 fl oz/a	POST	B
		COC			1% v/v	POST	B
		AMSOL			2.5% v/v	POST	B
PSII + HPPD	8	Callisto	4 lb/gal	27	3 fl oz/a	POST	B
		Moxy 2E	2 lbae/gal	6	1 pt/a	POST	B
		COC			1% v/v	POST	B
		AMSOL			2.5% v/v	POST	B
	9	Callisto	4 lb/gal	27	3 fl oz/a	POST	B
		Basagran 5L	5 lb/gal	6	1.2 pt/a	POST	B
		COC			1% v/v	POST	B
		AMSOL			2.5% v/v	POST	B
	10	Callisto	4 lb/gal	27	3 fl oz/a	POST	B
		Metricor DF	75% w/w	5	4 oz/a	POST	B
		COC			1% v/v	POST	B
		AMSOL			2.5% v/v	POST	B
	11	Armezon	2.8 lb/gal	27	0.75 fl oz/a	POST	B
		Moxy 2E	2 lbae/gal	6	1 pt/a	POST	B
		COC			1% v/v	POST	B
		AMSOL			2.5% v/v	POST	B
	12	Armezon	2.8 lb/gal	27	0.75 fl oz/a	POST	B
		Basagran 5L	5 lb/gal	6	1.2 pt/a	POST	B
		COC			1% v/v	POST	B
		AMSOL			2.5% v/v	POST	B
	13	Armezon	2.8 lb/gal	27	0.75 fl oz/a	POST	B
		Metricor DF	75% w/w	5	4 oz/a	POST	B
		COC			1% v/v	POST	B
		AMSOL			2.5% v/v	POST	B

Adjuvants: AMSOL = liquid ammonium sulfate; COC = CropOil

*Verdict was applied PRE over the entire trial area to suppress weeds but allow enough escapes to evaluate postemergence control. Brooklyn = Verdict @ 5 fl oz/a; Janesville = Verdict @ 10 fl oz/a.

****Weed free check:** POST applications of Roundup PM3 (30 oz) + Liberty (32 oz) + AMS were made followed by hand weeding as necessary.

Trial Summary:

Trials were established in May 2024 at the O'Brien Hybrids farm located north of Brooklyn, WI and at the Rock County Farm in Janesville, WI to evaluate the efficacy of atrazine alternative PSII- and HPPD-inhibitor herbicide tank mixes for control of giant ragweed and waterhemp.

Crop Injury

Severe corn leaf necrosis (burn) was observed at both locations but was dependent on the choice of PSII Inhibitors. At both sites regardless of tank mixing HPPD Inhibitors, corn injury at 14 days after application ranged from 19% to 39% for metribuzin, 1% to 19% for bromoxynil, and 1% to 4% for bentazon (Tables 9, 10). POST applications containing metribuzin had the greatest potential for crop injury at both locations. Crop injury levels were greater at the Janesville trial location than Brooklyn, likely due to differences in corn growth stage at the time of application.

Waterhemp

At 28 days after treatment (DAT), mesotrione alone controlled waterhemp by 64% but increased to 95% and 91% when metribuzin and bromoxynil were mixed, respectively (Table 9). Mesotrione + bromoxynil and mesotrione + metribuzin were the best performing tank mixes and provided comparable control to the weed free check near corn harvest.

Giant Ragweed

At 28 DAT, both topramezone and mesotrione alone controlled giant ragweed by 74% and 30%, respectively (Table 10). The addition of bentazon or bromoxynil to each HPPD-inhibitor increased control, ranging from 87% to 93%. Mesotrione + bromoxynil, mesotrione + bentazon, and topramezone + bentazon were the best performing tank mixes near corn harvest.

Corn Yield

Tank mixes were required to achieve the highest levels of corn yield at both locations. At Brooklyn, mesotrione + bromoxynil (197 bu acre^{-1}) and mesotrione + metribuzin (196 bu acre^{-1}) had similar yield averages compared to the weed free check (196 bu acre^{-1}). At Janesville, bromoxynil + HPPD-Inhibitor and bentazon + HPPD-Inhibitor treatments protected the most average yield ranging from 205-216 bu acre^{-1} compared to the weed free check (228 bu acre^{-1})

Take Home Points:

- POST applications containing metribuzin had the greatest potential for crop injury at both locations.
- Tank mixes of certain PSII- and HPPD-inhibitors enhanced weed control and corn grain yield compared to herbicides applied alone at both sites.
- The mesotrione + bromoxynil tank mix showed the greatest potential for effective control of both giant ragweed and waterhemp without significant corn injury or yield loss.

Check out this **article** by Daniel Zhu discussing his project in more detail!

Plot photos are available at **PSII and HPPD Herbicide POST Tank Mixes – Giant Ragweed** and **PSII and HPPD Herbicide POST Tank Mixes – Waterhemp** published on **wiscweeds.info**.

Table 9. Crop injury, waterhemp control ratings, and corn yield for trial #24-BRO-CN12 at Brooklyn, WI.[a]

	Trt #	Herbicide (rate acre^{-1})	Corn Injury[c] (%)			Waterhemp (%)			Yield[b] bu acre^{-1}
			7 DAT	14 DAT	28 DAT	14 DAT	28 DAT	EOS[e]	
	1	Check (PRE Only)	0	0	0	0	0	0	154 de
	2	Weed Free Check Roundup PowerMAX 3 (30 oz) + Liberty (32 oz) + AMS (2.5%) ***fb*** hand weeding (as necessary)	0	0	0	100	100	100	196 a
	Two-Pass – PRE[d] (5/24) *fb* POST (6/24)								
PSII Only	3	Moxy 2E (1 pt) + COC (1%) + AMS (2.5%)	1.5	1.0	1.0	11	7	20	156 de
PSII Only	4	Basagran 5L (1.2 pt) + COC (1%) + AMS (2.5%)	1.5	1.0	0.2	6	8	17	146 e
PSII Only	5	Metricor DF (4 oz) + COC (1%) + AMS (2.5%)	27.5	20.0	4.3	31	22	49	163 cde
HPPD Only	6	Callisto (3 oz) + COC (1%) + AMS (2.5%)	1.2	1.0	1.0	66	62	80	178 abcd
HPPD Only	7	Armezon (0.75 oz) + COC (1%) + AMS (2.5%)	1.2	1.0	1.0	39	28	59	180 abcd
PSII + HPPD	8	Callisto (3 oz) + Moxy 2E (1 pt) + COC (1%) + AMS (2.5%)	3.6	2.0	1.0	93	88	96	197 a
PSII + HPPD	9	Callisto (3 oz) + Basagran 5L (1.2 pt) + COC (1%) + AMS (2.5%)	2.4	1.0	1.0	74	39	81	197 a
PSII + HPPD	10	Callisto (3 oz) + Metricor DF (4 oz) + COC (1%) + AMS (2.5%)	32.5	23.8	4.3	95	92	97	196 a
PSII + HPPD	11	Armezon (0.75 oz) + Moxy 2E (1 pt) + COC (1%) + AMS (2.5%)	2.7	1.8	0.9	78	65	82	189 ab
PSII + HPPD	12	Armezon (0.75 oz)+Basagran 5L (1.2 pt) +COC (1%)+AMS (2.5%)	1.5	1.0	1.0	45	38	55	166 bcde
PSII + HPPD	13	Armezon (0.75 oz) +Metricor DF (4 oz) +COC (1%) +AMS (2.5%)	32.5	25.0	3.5	75	68	81	186 abc
		LSD (α=0.05)	**1.4**	**1.2**	**0.5**	**8**	**10**	**5**	**12**
		p value	**<0.01**	**<0.01**	**0.03**	**<0.01**	**<0.01**	**<0.01**	**<0.01**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

[c]Corn injury = leaf necrosis (burn)

[d]Verdict (5 fl oz/a) was applied PRE over the entire trial area including the checks (treatments #1 and #2)

[e]EOS = end-of-season weed control rating

Table 10. Crop injury, giant ragweed control ratings, and corn yield for trial #24-ROK-CN12 at Janesville, WI.[a]

	Trt #	Herbicide (rate acre^{-1})	Corn Injury[c] (%)			G. Ragweed (%)			Yield[b] bu acre^{-1}
			6 DAT	15 DAT	27 DAT	15 DAT	27 DAT	EOS[e]	
	1	Check (PRE Only)	0	0	0	0	0	0	7 g
	2	Weed Free Check Roundup PowerMAX 3 (30 oz) + Liberty (32 oz) + AMS (2.5%) ***fb*** hand weeding (as necessary)	0	0	0	100	100	100	228 a
	Two-Pass – PRE[d] (5/10) *fb* POST (6/6)								
PSII Only	3	Moxy 2E (1 pt) + COC (1%) + AMS (2.5%)	19.8	8.3	0.1	81	69	60	187 bc
PSII Only	4	Basagran 5L (1.2 pt) + COC (1%) + AMS (2.5%)	1.1	1.4	1.0	67	42	31	131 de
PSII Only	5	Metricor DF (4 oz) + COC (1%) + AMS (2.5%)	50.0	29.9	9.0	42	19	21	45 f
HPPD Only	6	Callisto (3 oz) + COC (1%) + AMS (2.5%)	1.1	3.3	2.7	53	30	27	100 e
HPPD Only	7	Armezon (0.75 oz) + COC (1%) + AMS (2.5%)	1.7	1.8	1.3	83	74	61	193 bc
PSII + HPPD	8	Callisto (3 oz) + Moxy 2E (1 pt) + COC (1%) + AMS (2.5%)	25.1	13.9	1.5	97	93	95	216 ab
PSII + HPPD	9	Callisto (3 oz) + Basagran 5L (1.2 pt) + COC (1%) + AMS (2.5%)	6.1	4.3	1.0	94	87	90	205 ab
PSII + HPPD	10	Callisto (3 oz) + Metricor DF (4 oz) + COC (1%) + (2.5%)	50.1	33.3	15.0	86	79	84	189 bc
PSII + HPPD	11	Armezon (0.75 oz) + Moxy 2E (1 pt) + COC (1%) + AMS (2.5%)	22.5	18.7	2.0	94	88	82	212 ab
PSII + HPPD	12	Armezon (0.75 oz)+Basagran 5L (1.2 pt)+COC (1%) +AMS (2.5%)	8.6	2.7	1.3	95	88	93	213 ab
PSII + HPPD	13	Armezon (0.75 oz) + Metricor DF (4 oz) +COC (1%) +AMS (2.5%)	50.0	38.6	15.0	78	59	50	162 cd
		LSD (α=0.05)	**1.7**	**2.3**	**1.6**	**4**	**6**	**6**	**13**
		p value	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

[c]Corn injury = leaf necrosis (burn)

[d]Verdict (10 fl oz/a) was applied PRE over the entire trial area including the checks (treatments #1 and #2)

[e]EOS = end-of-season weed control rating

The following figures summarize giant ragweed control from some of the corn herbicide evaluation trials conducted in 2024 at the Rock County Farm in Janesville, WI. Giant ragweed at the Rock County Farm is a biotype with a prolonged emergence pattern as emergence typically starts in mid- to late-April and continues well into June. Treatments were grouped by one of three herbicide systems: 1-pass preemergence (PRE), 1-pass early-postemergence (EPOST), and 2-pass (PRE *fb* POST). There were varying levels of effectiveness among the herbicides within each system, but by grouping we can get a better sense of what systems perform best on average. To see how certain herbicides or herbicide tank mixes perform, see individual trial data presented in this report.

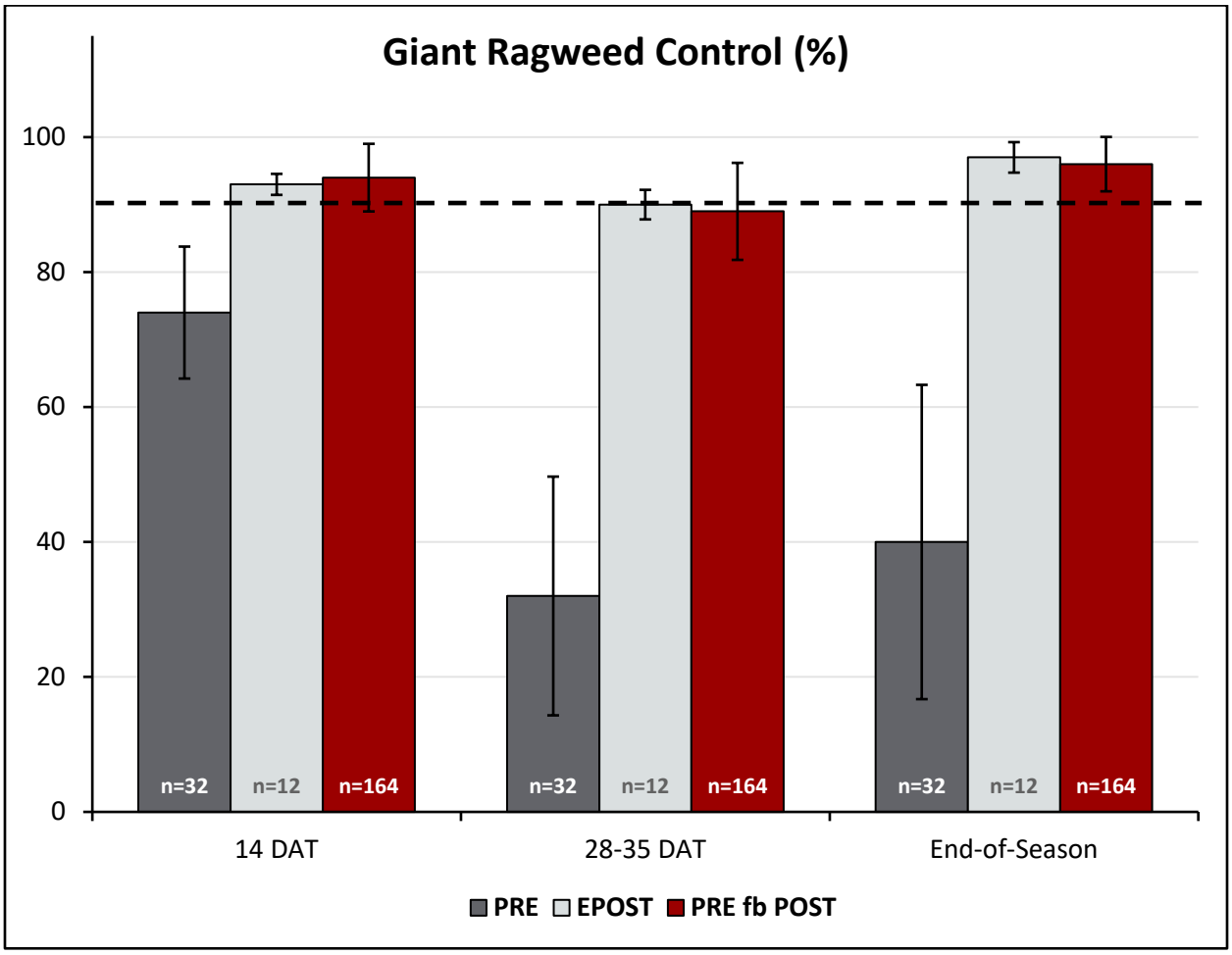

Figure 1. Giant ragweed control (%) of three corn herbicide systems (PRE only, EPOST only, PRE *fb* POST). Bars indicate the average % control ± the standard deviation 14 and 28-35 days after POST herbicide application and at the end of the growing season. n-values at the base of each bar represent the number of observations (plots) evaluated in each herbicide system.

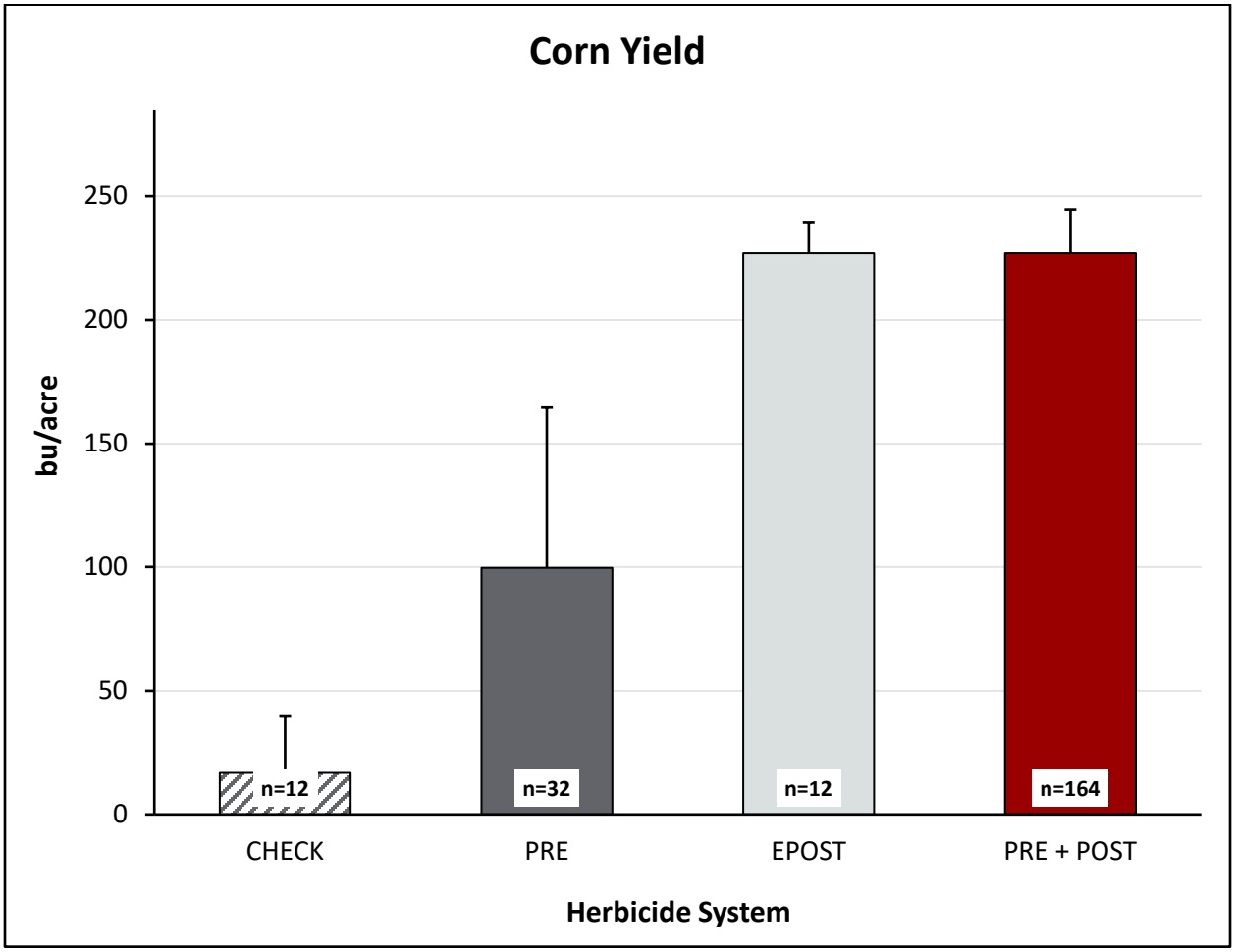

Figure 2. Corn yield (bu/acre) of three corn herbicide systems (PRE only, EPOST only, PRE *fb* POST). Yields of the untreated checks are included for comparison. Bars indicate the average yield + the standard deviation. n-values at the base of each bar represent the number of observations (plots) evaluated in each herbicide system.

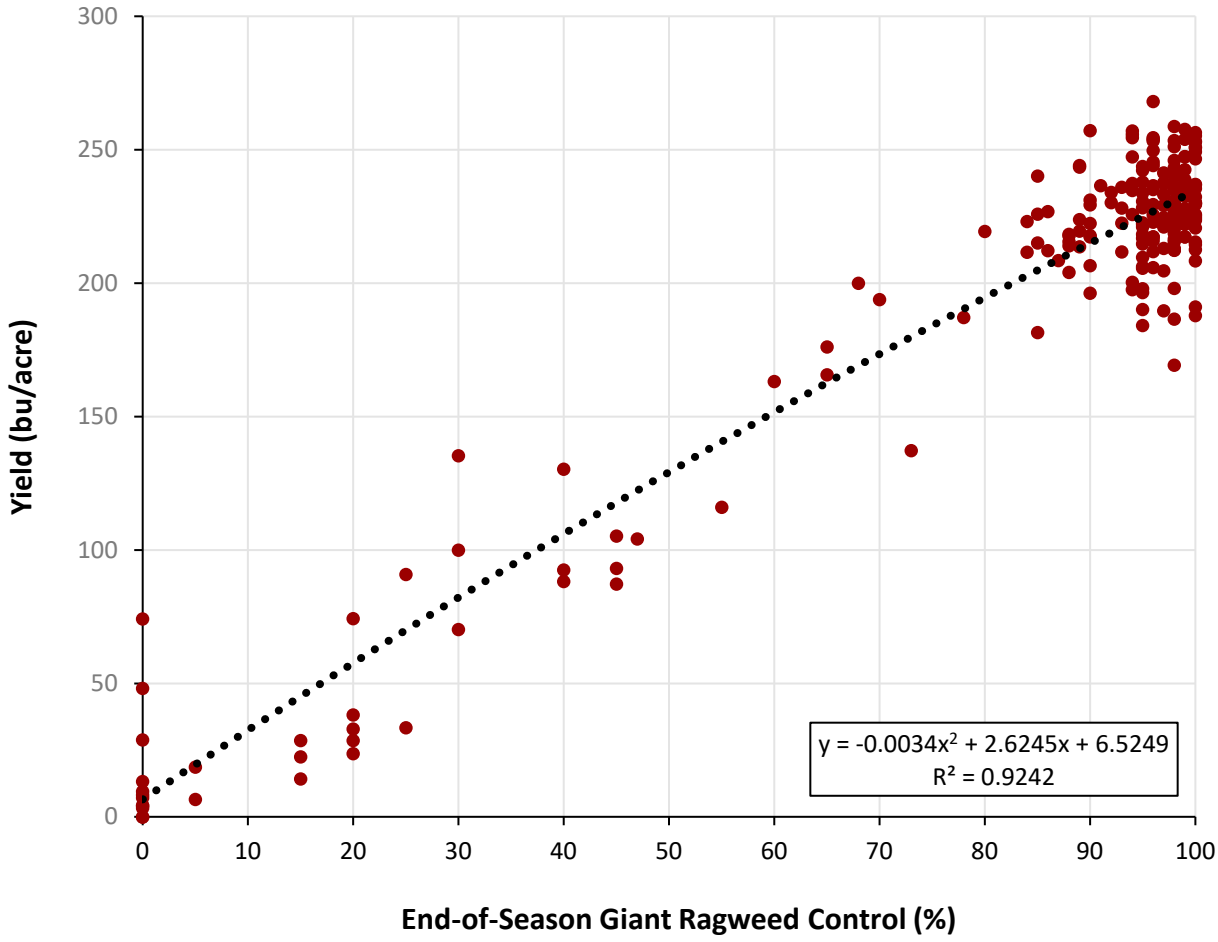

Figure 3. Corn yield regressed over end-of-season giant ragweed control from multiple corn herbicide evaluation trials at Janesville, WI. The formula and corresponding R^2 value is overlayed on the figure.

Project Goal: Evaluate the performance of **Voraxor** tank mixed with residuals compared to other commercial standards for preplant burndown control of winter annuals.

Site Description:

Location:	Arlington, WI	**Crop:**	Enlist Soybean
Field #:	428	**Variety:**	XO 2444E
Soil type:	Plano silt loam	**Planting Date:**	5/1
% OM:	3.8	**Emergence Date:**	5/16
pH:	6.4	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.5 in
Previous crop:	Corn silage	**Row spacing:**	30 in
Tillage:	No-till	**Plot Size:**	10 x 30 ft
Weed species:	dandelion (TAROF); gly-R marestail (ERICA); shepherd's purse (CAPBP)		

Herbicide Application Information:

Date:	4/24
Treatment:	Preplant (A)
Air Temp (°F):	51
2" Soil Temp (°F):	-
Soil moisture [surface]:	moist
RH %:	42
Cloud cover %	0
Wind speed (mph)/direction	2-7/NE
Rainfall (in) 1 wk after APP:	0.87"
GPA:	15
PSI:	38
Nozzle:	TT 110015
Nozzle spacing (in):	20
Boom Height (in):	23

Crop and weed information at application:

		Date: 4/24
soybean	Height:	-
	Stage:	-
dandelion	Diameter:	4-12" Avg=8"
	Density:	0-8/m^2
marestail	Height:	1-4" Avg=2"
	Density:	24-56/m^2
shepherd's purse	Diameter:	3-12" Avg=6"
	Density:	0-8/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	preplant	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	preplant	A
	Zidua SC	4.17 lb/gal	15	3.25 fl oz/a	preplant	A
	Agri-Dex			1% v/v	preplant	A
	AMS			8.5 lb/100 gal	preplant	A
3	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	preplant	A
	Voraxor*	3.13 lb/gal	14	1.4 fl oz/a	preplant	A
	Zidua SC	4.17 lb/gal	15	3.25 fl oz/a	preplant	A
	MSO			1% v/v	preplant	A
	AMS			8.5 lb/100 gal	preplant	A
4	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	preplant	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	preplant	A
	Voraxor*	3.13 lb/gal	14	1.4 fl oz/a	preplant	A
	Zidua SC	4.17 lb/gal	15	3.25 fl oz/a	preplant	A
	MSO			1% v/v	preplant	A
	AMS			8.5 lb/100 gal	preplant	A
5	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	preplant	A
	Boundary	6.5 lb/gal	5, 15	1.5 pt/a	preplant	A
	Agri-Dex			1% v/v	preplant	A
	AMS			8.5 lb/100 gal	preplant	A
6	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	preplant	A
	Boundary	6.5 lb/gal	5, 15	1.5 pt/a	preplant	A
	Voraxor*	3.13 lb/gal	14	1.4 fl oz/a	preplant	A
	Zidua SC	4.17 lb/gal	15	3.25 fl oz/a	preplant	A
	MSO			1% v/v	preplant	A
	AMS			8.5 lb/100 gal	preplant	A
7	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	preplant	A
	Matador-S	4.3 lb/gal	2, 5, 15	3 pt/a	preplant	A
	Agri-Dex			1% v/v	preplant	A
	AMS			8.5 lb/100 gal	preplant	A
8	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	preplant	A
	Matador-S	4.3 lb/gal	2, 5, 15	3 pt/a	preplant	A
	Voraxor*	3.13 lb/gal	14	1.4 fl oz/a	preplant	A
	MSO			1% v/v	preplant	A
	AMS			8.5 lb/100 gal	preplant	A

Adjuvants: AMS = AMSOL/Dry spray grade ammonium sulfate; MSO = Upland MSO; Agri-Dex = COC

Voraxor** is a new herbicide offering from BASF containing two group 14 active ingredients, saflufenacil and trifludimoxazin. ***Voraxor is not registered for commercial use in the United States at the time of this publication.

Trial Summary:

The trial was established at the Arlington Ag Research Station near Arlington, WI to evaluate the performance of **Voraxor** tank mixed with residuals compared to other commercial standards for preplant burndown control of winter annuals and early emerging summer annuals. **Voraxor** is a new herbicide offering from BASF containing two group 14 active ingredients, saflufenacil and trifludimoxazin. ***Voraxor is not registered for commercial use in the United States at the time of this publication***

An Enlist soybean variety was planted 1 week after the application of the herbicide treatments. No crop injury was observed after soybean emergence at any of the rating dates (data not shown).

Initial control of dandelion and marestail 7 days after treatment (DAT) was excellent for all herbicide mixes containing Voraxor (Table 11). Marestail control remained excellent for Voraxor treatments at subsequent ratings up to 28 DAT; however, dandelion control fell below 75% for most of the tank-mixes by 28 DAT due to regrowth. The Roundup + Enlist One + Voraxor treatment was the only tank mix that provided 100% control of dandelion 28 DAT. Voraxor tank mixes all provided quicker initial burndown of Shepherd's purse, >60% suppression at 7 DAT, than other treatments.

Voraxor was a very effective preplant burndown herbicide, particularly for marestail, but should be tank mixed to provide complete control of weeds with a large taproot like dandelion. In this trial, 2,4-D (Enlist One) was an excellent tank mix partner and provided near 100% of all weed species that were present in the trial area.

Plot photos from throughout the growing season are available at **Voraxor Tank Mixed with Residuals Preplant Burndown Control** published on **wiscweeds.info**.

Table 11. Preplant burndown weed control ratings for trial #24-ARL-SB01 at Arlington, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Dandelion (%)				Marestail (%)				Shepherd's Purse (%)		
		2 DAT	7 DAT	15 DAT	28 DAT	2 DAT	7 DAT	15 DAT	28 DAT	7 DAT	15 DAT	28 DAT
1	Untreated Check	0	0	0	0	0	0	0	0	0	0	0
One-Pass – Preplant Burndown (4/24)												
2	Roundup PM3 (22 oz) + Enlist One (2 pt) + Zidua SC (3.25 fl oz) + COC[b] + AMS[c]	11	55	78	81	15	81	93	95	56	82	98
3	Roundup PM3 (22 oz) + Voraxor (1.4 oz) + Zidua SC (3.25 fl oz) + MSO[d] + AMS[c]	44	99	88	36	44	100	100	94	72	93	85
4	Roundup PM3 (22 oz) + Enlist One (2 pt) + Voraxor (1.4 oz) + Zidua SC (3.25 fl oz) + MSO[d] + AMS[c]	55	100	100	100	53	99	100	100	71	93	95
5	Roundup PM3 (22 oz) + Boundary (1.5 pt) + COC[b] + AMS[c]	6	23	72	84	6	41	65	59	27	84	88
6	Roundup PM3 (22 oz) + Boundary (1.5 pt) + Voraxor (1.4 oz) + Zidua SC (3.25 fl oz) + MSO[d] + AMS[c]	52	99	81	21	53	100	100	98	72	93	87
7	Roundup PM3 (22 oz) + Matador-S (3 pt) + COC[b] + AMS[c]	1	29	75	78	8	38	61	43	15	70	78
8	Roundup PM3 (22 oz) + Matador-S (3 pt) + Voraxor (1.4 oz) + MSO[d] + AMS[c]	60	99	97	73	59	100	100	98	64	93	89
	LSD (α=0.10)	**8**	**10**	**7**	**7**	**8**	**3**	**11**	**7**	**15**	**12**	**ns**
	p value	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**0.030**	**0.436**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]COC=Agri-Dex, applied at 1% v/v

[c]AMS=AMSOL/Dry, applied at 8.5 lb/100 gal

[d]MSO=Upland MSO, applied at 1% v/v

Project Goal: Compare the efficacy of Liberty ULTRA to other formulations of glufosinate.

Site Description:

Location:	Janesville, WI	**Crop:**	Enlist Soybean
Field #:	5	**Variety:**	NK22-C4E3
Soil type:	Plano silt loam	**Planting Date:**	5/15
% OM:	3.3	**Emergence Date:**	5/22
pH:	6.4	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.5 in
Previous crop:	Corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	giant ragweed (AMBTR); common lambsquarters (CHEAL)		

Herbicide Application Information:

Date:	5/15	6/11
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	74	77
2" Soil Temp (°F):	62	84
Soil moisture [surface]:	moist	dry
RH %:	41	47
Cloud cover %	0	40
Wind speed (mph)/direction	3-9/NE	3-6/SW
Rainfall (in) 1 wk after APP:	0.47"	0.54"
GPA:	15	20
PSI:	38	40
Nozzle:	TTI 110015	TT 11002
Nozzle spacing (in):	20	20
Boom Height (in):	20	24

Crop and weed information at application:

	Date:	5/15	6/11
soybean	Height:	-	-
	Stage:	-	V1/V2
giant ragweed	Height:	-	1-6" Avg=2"
	Density:	-	16-60/m^2
lambsquarters	Height:	-	0.5-3"
	Density:	-	-

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Dual II Magnum*	7.64 lb/gal	15	10.6 fl oz/a	PRE	A
	Liberty ULTRA	1.61 lbae/gal	10	24 fl oz/a	POST	B
3	Dual II Magnum*	7.64 lb/gal	15	10.6 fl oz/a	PRE	A
	Surmise 5	4.6 lb/gal	10	16.4 fl oz/a	POST	B
4	Dual II Magnum*	7.64 lb/gal	15	10.6 fl oz/a	PRE	A
	Interline	2.34 lb/gal	10	32 fl oz/a	POST	B
5	Dual II Magnum*	7.64 lb/gal	15	10.6 fl oz/a	PRE	A
	Liberty ULTRA	1.61 lbae/gal	10	24 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
6	Dual II Magnum*	7.64 lb/gal	15	10.6 fl oz/a	PRE	A
	Surmise 5	4.6 lb/gal	10	16.4 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
7	Dual II Magnum*	7.64 lb/gal	15	10.6 fl oz/a	PRE	A
	Interline	2.34 lb/gal	10	32 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
8	Zidua PRO	4.09 lb/gal	2, 14, 15	6 fl oz/a	PRE	A
	Liberty ULTRA	1.61 lbae/gal	10	24 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	B
	AMS			3 lb/a	POST	B

Adjuvants: AMS = AMSOL/Dry spray grade ammonium sulfate

*A lower rate of Dual II Magnum (10.6 fl oz/a) was applied to provide annual grass suppression.

****Liberty ULTRA** is a new formulation of glufosinate (Liberty 280 SL) powered by Glu-L™ Technology offered by BASF. ***24 fl oz of Liberty ULTRA is equivalent to 32 fl oz of Liberty.***

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to compare the efficacy of **Liberty ULTRA** to other formulations of glufosinate. **Liberty ULTRA** is a new formulation of glufosinate (Liberty) powered by Glu-L™ Technology offered by BASF. 24 fl oz of Liberty ULTRA is equivalent to 32 fl oz of Liberty 280 SL.

Temporary soybean leaf chlorosis was observed 6 days after treatment (DAT) (Table 12). Injury was greatest following applications of Interline at 32 fl oz.

The efficacy of each glufosinate formulation was dependent on weed species and the inclusion of AMS (Table 12). All formulations provided similar levels of giant ragweed control 27 DAT when applied with AMS at 3 lb acre^{-1}. Interline and Liberty ULTRA provided similar control of common lambsquarters with AMS; however, control with Surmise 5 was poor. In general, the addition of AMS improved the control of giant ragweed of all formulations. This trend was not as evident with common lambsquarters. Results suggest that not all glufosinate formulations perform equally and performance is heavily dependent on the target weed species. Consideration should be given to what weed species are in your field when choosing a glufosinate herbicide. Furthermore, additional surfactants or oils may be needed with certain formulations to improve control of certain weed species.

Plot photos from throughout the growing season are available at **Liberty ULTRA Product Comparison** published on **wiscweeds.info**.

Table 12. Weed control and soybean injury ratings for trial #24-ROK-SB05 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Injury[b] (%)		AMBTR[c] (%)			CHEAL[c] (%)		
		6 DAT	14 DAT	14 DAT	20 DAT	27 DAT	14 DAT	20 DAT	27 DAT
1	Untreated Check	0	0	0	0	0	0	0	0
Two-Pass – PRE (5/24) *fb* POST (6/27)									
2	Dual II Magnum (10.6 oz) ***fb*** Liberty ULTRA (24 oz)	0.0	0	89	85	75	94	93	87
3	Dual II Magnum (10.6 oz) ***fb*** Surmise 5 (16.4 oz)	0.0	0	91	91	79	78	76	53
4	Dual II Magnum (10.6 oz) ***fb*** Interline (32 oz)	4.3	0	92	91	80	88	87	78
5	Dual II Magnum (10.6 oz) ***fb*** Liberty ULTRA (24 oz) + AMS (3 lb)	0.0	0	93	88	82	94	92	87
6	Dual II Magnum (10.6 oz) ***fb*** Surmise 5 (16.4 oz) + AMS (3 lb)	2.0	0	93	93	85	76	74	52
7	Dual II Magnum (10.6 oz) ***fb*** Interline (32 oz) + AMS (3 lb)	4.5	0	95	92	84	89	90	82
8	Zidua PRO (6 oz) ***fb*** Liberty ULTRA (24 oz) + RU PM3 (30 oz) + Zidua SC (2.5 fl oz) + AMS (3 lb)	3.3	0	98	96	90	100	100	100
	LSD (α=0.10)	**0.4**	**ns**	**2**	**3**	**5**	**5**	**7**	**9**
	p value	**<.001**	**ns**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Soybean injury symptoms 6 DAT = leaf chlorosis

[c]AMBTR = giant ragweed; CHEAL = common lambsquarters

Trial: Soybean Herbicide Programs for Giant Ragweed Management **24-ROK-SB21**

Project Goal: Evaluate several 2- and 3-pass herbicide programs for season-long giant ragweed control and soybean yield.

Site Description:

Location:	Janesville, WI	**Crop:**	Enlist Soybean
Field #:	5	**Variety:**	NK22-C4E3
Soil type:	Plano silt loam	**Planting Date:**	5/15
% OM:	3.3	**Emergence Date:**	5/22
pH:	6.4	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.5 in
Previous crop:	Corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	giant ragweed (AMBTR)		

Herbicide Application Information:

Date:	5/15	5/29	6/11	6/25	7/1
Treatment:	PRE (A)	EPOST (B)	MPOST(C)	POST (D)	LPOST (E)
Air Temp (°F):	74	67	77	90	79
2" Soil Temp (°F):	62	-	84	91	-
Soil moisture [surface]:	moist	wet	dry	wet	moist
RH %:	41	69	47	74	42
Cloud cover %	0	40	40	15	0
Wind speed (mph)/direction	3-9/NE	4-10/NW	3-6/SW	4-8/W	2-6/ENE
Rainfall (in) 1 wk after APP:	0.47"	2.80"	0.54"	1.57"	1.55"
Rainfall (in) 2 wks after APP:	2.77"	3.03"	5.55"	2.44"	5.83"
GPA:	15	15	15	15	15
PSI:	38	38	38	38	40
Nozzle:	TTI110015	AIXR110015	AIXR110015	AIXR110015	AIXR110015
Nozzle spacing (in):	20	20	20	20	20
Boom Height (in):	20	22	24	28	30

Crop and weed information at application:

	Date:	5/15	5/29	6/11	6/25	7/1
soybean	Height:	-	2-3"	-	7-9"	9-11"
	Stage:	-	VC	V1/V2	V5	V6
giant ragweed	Height:	-	0.5-1.5" Avg=1"	0.5-3" Avg=1.5"	1-12" Avg=6.5"	1-6" Avg=2"
	Density:	-	12-44/m^2	8-44/m^2	5-10/m^2	0.5-2/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Authority First	70% w/w	2, 14	5 oz/a	PRE	A
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	MPOST	C
	AMS			3 lb/a	MPOST	C
3	FirstRate	84% w/w	2	0.6 oz/a	EPOST	B
	Dual II Magnum	7.64 lb/gal	15	1.3 pt/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	D
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	D
	AMS			3 lb/a	POST	D
4	Prefix	5.29 lb/gal	14, 15	2.33 pt/a	EPOST	B
	Pursuit	2 lb/gal	2	4 fl oz/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	EPOST	B
	AMS			8.5 lb/100 gal	EPOST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	D
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	D
	AMS			3 lb/a	POST	D
5	Fierce XLT	62.4% w/w	2, 14, 15	3.75 oz/a	PRE	A
	Liberty	2.34 lb/gal	10	32 fl oz/a	MPOST	C
	Perpetuo	2.3 lb/al	14, 15	6 fl oz/a	MPOST	C
	COC			1% v/v	MPOST	C
	AMS			3 lb/a	MPOST	C
6	Valor XLT	40.3% w/w	2, 14	5 oz/a	PRE	A
	Liberty	2.34 lb/gal	10	32 fl oz/a	MPOST	C
	Perpetuo	2.3 lb/al	14, 15	6 fl oz/a	MPOST	C
	COC			1% v/v	MPOST	C
	AMS			3 lb/a	MPOST	C
7	Tendovo	4.03 lb/gal	2, 5, 15	2.1 qt/a	PRE	A
	Flexstar GT	3.5 lb/gal	9, 14	3.5 pt/a	MPOST	C
	NIS			0.25% v/v	MPOST	C
	AMS			3 lb/a	MPOST	C
8	Authority First	70% w/w	2, 14	6.4 oz/a	PRE	A
	Anthem Maxx	4.3 lb/gal	14, 15	3 fl oz/a	PRE	A
	Liberty	2.34 lb/gal	10	32 fl oz/a	MPOST	C
	Flexstar	1.88 lb/gal	14	1 pt/a	MPOST	C
	COC			1% v/v	MPOST	C
	AMS			3 lb/a	MPOST	C

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
9	Zidua PRO	4.09 lb/gal	2, 14, 15	6 fl oz/a	PRE	A
	Liberty ULTRA*	1.61 lbae/gal	10	24 fl oz/a	MPOST	C
	Enlist One	3.8 lbae/gal	4	2 pt/a	MPOST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	MPOST	C
	AMS			3 lb/a	MPOST	C
10	Zidua PRO	4.09 lb/gal	2, 14, 15	6 fl oz/a	PRE	A
	Liberty ULTRA*	1.61 lbae/gal	10	29 fl oz/a	MPOST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	MPOST	C
	AMS			3 lb/a	MPOST	C
11	Surveil	48% w/w	2, 14	4.2 oz/a	PRE	A
	Liberty	2.34 lb/gal	10	32 fl oz/a	MPOST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	MPOST	C
	AMS			3 lb/a	MPOST	C
	Liberty	2.34 lb/gal	10	32 fl oz/a	LPOST	E
	AMS			3 lb/a	LPOST	E
12	Surveil	48% w/w	2, 14	4.2 oz/a	PRE	A
	Basagran 5L	5 lb/gal	6	1.6 pt/a	MPOST	C
	Poast	1.5 lb/gal	1	1 pt/a	MPOST	C
	MSO			1% v/v	MPOST	C
	AMS			3 lb/a	MPOST	C
13	Surveil	48% w/w	2, 14	4.2 oz/a	PRE	A
	Flexstar	1.88 lb/gal	14	1 pt/a	MPOST	C
	Poast	1.5 lb/gal	1	1 pt/a	MPOST	C
	MSO			1% v/v	MPOST	C
	AMS			3 lb/a	MPOST	C
14	Surveil	48% w/w	2, 14	4.2 oz/a	PRE	A
	Flexstar	1.88 lb/gal	14	1 pt/a	MPOST	C
	Basagran 5L	5 lb/gal	6	1.6 pt/a	MPOST	C
	Poast	1.5 lb/gal	1	1 pt/a	MPOST	C
	MSO			1% v/v	MPOST	C
	AMS			3 lb/a	MPOST	C
15	Surveil	48% w/w	2, 14	4.2 oz/a	PRE	A
	Storm	4 lb/gal	6, 14	1.5 pt/a	MPOST	C
	Poast	1.5 lb/gal	1	1 pt/a	MPOST	C
	COC			1% v/v	MPOST	C
	AMS			3 lb/a	MPOST	C
	Basagran 5L	5 lb/gal	6	1.6 pt/a	LPOST	E
	COC			1% v/v	LPOST	E
	AMS			3 lb/a	LPOST	E

Adjuvants: AMS = AMSOL/Dry spray grade ammonium sulfate**;** COC = CropOil; MSO = Upland MSO; NIS = Prefer 90

Liberty ULTRA** is a new formulation of glufosinate (Liberty) powered by Glu-L™ Technology offered by BASF. ***24 fl oz of Liberty ULTRA is equivalent to 32 fl oz of Liberty 280 SL.

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to evaluate several 2- and 3-pass herbicide programs for season-long giant ragweed management and soybean yield. Giant ragweed at this research location is a biotype with a prolonged emergence pattern as emergence typically starts in mid- to late-April and continues well into June. Due to this, managing giant ragweed with a 2-pass PRE followed by POST herbicide system is challenging and in past years a third cleanup pass was often needed to achieve greater than 90% control at the end of the season. We developed several 2-pass PRE followed by POST herbicide programs and prioritized choosing products that have been shown to provide good giant ragweed control. Chosen rates for PRE herbicides were very aggressive (high end of rate range) to give us the best optortunity to achieve season long control with only two herbicide applications. We also designed a 2-pass very early POST (applied when soybean reached the VC, cotyledon, growth stage) followed by a second POST pass (applied when giant ragweed reached four inches) to evaluate if delaying the initial herbicide application would result in season long giant ragweed control with only two herbicide applications.

Several of the PRE herbicides caused soybean injury symptoms (stunting, leaf crinkling) 20 and 27 days after treatment (DAT) (Table 13). The most severe injury was observed following applications of PRE herbicides that contained flumioxazin. Soybean injury (stunting, necrosis) was also observed 6 and 13 days following the EPOST application of Prefix + Pursuit + Roundup (trt 4). Severe necrosis and some stunting occurred following the MPOST applications of treatments containing PPO herbicides, fomesafen, acifluorfen, and flumiclorac. Herbicide injury did affect soybean growth later in the season as seen in the difference in percent canopy closure on 7/8 (Table 13).

Most of the PRE herbicides we evaluated provided good early season residual control of giant ragweed (Table 13). Furthermore, several of the 2-pass PRE followed by POST herbicide programs provide good end-of-season control; however, none achieved 100% control. A third pass was necessary for complete control (trt 11). POST herbicide mixes containing fomesafen seemed to have greater levels of giant ragweed control after application. Both 2-pass very early POST followed by POST herbicide programs provided near 100% control at soybean harvest.

Soybean yield was statisticaly similar among most of the different herbicide programs (Table 13). Lowest yields were observed in treatments that had poor end-of-season giant ragweed control or had high levels of crop injury earlier in the season.

Plot photos are available for **weed control** and **soybean injury** published on **wiscweeds.info**.

Take Home Points:

- 2-pass very early POST followed by POST herbicide programs provided near complete control of giant ragweed at soybean harvest.
- Several 2-pass PRE followed by POST programs had good end-of-season control; however, none achieved 100%
  - A third herbicide application was necessary to achieve 100% control at soybean harvest

Table 13. Crop injury, giant ragweed control ratings, and soybean yield for trial #24-ROK-SB21 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Soybean Injury (%)			Canopy	Giant Ragweed (%)					Yield[b]
		6/4	6/11	6/25	7/8	6/4	6/11	6/25	7/8	9/18	bu acre^{-1}
1	Untreated Check	0	0	0	-	0	0	0	0	0	6 c
Two-Pass – EPOST (5/15) *fb* POST (6/25)								POST			
3	FirstRate (0.6 oz) + Dual II Magnum (1.3 pt) + Roundup PM3 (20 oz) + AMS[d] ***fb*** Liberty (32 oz) + Roundup PowerMAX3 (26 oz) + AMS[c]	1.3	9.3	3.5	55	94	93	79	98	99	71 a
4	Prefix (2.33 pt) + Pursuit (4 oz) + Roundup PM3 (20 oz) + AMS[d] ***fb*** Liberty (32 oz) + Roundup PowerMAX3 (26 oz) + AMS[c]	15.0	16.8	10.3	48	95	95	81	99	99	72 a
Two-Pass – PRE (5/15) *fb* MPOST (6/11)			MPOST				MPOST				
2	Authority First (5 oz) ***fb*** Roundup PowerMAX3 (30 oz) + AMS[c]	0.3	1.8	2.0	58	85	87	89	87	84	68 a
5	Fierce XLT (3.75 oz) ***fb*** Liberty (32 oz) + Perpetuo (6 oz) + COC (1% v/v) + AMS[c]	6.5	6.0	16.5	50	79	76	93	83	67	64 ab
6	Valor XLT (5 oz) ***fb*** Liberty (32 oz) + Perpetuo (6 oz) + COC (1% v/v) + AMS[c]	9.0	7.5	15.8	48	88	83	94	86	78	68 a
7	Tendovo (2.1 qt) ***fb*** Flexstar GT (3.5 pt) + NIS (0.25% v/v) + AMS[c]	0.0	4.3	7.3	53	86	87	94	92	92	68 a
8	Authority First (6.4 oz) + Anthem Maxx (3 fl oz) ***fb*** Liberty (32 oz) + Flexstar (1 pt) + COC (1% v/v) + AMS[c]	2.0	1.5	12.0	52	84	82	99	95	94	73 a
9	Zidua PRO (6 oz) ***fb*** Liberty ULTRA (24 oz) + Enlist One (2 pt) + Roundup PM3 (20 oz) + AMS[c]	0.0	0.8	5.5	56	63	55	98	92	87	71 a
10	Zidua PRO (6 oz) ***fb*** Liberty ULTRA (29 oz) + Roundup PM3 (30 oz) + AMS[c]	0.0	0.0	2.3	57	70	61	91	84	78	60 ab
12	Surveil (4.2 oz) ***fb*** Basagran 5L (1.6 pt) + Poast (1 pt) + MSO (1% v/v) + AMS[c]	9.0	8.5	5.8	55	88	83	89	78	66	55 b
13	Surveil (4.2 oz) ***fb*** Flexstar (1 pt) + Poast (1 pt) + MSO (1% v/v) + AMS[c]	7.3	7.5	13.5	48	90	86	96	90	86	64 ab
14	Surveil (4.2 oz) ***fb*** Flexstar (1 pt) + Basagran 5L (1.6 pt) + Poast (1 pt) + MSO (1% v/v) + AMS[c]	9.0	8.0	22.8	36	87	84	96	90	85	66 ab
Three-Pass – PRE (5/15) *fb* MPOST (6/11) *fb* LPOST (7/1)								LPOST			
15	Surveil (4.2 oz) ***fb*** Storm (1.5 pt) + Poast (1 pt) + COC (1% v/v) + AMS[c] ***fb*** Basagran 5L (1.6 pt) + COC (1% v/v) + AMS[c]	8.8	8.3	27.8	33	84	87	95	97	94	66 ab
11	Surveil (4.2 oz) ***fb*** Liberty (32 oz) + Roundup PM3 (26 oz) + AMS[c] ***fb*** Liberty (32 oz) + AMS[c]	8.5	8.5	10.0	48	89	86	95	100	100	67 a
	LSD (α=0.10)	**2.4**	**4.1**	**3.8**	**4**	**9**	**9**	**5**	**7**	**12**	**7**
	p value	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

[c]AMS = AMSOL/Dry, [c]applied at 3 lb/a; [d]applied at 8.5 lb/100 gal.

Project Goal: Compare the crop safety profile and waterhemp control of Enversa to other group 15 herbicides on the market. Enversa is a new herbicide offering from Corteva containing encapsulated acetochlor.

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-5	**Variety:**	O'SOY 2024EL-3
Soil type:	Kegonsa loam	**Planting Date:**	5/23/24
% OM:	1.6	**Emergence Date:**	6/3/24
pH:	6.7	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.25 in
Previous crop:	Corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	gly-R waterhemp (AMATA)		

Herbicide Application Information:

Date:	5/24	6/20
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	64	79
2" Soil Temp (°F):	-	-
Soil moisture [surface]:	moist	wet
RH %:	81	92
Cloud cover %	-	99
Wind speed (mph)/direction	4/S	4-8/S
Rainfall (in) 1 wk after APP:	2.44"	1.93"
GPA:	13.6	15
PSI:	-	38
Nozzle:	TTI 11002	AIXR 110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	23

Crop and weed information at application:

	Date:	5/24	6/20
soybean	Height:	-	3-5"
	Stage:	-	V2
waterhemp	Height:	-	0.5-2" Avg=1"
	Density:	-	20-140/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Sonic*	70% w/w	2, 14	2.5 oz/a	PRE	A
2	Sonic*	70% w/w	2, 14	2.5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
3	Sonic*	70% w/w	2, 14	2.5 oz/a	PRE	A
	Enversa	3 lb/gal	15	3 pt/a	POST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
4	Sonic*	70% w/w	2, 14	2.5 oz/a	PRE	A
	Warrant	3 lb/gal	15	3 pt/a	POST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
5	Sonic*	70% w/w	2, 14	2.5 oz/a	PRE	A
	Dual II Magnum	7.64 lb/gal	15	1.25 pt/a	POST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
6	Sonic*	70% w/w	2, 14	2.5 oz/a	PRE	A
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
7	Sonic*	70% w/w	2, 14	2.5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
8	Sonic*	70% w/w	2, 14	2.5 oz/a	PRE	A
	Enversa	3 lb/gal	15	3 pt/a	POST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
9	Sonic*	70% w/w	2, 14	2.5 oz/a	PRE	A
	Warrant	3 lb/gal	15	3 pt/a	POST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B

Adjuvants: AMSOL = liquid AMS

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
10	Sonic*	70% w/w	2, 14	2.5 oz/a	PRE	A
	Dual II Magnum	7.64 lb/gal	15	1.25 pt/a	POST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
11	Sonic*	70% w/w	2, 14	2.5 oz/a	PRE	A
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B

Adjuvants: AMSOL = liquid AMS

*A lower rate of Sonic (2.5 oz/a) was applied over the entire trial area to suppress waterhemp but allow enough escapes to evaluate postemergence control.

Trial Summary:

The trial was established at the O'Brien Hybrids farm located north of Brooklyn, WI to compare the crop safety profile and waterhemp control of Enversa to other group 15 herbicides on the market. Enversa is a new herbicide offering from Corteva containing encapsulated acetochlor. The field was infested with a natural population of glyphosate-resistant waterhemp.

All the POST herbicide programs caused soybean leaf necrosis 6 days after treatment (DAT) (Table 14). Greater injury levels were observed in Liberty + Enlist tank mixes than Roundup + Enlist tank mixes. Enversa caused less soybean leaf burn than the other group 15 herbicides when in a tank mix with Liberty and Enlist. Soybean quickly recovered and by 13 DAT leaf necrosis was <3% in all treatments.

Initial waterhemp control (13 DAT) was 4-8% greater in Liberty + Enlist tank mixes than Roundup + Enlist tank mixes; however, by 27 DAT control was similar (Table 14). Tank mixes containing Zidua SC had better waterhemp control at 27 DAT than similar tank mixes with the other group 15 herbicides. All the herbicide programs evaluated provided excellent end-of-season waterhemp control.

Soybean yield of the various herbicide programs was very similar and did not statistically differ (Table 14). Yield across all PRE fb POST herbicide programs = 69 bu acre^{-1}, while the treated check (PRE only) = 66 bu acre^{-1}.

Plot photos from throughout the growing season are available **Enversa and Group 15 Herbicides Layered Residual Comparison** published on **wiscweeds.info**.

Table 14. Crop injury, waterhemp control ratings, and soybean yield for trial #24-BRO-SB02 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Necrosis (%)		Waterhemp (%)			Yield[b] bu acre^{-1}
		6 DAT	13 DAT	13 DAT	27 DAT	9/18	
1	Treated Check[c]	0	0	0	0	0	66 a
Two-Pass – PRE[c] (5/24) *fb* POST (6/20)							
2	Enlist One (2 pt) + Roundup PM3 (30 oz) + AMS[d]	3.0	1.3	93	88	96	70 a
3	Enlist One (2 pt) + Roundup PM3 (30 oz) + Enversa (3 pt) + AMS[d]	2.3	1.8	92	85	92	69 a
4	Enlist One (2 pt) + Roundup PM3 (30 oz) + Warrant (3 pt) + AMS[d]	2.3	2.3	93	88	96	68 a
5	Enlist One (2 pt) + Roundup PM3 (30 oz) + Dual II Magnum (1.25 pt) + AMS[d]	5.3	1.8	90	85	95	68 a
6	Enlist One (2 pt) + Roundup PM3 (30 oz) + Zidua SC (2.5 fl oz) + AMS[d]	4.3	1.8	94	91	97	67 a
7	Enlist One (2 pt) + Liberty (32 oz) + AMS[d]	9.8	1.5	97	88	96	69 a
8	Enlist One (2 pt) + Liberty (32 oz) + Enversa (3 pt) + AMS[d]	8.8	1.5	98	87	96	69 a
9	Enlist One (2 pt) + Liberty (32 oz) + Warrant (3 pt) + AMS[d]	11.8	2.5	98	91	95	70 a
10	Enlist One (2 pt) + Liberty (32 oz) + Dual II Magnum (1.25 pt) + AMS[d]	11.8	2.0	97	89	96	70 a
11	Enlist One (2 pt) + Liberty (32 oz) + Zidua SC (2.5 fl oz) + AMS[d]	11.3	1.8	98	95	98	69 a
	LSD (α=0.10)	**1.5**	**ns**	**3**	**4**	**ns**	**ns**
	p value	**<.001**	**0.677**	**<.001**	**0.016**	**0.670**	**0.257**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

[c]A lower rate of Sonic (2.5 oz/a) was applied PRE over the entire trial area including the treated check (treatment #1)

[d]All POST applications included AMSOL (liquid AMS) applied at 2.5% v/v.

Project Goal: Evaluate tank mixes for postemergence control of glyphosate-resistant waterhemp in Enlist soybean.

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-5	**Variety:**	O'SOY 2024EL-3
Soil type:	Kegonsa loam	**Planting Date:**	5/23/24
% OM:	1.6	**Emergence Date:**	6/3/24
pH:	6.7	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.25 in
Previous crop:	Corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	gly-R waterhemp (AMATA)		

Herbicide Application Information:

Date:	5/24	6/27	7/10
Treatment:	PRE (A)	POST (B)	LPOST (C)
Air Temp (°F):	64	81	79
2" Soil Temp (°F):	-	-	-
Soil moisture [surface]:	moist	moist	moist
RH %:	81	51	63
Cloud cover %	-	30	30
Wind speed (mph)/direction	4/S	0-2/SW	2-5/N
Rainfall (in) 1 wk after APP:	2.44"	1.70"	4.35"
GPA:	13.6	15	15
PSI:	-	40	40
Nozzle:	TTI 11002	AIXR 110015	AIXR 110015
Nozzle spacing (in):	20	20	20
Boom Height (in):	20	26	26

Crop and weed information at application:

	Date:	5/24	6/27	7/10
soybean	Height:	-	-	14"
	Stage:	-	V3	R1/R2
waterhemp	Height:	-	0.5-6" Avg=3"	0.5-1" Avg=1"
	Density:	-	4-60/m^2	0-12/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
2	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
3	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
4	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
5	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	Enversa	3 lb/gal	15	3 pt/a	POST	B
	AMSOL			2.5% v/v	POST	B
6	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	POST	B
	Enversa	3 lb/gal	15	3 pt/a	POST	B
	AMSOL			2.5% v/v	POST	B
7	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	POST	B
	Enversa	3 lb/gal	15	3 pt/a	POST	B
	AMSOL			2.5% v/v	POST	B
8	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Flexstar	1.88 lb/gal	14	1 pt/a	POST	B
	AMSOL			2.5% v/v	POST	B
9	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	Flexstar	1.88 lb/gal	14	1 pt/a	POST	B
	AMSOL			2.5% v/v	POST	B

Adjuvants: AMSOL = liquid AMS

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
10	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	POST	B
	Flexstar	1.88 lb/gal	14	1 pt/a	POST	B
	AMSOL			2.5% v/v	POST	B
11	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	Flexstar	1.88 lb/gal	14	1 pt/a	POST	B
	AMSOL			2.5% v/v	POST	B
12	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	LPOST	C
	Liberty	2.34 lb/gal	10	32 fl oz/a	LPOST	C
	AMSOL			2.5% v/v	LPOST	C
13	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	LPOST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	LPOST	C
	AMSOL			2.5% v/v	LPOST	C
14	Sonic*	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	LPOST	C
	AMSOL			2.5% v/v	LPOST	C

Adjuvants: AMSOL = liquid AMS

*Sonic (5 oz/a) was applied over the entire trial area to suppress waterhemp but allow enough escapes to evaluate postemergence control.

Trial Summary:

The trial was established at the O'Brien Hybrids farm located north of Brooklyn, WI to evaluate tank mixes for postemergence control of glyphosate-resistant waterhemp in Enlist soybean. The field was infested with a natural population of glyphosate-resistant waterhemp.

All soybean plots treated by a POST herbicide program exhibited some level of injury 6 and 14 days after treatment (DAT) (Table 15). Soybean injury was greater from herbicide mixtures containing Flexstar (fomesafen).

Initial waterhemp control (14 DAT) was slightly better in plots treated with tank mixes containing either Liberty or Flexstar; however control was excellent (>95%) for all herbicide programs by 27 DAT and near soybean harvest (Table 15).

Soybean yield of the various herbicide programs was very similar (Table 15). Yield across all two- and three-pass herbicide programs = 64 bu acre^{-1}, while the treated check (PRE only) = 57 bu acre^{-1}.

Plot photos from throughout the growing season are available at **Evaluation of POST Herbicide Tank Mixes in Enlist Soybean** published on **wiscweeds.info**.

Take Home Points:

- POST herbicide tank mixes containing Flexstar had greater soybean injury.
- Three-pass herbicide programs were not necessary to achieve season long control.
- Results from this trial suggest that several POST herbicide tank mixtures can be effective for season long control of glyphosate-resistant waterhemp **IF** used in combination with an effective PRE herbicide.

Table 15. Crop injury, waterhemp control ratings, and soybean yield for trial #24-BRO-SB03 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Injury (%)		Waterhemp (%)			Yield[b] bu acre^{-1}
		7/3	7/11	7/11	7/23	9/18	
1	Treated Check[c]	0	0	0	0	0	57 d
Two-Pass – PRE[c] (5/24) *fb* POST (6/27)							
2	Enlist One (2 pt) + Liberty (32 oz) + AMS[d]	3.8	2.5	97	98	99	63 abc
3	Enlist One (2 pt) + Roundup PM3 (20 oz) + AMS[d]	1.5	1.3	94	98	99	67 ab
4	Enlist One (2 pt) + Liberty (32 oz) + Roundup PM3 (20 oz) + AMS[d]	1.8	1.8	95	98	97	64 abc
5	Enlist One (2 pt) + Liberty (32 oz) + Enversa (3 pt) + AMS[d]	2.5	1.8	97	99	100	63 abc
6	Enlist One (2 pt) + Roundup PM3 (20 oz) + Enversa (3 pt) + AMS[d]	1.5	1.0	92	97	99	63 abc
7	Enlist One (2 pt)+Liberty (32 oz)+Roundup PM (20 oz)+Enversa (3 pt)+AMS[d]	2.3	1.5	94	99	98	67 a
8	Enlist One (2 pt) + Flexstar (1 pt) + AMS[d]	6.3	11.5	97	99	100	66 abc
9	Enlist One (2 pt) + Liberty (32 oz) + Flexstar (1 pt) + AMS[d]	7.8	12.5	99	100	99	65 abc
10	Enlist One (2 pt) + Roundup PM3 (20 oz) + Flexstar (1 pt) + AMS[d]	7.8	12.5	99	100	99	65 abc
11	Liberty (32 oz) + Flexstar (1 pt) + AMS[d]	7.0	11.0	98	99	97	64 abc
Three-Pass – PRE[c] (5/24) *fb* POST (6/27) *fb* LPOST (7/10)				LPOST			
12	Enlist One (2 pt) + Liberty (32 oz) + AMS[d] ***fb*** Enlist One (2 pt) + Liberty (32 oz) + AMS[d]	2.5	1.5	99	100	100	62 abc
13	Enlist One (2 pt) + Liberty (32 oz) + AMS[d] ***fb*** Liberty (32 oz) + Roundup PM3 (20 oz) + AMS[d]	3.3	0.8	97	100	100	61 cd
14	Enlist One (2 pt) + Roundup PM3 (20 oz) + AMS[d] ***fb*** Liberty (32 oz) + AMS[d]	2.0	1.5	94	100	100	61 bcd
	LSD (α=0.10)	**1.0**	**1.2**	**2**	**ns**	**2**	**3**
	p value	**<.001**	**<.001**	**<.001**	**0.249**	**0.034**	**<.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

[c]Sonic (5 oz/a) was applied PRE over the entire trial area including the treated check (treatment #1)

[d]All POST applications included AMSOL (liquid AMS) applied at 2.5% v/v.

Project Goal: Compare waterhemp control of four group 15 herbicide active ingredients.

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-5	**Variety:**	O'SOY 2024EL-3
Soil type:	Kegonsa loam	**Planting Date:**	5/23/24
% OM:	1.6	**Emergence Date:**	6/3/24
pH:	6.7	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.25 in
Previous crop:	Corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	gly-R waterhemp (AMATA); fall panicum (PANDI)		

Herbicide Application Information:

Date:	5/23
Treatment:	PRE (A)
Air Temp (°F):	81
2" Soil Temp (°F):	72
Soil moisture [surface]:	Moist
RH %:	32
Cloud cover %	0
Wind speed (mph)/direction	0-4/W
Rainfall (in) 1 wk after APP:	2.44"
GPA:	15
PSI:	40
Nozzle:	TTI 110015
Nozzle spacing (in):	20
Boom Height (in):	20

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Zidua SC	4.17 lb/gal	15	3.25 fl oz/a	PRE	A
3	Dual II Magnum	7.64 lb/gal	15	1.3 pt/a	PRE	A
4	Outlook	6 lb/gal	15	14 fl oz/a	PRE	A
5	Warrant	3 lb/gal	15	3 pt/a	PRE	A

Trial Summary:

The trial was established at the O'Brien Hybrids farm located north of Brooklyn, WI to compare waterhemp control of four group 15 herbicide active ingredients (pyroxasulfone [Zidua SC], *S*-metolachlor [Dual II Magnum], dimethenamid [Outlook], acetochlor [Warrant]). The field was infested with a natural population of glyphosate-resistant waterhemp and fall panicum. Only very minor (<2%) soybean was observed at 21 days after treatment (DAT) (data not shown). Waterhemp and fall panicum control differed among the four group 15 herbicides evaluated in this trial (Table 16). The poor control from Warrant is consistent to what we have observed in previous research trials at this location. This location has a lighter soil (45% sand, 41% silt, 14% clay) with low OM (1.6%). Warrant may perform better in fields with a different soil type.

Plot photos from throughout the growing season are available **Group 15 Herbicide Comparison** published on **wiscweeds.info**.

Take Home Points:

- There was no significant soybean injury observed from any of the group 15 herbicides evaluated.
- Waterhemp Control
  - Zidua SC **>** Dual II Magnum, Outlook **>** Warrant
- Fall Panicum Control
  - Zidua SC, Dual II Magnum, Outlook **>** Warrant

Table 16. Waterhemp and fall panicum control ratings for trial #24-BRO-SB04 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Waterhemp (%)				Fall Panicum (%)			
		12 DAT	21 DAT	29 DAT	39 DAT	12 DAT	21 DAT	29 DAT	39 DAT
1	Untreated Check	0	0	0	0	0	0	0	0
One-Pass – PRE (5/23)									
2	Zidua SC (3.25 fl oz)	99	99	91	80	99	99	97	88
3	Dual II Magnum (1.3 pt)	98	90	75	30	99	99	95	85
4	Outlook (14 fl oz)	99	91	73	25	100	100	95	85
5	Warrant (3 pt)	91	65	33	15	96	89	81	50
	LSD (α=0.10)	**5**	**9**	**7**	**6**	**3**	**4**	**5**	**6**
	p value	**0.055**	**<.001**	**<.001**	**<.001**	**0.076**	**0.001**	**<.001**	**<.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

Project Goal: Evaluate the efficacy of applying Liberty ULTRA first early-postemergence in the Enlist One soybean system.

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-5	**Variety:**	O'SOY 2024EL-3
Soil type:	Kegonsa loam	**Planting Date:**	5/23/24
% OM:	1.6	**Emergence Date:**	6/3/24
pH:	6.7	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.25 in
Previous crop:	Corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	gly-R waterhemp (AMATA); fall panicum (PANDI)		

Herbicide Application Information:

Date:	5/24	6/27	7/10	7/16
Treatment:	PRE (A)	POST (B)	LPOST (C)	LPOST (D)
Air Temp (°F):	64	72	79	85
2" Soil Temp (°F):	-	-	-	-
Soil moisture [surface]:	moist	moist	moist	wet
RH %:	81	56	63	57
Cloud cover %	-	30	30	15
Wind speed (mph)/direction	4/S	2-5/W	2-5/N	1-3/NNW
Rainfall (in) 1 wk after APP:	2.44"	1.70"	4.35"	0.54"
GPA:	13.6	20*/15*	15	20
PSI:	-	40	40	39
Nozzle:	TTI 11002	TT*/AIXR**	AIXR110015	TT 11002
Nozzle spacing (in):	20	20	20	20
Boom Height (in):	20	26	26	26

*Used TT11002 nozzle tips and 20 GPA for trts 2, 3, and 7

**Used AIXR110015 nozzle tips and 15 GPA for trts 4, 5, 6, and 8

Crop and weed information at application:

	Date:	5/24	6/27	7/10	7/16
soybean	Height:	-	-	14"	16"
	Stage:	-	V3	R1	R2
waterhemp	Height:	-	0.5-9" Avg=4"	1-6" Avg=3"	1-6" Avg=2.5"
	Density:	-	56-308/m^2	16-102/m^2	10-12/m^2
fall panicum	Height:	-	1-8" Avg=4"	-	-
	Density:	-	8-196/m^2	-	-

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
2	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Liberty ULTRA	1.61 lbae/gal	10	24 fl oz/a	POST	B
	Select Max	0.97 lb/gal	1	12 fl oz/a	POST	B
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
3	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Liberty ULTRA	1.61 lbae/gal	10	24 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
4	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Select Max	0.97 lb/gal	1	12 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1 pt/a	POST	B
	COC			1% v/v	POST	B
	AMS			1.5 lb/a	POST	B
5	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1 pt/a	POST	B
	COC			1% v/v	POST	B
	AMS			1.5 lb/a	POST	B
6	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty ULTRA	1.61 lbae/gal	10	24 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
7	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Liberty ULTRA	1.61 lbae/gal	10	24 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	LPOST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	LPOST	C
	COC			1% v/v	LPOST	C
	AMS			3 lb/a	LPOST	C

Adjuvants: AMS = AMSOL/Dry spray grade ammonium sulfate; COC = Crop Oil

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
8	Verdict*	5.57 lb/gal	14, 15	5 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1 pt/a	POST	B
	COC			1% v/v	POST	B
	AMS			1.5 lb/a	POST	B
	Liberty ULTRA	1.61 lbae/gal	10	24 fl oz/a	LPOST	D
	Roundup PowerMAX3	4.8 lbae/gal	9	30 fl oz/a	LPOST	D
	AMS			3 lb/a	LPOST	D

Adjuvants: AMS = AMSOL/Dry spray grade ammonium sulfate; COC = CropOil

*Verdict (5 fl oz/a) was applied over the entire trial area to suppress waterhemp but allow enough escapes to evaluate postemergence control.

Liberty ULTRA is a new formulation of glufosinate (Liberty) powered by Glu-L™ Technology offered by BASF. ***24 fl oz of Liberty ULTRA is equivalent to 32 fl oz of Liberty 280 SL.***

Trial Summary:

The trial was established at the O'Brien Hybrids farm located north of Brooklyn, WI to evaluate the efficacy of applying Liberty ULTRA first early-postemergence in the Enlist One soybean system. The field was infested with a natural population of glyphosate-resistant waterhemp and fall panicum.

Minor (<5%) soybean injury was observed in all treatments at 6 and 14 days after the POST (B) application (data not shown).

All of the treatments provided similar waterhemp control at 6 and 14 days after the POST (B) application (Table 17). Amongst the single POST application treatments, the Enlist One + Roundup tank mix (trt 5) had the greatest waterhemp control 26 DAT. This is consistent to what we observed in several other trials at this location in 2024. Amongst the 2-pass POST systems, the Enlist One followed by Liberty ULTRA program had greater control than the Libery ULTRA followed by Enlist One program at the 7/23 rating. However, each program did provide >90% control. Fall panicum control was excellent for all herbicide programs except treatment 4 (Table 17).

Soybean yield of the various herbicide programs was very similar (Table 17). Yield across all two- and three-pass herbicide programs = 62 bu acre^{-1}, while the treated check (PRE only) = 37 bu acre^{-1}.

Plot photos from throughout the growing season are available **Lead with Liberty ULTRA** published on **wiscweeds.info**.

Table 17. Weed control ratings and soybean yield for trial #24-BRO-SB08 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Waterhemp (%) 7/3	7/11	7/16	7/23	F. Panicum 7/11	7/16	Yield[b] bu acre^{-1}
1	Treated Check[c]	0	0	0	0	0	0	37 b
Two-Pass – PRE (5/24) *fb* POST (6/27)								
2	Liberty ULTRA (24 oz) + Select Max (12 oz) + Zidua SC (2.5 fl oz) + AMS[d]	91	83	79	82	100	100	61 a
3	Liberty ULTRA (24 oz) + Roundup PM3 (30 oz) + Zidua SC (2.5 fl oz) + AMS[d]	89	82	80	81	98	98	62 a
4	Enlist One (2 pt) + Select Max (12 oz) + Dual II Magnum (1 pt) + COC + AMS[e]	86	82	83	85	86	90	57 a
5	Enlist One (2 pt) + Roundup PM3 (30 oz) + Dual II Magnum (1 pt) + COC + AMS[e]	88	85	87	91	100	100	63 a
6	Enlist One (2 pt) + Liberty ULTRA (24 oz) + Roundup PM3 (30 oz) + Zidua SC (2.5 fl oz) + AMS[d]	91	87	84	83	99	100	61 a
Three-Pass – PRE (5/24) *fb* POST (6/27) *fb* LPOST (7/10)				**LPOST (C)**				
7	Liberty ULTRA (24 oz) + Roundup PM3 (30 oz) + Zidua SC (2.5 fl oz) + AMS[d] ***fb*** Enlist One (2 pt) + Roundup PM3 (30 oz) + COC + AMS[d]	85	85	89	93	99	100	64 a
Three-Pass – PRE (5/24) *fb* POST (6/27) *fb* LPOST (7/16)					**LPOST (D)**			
8	Enlist One (2 pt) + Select Max (12 oz) + Dual II Magnum (1 pt) + COC + AMS[e] ***fb*** Liberty ULTRA (24 oz) + Roundup PM3 (30 oz) + AMS[d]	92	85	89	98	100	100	63 a
	LSD (α=0.10)	**ns**	**ns**	**3**	**4**	**1**	**2**	**7**
	p value	**0.391**	**0.308**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

[c]Verdict (5 fl oz/a) was applied over the entire trial area to suppress waterhemp but allow enough escapes to evaluate postemergence control

[d]POST applications included AMSOL/Dry applied at 3 lb/a

[e]POST applications included AMSOL/Dry applied at 1.5 lb/a

Trial: Fomesafen and Group 15 Herbicides Layered Residual Comparison **24-BRO-SB12**

Project Goals: Compare fomesafen POST control with Liberty vs Liberty alone vs Liberty + Enlist. Compare fomesafen layered residual control vs group 15 herbicides.

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-5	**Variety:**	O'SOY 2024EL-3
Soil type:	Kegonsa loam	**Planting Date:**	5/23/24
% OM:	1.6	**Emergence Date:**	6/3/24
pH:	6.7	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.25 in
Previous crop:	Corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	gly-R waterhemp (AMATA)		

Herbicide Application Information:

Date:	5/23	6/27
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	81	81
2" Soil Temp (°F):	72	-
Soil moisture [surface]:	moist	moist
RH %:	32	51
Cloud cover %	-	30
Wind speed (mph)/direction	4-6/W	0-2/SW
Rainfall (in) 1 wk after APP:	2.44"	1.70"
GPA:	15	15
PSI:	38	40
Nozzle:	TTI 110015	AIXR 110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	26

Crop and weed information at application:

	Date:	5/23	6/27
soybean	Height:	-	-
	Stage:	-	V3
waterhemp	Height:	-	0.5-6" Avg=4"
	Density:	-	36-126/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Liberty	2.34 lb/gal	10	36 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
3	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
4	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Liberty	2.34 lb/gal	10	36 fl oz/a	POST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
5	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Liberty	2.34 lb/gal	10	36 fl oz/a	POST	B
	Flexstar	1.88 lb/gal	14	1 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
6	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Liberty	2.34 lb/gal	10	36 fl oz/a	POST	B
	Prefix	5.29 lb/gal	14, 15	2 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
7	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Liberty	2.34 lb/gal	10	36 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
8	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Liberty	2.34 lb/gal	10	36 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1.25 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
9	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Liberty	2.34 lb/gal	10	36 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1.5 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B

Adjuvants: AMS = AMSOL/Dry spray grade ammonium sulfate

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
10	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Liberty	2.34 lb/gal	10	36 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1.75 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
11	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Liberty	2.34 lb/gal	10	36 fl oz/a	POST	B
	Anthem Maxx	4.3 lb/gal	14, 15	2.5 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
12	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Liberty	2.34 lb/gal	10	36 fl oz/a	POST	B
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
13	Tendovo*	4.03 lb/gal	2, 5, 15	1.4 qt	PRE	A
	Liberty	2.34 lb/gal	10	36 fl oz/a	POST	B
	Warrant	3 lb/gal	15	3 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMS			3 lb/a	POST	B

Adjuvants: AMS = AMSOL/Dry spray grade ammonium sulfate

*A lower rate of Tendovo (1.4 qt/a) was applied over the entire trial (except the untreated check) to suppress waterhemp but allow enough escapes to evaluate postemergence control.

Trial Summary:

The trial was established at the O'Brien Hybrids farm located north of Brooklyn, WI to

1) Compare fomesafen POST control with Liberty vs Liberty alone vs Liberty + Enlist and
2) Compare fomesafen layered residual control vs group 15 herbicides.

The field was infested with a natural population of glyphosate-resistant waterhemp.

All the POST herbicide programs caused some level of soybean leaf necrosis 6 and 14 days after treatment (DAT) (Table 18). Greater injury levels were observed in tank mixes containing fomesafen (Flexstar, Prefix) and fluthiacet (Anthem Maxx). The addition of a group 15 herbicide also increased soybean injury. Warrant (acetochlor) caused less soybean injury than either Dual II Magnum (*S*-metolachlor) or Zidua SC (pyroxasulfone) 14 DAT. Soybean injury symptoms did not persist throughout the growing season.

Initial waterhemp control (6 DAT) was slightly better in plots treated with tank mixes containing fomesafen (Flexstar, Prefix) + Liberty and the Enlist One + Liberty treatment (Table 18). These mixes and Enlist One + Roundup were the only four herbicide programs that provided >90% control at 14 DAT and after. Averaged across treatments, waterhemp control near soybean harvest of Liberty tank mixed with Enlist One or fomesafen was 94% compared to 77% of Liberty plus glyphosate mixes. There was not an evident benefit of adding a group 15 layered residual herbicide, as the Enlist One + Roundup (no layered residual) treatment had the highest waterhemp control at the end of the season.

Soybean yield of the various herbicide programs were very similar and there was not a statistically significant difference (Table 18). All herbicide programs provided a statistically significant yield increase over the untreated check. Yield across all two-pass herbicide programs = 58 bu acre^{-1}, while the untreated check = 50 bu acre^{-1}.

Plot photos from throughout the growing season are available **Fomesafen and Group 15 Herbicides Layered Residual Comparison** published on **wiscweeds.info**.

Take Home Points:

- POST herbicide tank mixes containing fomesafen and fluthiacet had greater soybean injury.
- The addition of a group 15 herbicide at the POST application did not improve waterhemp control or soybean yield.
- Liberty needed to be tank mixed with fomesafen (Flexstar, Prefix) or Enlist One to achieve satisfactory waterhemp control.

Table 18. Crop injury, waterhemp control ratings, and soybean yield for trial #24-BRO-SB12 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Necrosis (%)		Waterhemp (%)				Yield[b] bu acre^{-1}
		6 DAT	14 DAT	6 DAT	14 DAT	26 DAT	9/18	
1	Untreated Check	0	0	0	0	0	0	50 b
Two-Pass – PRE[c] (5/23) *fb* POST (6/27)								
2	Liberty (36 oz) + Roundup PM3 (26 oz) + AMS[d]	4.0	1.5	93	87	78	77	59 a
3	Enlist One (2 pt) + Roundup PM3 (26 oz) + AMS[d]	5.3	1.0	94	92	94	96	60 a
4	Liberty (36 oz) + Enlist One (2 pt) + Roundup PM3 (26 oz) + AMS[d]	5.3	1.5	96	96	91	95	59 a
5	Liberty (36 oz) + Flexstar (1 pt) + Roundup PM3 (26 oz) + AMS[d]	10.3	12.0	99	95	95	93	56 a
6	Liberty (36 oz) + Prefix (2 pt) + Roundup PM3 (26 oz) + AMS[d]	10.5	15.8	99	97	94	92	57 a
7	Liberty (36 oz) + Dual II Magnum (1 pt) + Roundup PM3 (26 oz) + AMS[d]	5.8	11.0	93	85	81	78	57 a
8	Liberty (36 oz) + Dual II Magnum (1.25 pt) + Roundup PM3 (26 oz) + AMS[d]	7.5	7.0	90	85	83	75	60 a
9	Liberty (36 oz) + Dual II Magnum (1.5 pt) + Roundup PM3 (26 oz) + AMS[d]	5.0	7.5	87	82	74	74	59 a
10	Liberty (36 oz) + Dual II Magnum (1.75 pt) + Roundup PM3 (26 oz) + AMS[d]	5.5	9.3	89	83	78	75	59 a
11	Liberty (36 oz) + Anthem Maxx (2.5 oz) + Roundup PM3 (26 oz) + AMS[d]	6.3	12.0	93	85	79	79	56 a
12	Liberty (36 oz) + Zidua SC (2.5 fl oz) + Roundup PM3 (26 oz) + AMS[d]	4.0	6.8	88	82	80	75	60 a
13	Liberty (36 oz) + Warrant (3 pt) + Roundup PM3 (26 oz) + AMS[d]	3.3	2.7	85	83	72	74	58 a
	LSD (α=0.10)	**2.5**	**3.5**	**7**	**6**	**7**	**8**	**4**
	p value	**<.001**	**<.001**	**0.023**	**<.001**	**<.001**	**<.001**	**0.019**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

[c]A lower rate of Tendovo (1.4 qt/a) was applied PRE over the entire trial area (except the untreated check).

[d]All POST applications included AMSOL/Dry applied at 3 lb/a

Project Goal: Evaluate multiple two-pass herbicide programs with layered residuals for season-long glyphosate-resistant waterhemp control in Enlist soybean.

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-5	**Variety:**	O'SOY 2024EL-3
Soil type:	Kegonsa loam	**Planting Date:**	5/23/24
% OM:	1.6	**Emergence Date:**	6/3/24
pH:	6.7	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.25 in
Previous crop:	Corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	gly-R waterhemp (AMATA)		

Herbicide Application Information:

Date:	5/23	6/20	6/27
Treatment:	PRE (A)	EPOST (B)	POST (C)
Air Temp (°F):	81	79	81
2" Soil Temp (°F):	72	-	-
Soil moisture [surface]:	moist	wet	moist
RH %:	32	92	51
Cloud cover %	-	99	30
Wind speed (mph)/direction	4-6/W	4-8/S	0-2/SW
Rainfall (in) 1 wk after APP:	2.44"	1.93"	1.70"
GPA:	15	15	15
PSI:	38	38	38
Nozzle:	TTI 110015	AIXR 11015	AIXR 110015
Nozzle spacing (in):	20	20	20
Boom Height (in):	20	23	26

Crop and weed information at application:

	Date:	5/23	6/20	6/27*
soybean	Height:	-	-	-
	Stage:	-	V2	V3
waterhemp	Height:	-	0.25-3" Avg=1"	0.5-5" Avg=2"
	Density:	-	84-142/m^2	8-66/m^2

*All weed densities and heights were recorded from plots with a PRE herbicide.
Density and height varied depending on the effectiveness of the PRE-emergence herbicide.

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Tendovo	4.03 lb/gal	2, 5, 15	2.1 qt/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	28 fl oz/a	POST	C
	AMS			3 lb/a	POST	C
3	Tendovo	4.03 lb/gal	2, 5, 15	2.1 qt/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	28 fl oz/a	POST	C
	Dual II Magnum	7.64 lb/gal	15	1.5 pt/a	POST	C
	AMS			3 lb/a	POST	C
4	Prefix	5.29 lb/gal	14, 15	2 pt/a	PRE	A
	Tricor DF	75% w/w	5	7 oz/a	PRE	A
	Pursuit	2 lb/gal	2	3 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	28 fl oz/a	POST	C
	Dual II Magnum	7.64 lb/gal	15	1.5 pt/a	POST	C
	AMS			3 lb/a	POST	C
5	Prefix	5.29 lb/gal	14, 15	2 pt/a	PRE	A
	Dual II Magnum	7.64 lb/gal	15	0.75 pt/a	PRE	A
	Pursuit	2 lb/gal	2	3 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	28 fl oz/a	POST	C
	Dual II Magnum	7.64 lb/gal	15	1.5 pt/a	POST	C
	AMS			3 lb/a	POST	C
6	Prefix	5.29 lb/gal	14, 15	2 pt/a	EPOST	B
	Pursuit	2 lb/gal	2	3 fl oz/a	EPOST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	EPOST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	EPOST	B
	AMS			2 lb/a	EPOST	B
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	28 fl oz/a	POST	C
	Dual II Magnum	7.64 lb/gal	15	1.5 pt/a	POST	C
	AMS			3 lb/a	POST	C
7	Tricor DF	75% w/w	5	7 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	28 fl oz/a	POST	C
	Dual II Magnum	7.64 lb/gal	15	1.5 pt/a	POST	C
	AMS			3 lb/a	POST	C
8	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	A
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	C
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	C
	Agri-Dex			1% v/v	POST	C
	AMS			3 lb/a	POST	C

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
9	Fierce MTZ	2.64 lb/gal	5, 14, 15	1 pt/a	PRE	A
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	C
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	C
	Agri-Dex			1% v/v	POST	C
	AMS			3 lb/a	POST	C
10	Fierce XLT	62.4% w/w	2, 14, 15	3.75 oz/a	PRE	A
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	C
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	C
	Agri-Dex			1% v/v	POST	C
	AMS			3 lb/a	POST	C
11	Preview 2.1SC	3.35 lb/gal	5, 14	21 fl oz/a	PRE	A
	InterMoc	3.57 lb/gal	10, 15	64 fl oz/a	POST	C
	Velexi	1% N		12.8 fl oz/a	POST	C
	AMS			3 lb/a	POST	C
12	Preview 2.1SC	3.35 lb/gal	5, 14	21 fl oz/a	PRE	A
	Moccasin	8 lb/gal	15	1.1 pt/a	PRE	A
	InterMoc	3.57 lb/gal	10, 15	64 fl oz/a	POST	C
	Velexi	1% N		12.8 fl oz/a	POST	C
	AMS			3 lb/a	POST	C
13	Preview 2.1SC	3.35 lb/gal	5, 14	21 fl oz/a	PRE	A
	Satelite HydroCap	3.8 lb/gal	3	2 pt/a	PRE	A
	InterMoc	3.57 lb/gal	10, 15	64 fl oz/a	POST	C
	Velexi	1% N		12.8 fl oz/a	POST	C
	AMS			3 lb/a	POST	C
14	Boundary	6.5 lb/gal	5, 15	1.75 pt/a	PRE	A
	Zalo	2.5 lb/gal	1, 10	43 fl oz/a	POST	C
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	C
	COC			1% v/v	POST	C
	AMS			3 lb/a	POST	C
15	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	A
	FirstRate	84% w/w	2	0.6 oz/a	POST	C
	Zalo	2.5 lb/gal	1, 10	32 fl oz/a	POST	C
	Dual II Magnum	7.64 lb/gal	15	1 pt/a	POST	C
	COC			1% v/v	POST	C
	AMS			3 lb/a	POST	C
16	Authority Supreme	4.16 lb/gal	14, 15	7 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	C
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	C
	Anthem Maxx	4.3 lb/gal	14, 15	2 fl oz/a	POST	C
	AMS			2 lb/a	POST	C

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
17	Authority Edge	4.25 lb/gal	14, 15	7 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	C
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	C
	Anthem Maxx	4.3 lb/gal	14, 15	3 fl oz/a	POST	C
	AMS			2 lb/a	POST	C
18	Zidua PRO	4.09 lb/gal	2, 14, 15	6 fl oz/a	PRE	A
	Liberty Ultra	1.76 lb/gal	10	24 fl oz/a	POST	C
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	POST	C
	Zidua SC	4.17 lb/gal	15	2.5 fl oz/a	POST	C
	AMS			2 lb/a	POST	C
19	Zidua PRO	4.09 lb/gal	2, 14, 15	6 fl oz/a	PRE	A
	Liberty Ultra	1.76 lb/gal	10	24 fl oz/a	POST	C
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	C
	Roundup PowerMAX3	4.8 lbae/gal	9	20 fl oz/a	POST	C
	Outlook	6 lb/gal	15	12 fl oz/a	POST	C
	Intact			0.5% v/v	POST	C
	AMS			2 lb/a	POST	C

Adjuvants: Agri-Dex = COC; AMS = AMSOL/Dry spray grade ammonium sulfate; COC = CropOil; Intact = drift reduction agent; Velexi = liquid fertilizer (1-0-0)

Trial Summary:

The trial was established at the O'Brien Hybrids farm located north of Brooklyn, WI to evaluate multiple two-pass herbicide programs with layered residuals from several company portfolios for season-long control of glyphosate resistant waterhemp in Enlist soybean.

Minor soybean injury (<5%) was observed 21 days after PRE application (data not shown). Severe soybean injury (leaf necrosis, deformed leaves) was observed 6 and 21 days after EPOST application of Prefix + Pursuit + Enlist One + Roundup (trt 6) (Table 19). All the POST herbicide programs, except treatment 2, caused some level of soybean leaf necrosis 14 days after the POST application (Table 19). POST applications containing a PPO active ingredient (Perpetuo, Anthem Maxx) caused greater levels of leaf necrosis.

Most of the PRE herbicides we evaluated provided acceptable early-season residual control of waterhemp 34 days after treatment (DAT) (Table 19). Additionally, most of the POST herbicide programs provided excellent (>90%) end-of-season waterhemp control. POST treatments with glufosinate as the only effective active ingredient for control of emerged waterhemp tended to have reduced levels of control, particularly in treatments that had worse PRE residual control at the time of application. All glufosinate + Enlist One or glyphosate + Enlist One POST tank mixes had >96% waterhemp control.

Soybean yield of all the two-pass PRE followed by POST herbicide programs were very similar and there was not a statistically significant difference (Table 19). The two-pass EPOST followed by POST did have a yield reduction, potentially due to the severe crop injury following the EPOST application and/or the early season weed weed competition.

Plot photos from throughout the growing season are available **Evaluation of Layered Residual Herbicide Programs in Enlist Soybean** published on **wiscweeds.info**.

Similar trials were conducted in 2021-2023. See trial #23-BRO-SB10 in the **2023 Wisconsin Weed Science Research Report**, trial #22-BRO-SB12 in the **2022 Wisconsin Weed Science Research Report**, and trial #21-BRO-SB10 in the **2021 Wisconsin Weed Science Research Report**

Table 19. Crop injury, waterhemp control ratings, and soybean yield for trial #24-BRO-SB13 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Injury (%)		Waterhemp (%)				Yield[b] bu acre^{-1}
		6/26	7/11	6/13	6/26	7/11	9/18	
1	Untreated Check	0	0	0	0	0	0	46 c
Two-Pass – EPOST (6/20) *fb* POST (6/27)								
6	Prefix (2 pt) + Pursuit (3 oz) + Enlist One (2 pt) + RU PM3 (22 oz) + AMS[c] ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.5 pt) + AMS[d]	18.7	18.0	0	99	100	98	54 b
Two-Pass – PRE (5/23) *fb* POST (6/27)								
2	Tendovo (2.1 qt) ***fb*** Enlist One (2 pt) + Roundup PowerMAX3 (28 oz) + AMC[d]	0	0.5	99	82	94	97	65 a
3	Tendovo (2.1 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.5 pt) + AMS[d]	0	3.5	99	82	95	96	60 ab
4	Prefix (2 pt) + Tricor DF (7 oz) + Pursuit (3 oz) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.5 pt) + AMS[d]	0	2.8	100	91	97	100	63 a
5	Prefix (2 pt) + Dual II Magnum (0.75 pt) + Pursuit (3 oz) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.5 pt) + AMS[d]	0	3.5	99	89	97	99	61 ab
7	Tricor DF (7 oz) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.5 pt) + AMS[d]	0	1.8	78	40	81	97	67 a
8	Fierce EZ (6 oz) ***fb*** Liberty (32 oz) + Perpetuo (6 oz) + Agri-Dex (1% v/v) + AMS[d]	0	10.5	100	96	100	99	69 a
9	Fierce MTZ (1 pt) ***fb*** Liberty (32 oz) + Perpetuo (6 oz) + Agri-Dex (1% v/v) + AMS[d]	0	10.8	100	97	99	98	64 a
10	Fierce XLT (3.75 oz) ***fb*** Liberty (32 oz) + Perpetuo (6 oz) + Agri-Dex (1% v/v) + AMS[d]	0	13.0	100	95	99	99	65 a
11	Preview 2.1SC (21 oz) ***fb*** InterMoc (64 oz) + Velexi (12.8 oz) + AMS[d]	0	2.0	96	80	88	89	66 a
12	Preview 2.1SC (21 oz) + Moccasin (1.1 pt) ***fb*** InterMoc (64 oz) + Velexi (12.8 oz) + AMS[d]	0	2.3	99	86	91	91	66 a
13	Preview 2.1SC (21 oz) + Satellite HydroCap (2 pt) ***fb*** InterMoc (64 oz) + Velexi (12.8 oz) + AMS[d]	0	1.3	98	84	90	91	66 a
14	Boundary (1.75 pt) ***fb*** Zalo (43 oz) + Zidua SC (2.5 oz) + COC (1% v/v) + AMS[d]	0	4.5	93	72	83	88	67 a
15	Fierce EZ (6 oz) + FirstRate (0.6 oz) ***fb*** Zalo (32 oz) + Dual II Magnum (1 pt) + COC (1% v/v) + AMS[d]	0	3.3	100	95	98	96	65 a
16	Authority Supreme (7 oz) ***fb*** Enlist One (2 pt) + Liberty (32 oz) + Anthem Maxx (2 oz) + AMS[c]	0	9.5	100	93	100	100	65 a
17	Authority Edge (7 oz) ***fb*** Enlist One (2 pt) + Liberty (32 oz) + Anthem Maxx (3 oz) + AMS[c]	0	8.0	100	90	96	99	66 a
18	Zidua PRO (6 oz) ***fb*** Liberty Ultra (24 oz) + Enlist One (2 pt) + RU PM3 (20 oz) + Zidua SC (2.5 oz) + AMS[c]	0	3.3	100	88	97	98	67 a
19	Zidua PRO (6 oz) ***fb*** Liberty Ultra (24 oz) + Enlist One (2 pt) + RU PM3 (20 oz) + Outlook (12 oz) + Intact (0.5% v/v) + AMS[c]	0	2.3	100	89	97	97	64 a
	LSD (α=0.10)	**0.3**	**1.9**	**2**	**7**	**3**	**4**	**6**
	p value	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Yield values with the same letter are not significantly different.

[c]POST applications included AMSOL/Dry applied at 2 lb/a

[d]POST applications included AMSOL/Dry applied at 3 lb/a

Project Goal: Evaluate different metribuzin rates in comprehensive herbicide programs to maximize PRE waterhemp control and minimize crop injury in early and late planted soybeans

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-4	**Variety:**	NK22-C4E
Soil type:	Kegonsa loam	**Planting Date (early):**	4/24/24
% OM:	1.6	**Planting Date (late):**	5/23/24
pH:	6.9	**Emergence Date (early):**	5/12/24
Fertilization:	-	**Emergence Date (late):**	6/3/24
Previous crop:	Corn	**Population:**	140,000 seeds/acre
Tillage:	Conventional	**Depth:**	1.25 in
Plot Size:	10 x 30 ft	**Row spacing:**	30 in
Weed species:	gly-R waterhemp (AMATA)		

PRE Herbicide Application Information:

Date:	4/24	5/23
Treatment:	PRE (A)	PRE (B)
Air Temp (°F):	60	79
2" Soil Temp (°F):	66	72
Soil moisture [surface]:	moist	moist
RH %:	35	44
Cloud cover %	5	45
Wind speed (mph)/direction	2-5/SW	2-7/SW
Rainfall (in) 1 wk after APP:	2.51"	2.44"
GPA:	15	15
PSI:	40	40
Nozzle:	TTI 110015	TTI 110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	20

Soybean information at POST application:

	Date:	6/20	6/27	7/10
	Treatments Sprayed:	1-7	14	9-13, 15
soybean	Height:	6-9"	-	-
	Stage:	V6/R1	V3	R1/R2

***POST applications were made when waterhemp reached an average height of 4 inches.

Planting Date	Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
Early	1	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	A
	2	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	A
		Metricor DF	75% w/w	5	4 oz/a	PRE	A
	3	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	A
		Metricor DF	75% w/w	5	8 oz/a	PRE	A
	4	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	A
		Metricor DF	75% w/w	5	12 oz/a	PRE	A
	5	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	A
		Metricor DF	75% w/w	5	16 oz/a	PRE	A
	6	Spartan	4 lb/gal	14	10 fl oz/a	PRE	A
	7	Preview 2.1SC	3.35 lb/gal	5, 14	23 fl oz/a	PRE	A
	8	Untreated Check					
Late	9	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	B
	10	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	B
		Metricor DF	75% w/w	5	4 oz/a	PRE	B
	11	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	B
		Metricor DF	75% w/w	5	8 oz/a	PRE	B
	12	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	B
		Metricor DF	75% w/w	5	12 oz/a	PRE	B
	13	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	B
		Metricor DF	75% w/w	5	16 oz/a	PRE	B
	14	Spartan	4 lb/gal	14	10 fl oz/a	PRE	B
	15	Preview 2.1SC	3.35 lb/gal	5, 14	23 fl oz/a	PRE	B
	16	Untreated Check					

*POST application of Liberty (32 oz) + Enlist One (2 pt) + Dual II Magnum (1.5 pt) + AMS (3 lb) was made when average waterhemp height reached 4 inches.

Trial Summary:

This study was part of multi-state effort funded by the United Soybean Board evaluating different metribuzin rates in comprehensive herbicide programs to maximize PRE waterhemp control and minimize crop injury in early and late planted soybeans. The trial was established at the O'Brien Hybrids farm located north of Brooklyn, WI in a field with a natural infestation of glyphosate-resistant waterhemp. The entire trial area was tilled immediately prior to the first soybean planting date (4/24). No tillage operation was done prior to the second planting date on 5/23, so Liberty (32 fl oz/a) and AMS (3 lb/a) were added to all PRE herbicide treatments to control any emerged waterhemp in the late planted treatments. POST applications were made when waterhemp reached an average height of 4 inches.

None of the herbicide programs we evaluated caused significant soybean injury at either planting date (data not shown).

Waterhemp density data was collected from each plot at three intervals: 14 days after soybean emergence (DAE), 28 DAE, and at the time of POST application and is presented in Table 20. All treatments containing Fierce EZ had similar waterhemp densities at each timing. The addition of metribuzin at increasing rates to Fierce EZ did not result in reduced waterhemp emergence. Both the Spartan and Preview 2.1SC treatments had higher waterhemp emergence prior to the POST application than any of the treatments containing Fierce EZ; however, density was significantly less than the untreated checks of each respective soybean planting date. Averaged across herbicide treatments, waterhemp density at each rating interval was greater in the early planted soybean.

Soybean yield was similar across PRE herbicide treatments at each respective soybean planting date (Table 20). Averaged across herbicide treatments, the early planted soybean had an 11 bu acre^{-1} yield advantage relative to the late planted soybean (76 and 65 bu acre^{-1}, respectively).

Plot photos from throughout the growing season are **Metribuzin in Early Planted Soybean** published on **wiscweeds.info**.

Take Home Points:

- PRE herbicide combinations with flumioxazin and pyroxasulfone (Fierce EZ) provided excellent residual waterhemp control in both early and late planted soybean.
  - Adding metribuzin did not significantly reduce waterhemp density; however, the addition of another effective site of action may delay the evolution of herbicide resistance
- Waterhemp emergence was greater in early planted soybean
- Early planted soybean had 11 bu acre^{-1} greater yield than late planted soybean.

Table 20. Waterhemp density and soybean yield for trial #24-BRO-USB01 at Brooklyn, WI.

Plant Date	POST App Date	Trt #	Herbicide (rate acre^{-1})	Waterhemp Density[a] (plants m^{-2}) 14 DAE	28 DAE	@POST	Yield[b] bu acre^{-1}
Early	-	8	Untreated Check	53.0	69.0	76.5	47 d
Late	-	16	Untreated Check	29.0	35.5	48.0	37 e
Two-Pass – PRE (5/23) *fb* POST[c]							
Early	6/20	1	Fierce EZ (6 fl oz)	0.0	4.0	10.5	74 ab
		2	Fierce EZ (6 fl oz) + Metricor DF (4 oz)	0.5	3.0	8.0	76 a
		3	Fierce EZ (6 fl oz) + Metricor DF (8 oz)	2.0	8.5	9.0	77 a
		4	Fierce EZ (6 fl oz) + Metricor DF (12 oz)	0.5	6.0	7.0	77 a
		5	Fierce EZ (6 fl oz) + Metricor DF (16 oz)	1.0	2.5	10.0	75 a
		6	Spartan (10 fl oz)	0.5	18.0	26.0	75 a
		7	Preview 2.1SC (23 fl oz)	3.0	24.0	44.0	76 a
			Average (trts 2-7)	**1.1**	**9.4**	**16.4**	**76**
Late	7/10	9	Fierce EZ (6 fl oz)	0.0	0.5	2.5	63 c
		10	Fierce EZ (6 fl oz) + Metricor DF (4 oz)	0.0	0.5	2.0	66 bc
		11	Fierce EZ (6 fl oz) + Metricor DF (8 oz)	0.0	1.5	3.5	62 c
		12	Fierce EZ (6 fl oz) + Metricor DF (12 oz)	0.0	2.0	5.5	66 bc
		13	Fierce EZ (6 fl oz) + Metricor DF (16 oz)	0.0	0.0	4.5	65 bc
	6/27	14	Spartan (10 fl oz)	4.5	-	17.0	67 bc
	7/10	15	Preview 2.1SC (23 fl oz)	4.0	19.5	24.5	66 bc
			Average (trts 9-15)	**1.2**	**3.4**	**8.5**	**65**
			LSD (α=0.10)	**9.7**	**15.7**	**22.2**	**5**
			p value	**<.001**	**<.001**	**<.001**	**<.001**

[a]Waterhemp density collected from two 0.25 m^2 quadrats 14 and 28 days after emergence (DAE) of each respective planting date and at the time of the POST herbicide application.

[b]Yield values with the same letter are not significantly different.

[c]POST application of Liberty (32 oz) + Enlist One (2 pt) + Dual II Magnum (1.5 pt) + AMS (3 lb) was made when average waterhemp height reached 4 inches.

Project Goal: Evaluate several PRE herbicide tank mixtures with two rates of metribuzin for waterhemp residual control.

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-4	**Variety:**	NK22-C4E
Soil type:	Kegonsa loam	**Planting Date:**	5/23/24
% OM:	1.6	**Emergence Date:**	6/3/24
pH:	6.9	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.25 in
Previous crop:	Corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	gly-R waterhemp (AMATA)		

Herbicide Application Information:

Date:	5/23
Treatment:	PRE (A)
Air Temp (°F):	79
2” Soil Temp (°F):	72
Soil moisture [surface]:	moist
RH %:	44
Cloud cover %	45
Wind speed (mph)/direction	2-7/SW
Rainfall (in) 1 wk after APP:	2.44”
GPA:	15
PSI:	40
Nozzle:	TTI 110015
Nozzle spacing (in):	20
Boom Height (in):	20

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Metricor DF	75% w/w	5	6 oz/a	PRE	A
3	Metricor DF	75% w/w	5	10 oz/a	PRE	A
4	Valor EZ	4 lb/gal	14	2.5 fl oz/a	PRE	A
5	Zidua SC	4.17 lb/gal	15	3.5 fl oz/a	PRE	A
6	Metricor DF	75% w/w	5	6 oz/a	PRE	A
	Valor EZ	4 lb/gal	14	2.5 fl oz/a	PRE	A
7	Metricor DF	75% w/w	5	10 oz/a	PRE	A
	Valor EZ	4 lb/gal	14	2.5 fl oz/a	PRE	A
8	Metricor DF	75% w/w	5	6 oz/a	PRE	A
	Zidua SC	4.17 lb/gal	15	3.5 fl oz/a	PRE	A
9	Metricor DF	75% w/w	5	10 oz/a	PRE	A
	Zidua SC	4.17 lb/gal	15	3.5 fl oz/a	PRE	A
10	Valor EZ	4 lb/gal	14	2.5 fl oz/a	PRE	A
	Zidua SC	4.17 lb/gal	15	3.5 fl oz/a	PRE	A
11	Metricor DF	75% w/w	5	6 oz/a	PRE	A
	Valor EZ	4 lb/gal	14	2.5 fl oz/a	PRE	A
	Zidua SC	4.17 lb/gal	15	3.5 fl oz/a	PRE	A
12	Metricor DF	75% w/w	5	10 oz/a	PRE	A
	Valor EZ	4 lb/gal	14	2.5 fl oz/a	PRE	A
	Zidua SC	4.17 lb/gal	15	3.5 fl oz/a	PRE	A
13	Surveil*	48% w/w	2, 14	3.5 oz/a	PRE	A
14	Metricor DF	75% w/w	5	6 oz/a	PRE	A
	Surveil*	48% w/w	2, 14	3.5 oz/a	PRE	A
15	Metricor DF	75% w/w	5	10 oz/a	PRE	A
	Surveil*	48% w/w	2, 14	3.5 oz/a	PRE	A
16	Metricor DF	75% w/w	5	6 oz/a	PRE	A
	Surveil	48% w/w	2, 14	3.5 oz/a	PRE	A
	Zidua SC	4.17 lb/gal	15	3.5 fl oz/a	PRE	A
17	Metricor DF	75% w/w	5	10 oz/a	PRE	A
	Surveil	48% w/w	2, 14	3.5 oz/a	PRE	A
	Zidua SC	4.17 lb/gal	15	3.5 fl oz/a	PRE	A
18	Fierce MTZ**	2.64 lb/gal	5, 14, 15	1.25 pt/a	PRE	A
19	Fierce MTZ**	2.64 lb/gal	5, 14, 15	1.25 pt/a	PRE	A
	Metricor DF	75% w/w	5	1 oz/a	PRE	A
20	Fierce MTZ**	2.64 lb/gal	5, 14, 15	1.25 pt/a	PRE	A
	Metricor DF	75% w/w	5	5 oz/a	PRE	A

***3.5 oz Surveil** = 2.5 fl oz Valor EZ + 0.5 oz FirstRate

****1.25 pt Fierce MTZ** = 2.5 fl oz Valor EZ + 3.1 fl oz Zidua SC + 5 oz Metricor DF

Trial Summary:

This study was part of multi-state effort funded by the United Soybean Board investigating the potential benefits of adding metribuzin to the PRE tank mixture as part of a waterhemp management strategy. The trial was established at the O'Brien Hybrids farm located north of Brooklyn, WI to evaluate several PRE herbicide tank mixtures with two rates of metribuzin for waterhemp residual control. The field was infested with a natural population of glyphosate-resistant waterhemp.

Metribuzin alone did not cause any soybean injury symptoms 21 days after treatment (DAT) (Table 21). Tank mixes with flumioxazin (Valor EZ) and pyroxasulfone (Zidua SC) caused the highest level of soybean injury (3-7%) 21 DAT. No injury symptoms were observed 34 DAT.

Metribuzin alone at either 6 oz or 10 oz did not provide satisfactory waterhemp control (Table 21). The higher 10 oz acre^{-1} rate did provide greater waterhemp suppression. None of the single active ingredient treatments provided >90% waterhemp control 34 DAT. All tank mixes with some combination of flumioxazin and pyroxasulfone provided excellent (>95%) control.

Plot photos from throughout the growing season are **Evaluation of Metribuzin Tank Mixes for Waterhemp Control** published on **wiscweeds.info**.

Take Home Points:

- Valor EZ (flumioxazin) had the highest potential to cause soybean injury in our trial.
  - Injury tended to be greater when tank mixed with Zidua SC (pyroxasulfone)
- Metribuzin alone did not provide satisfactory waterhemp control.
- Herbicide combinations with flumioxazin and pyroxasulfone provided excellent residual waterhemp control.
  - Adding metribuzin to these tank mixtures did not significantly improve control; however, the addition of another effective site of action may delay the evolution of herbicide resistance

Table 21. Soybean injury and waterhemp control for trial #24-BRO-USB03 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Soybean Injury (%)		Waterhemp (%)		Biomass Red.[b] (%)
		21 DAT	34 DAT	21 DAT	34 DAT	34 DAT
1	Untreated Check	0	0	0	0	0
One-Pass – PRE (5/23)						
2	Metricor DF (6 oz)	0.3	0.0	51	34	30
3	Metricor DF (10 oz)	0.0	0.0	58	58	36
4	Valor EZ (2.5 fl oz)	2.8	0.0	99	84	91
5	Zidua SC (3.5 fl oz)	0.8	0.0	99	86	95
6	Metricor DF (6 oz) + Valor EZ (2.5 fl oz)	1.8	0.0	100	86	97
7	Metricor DF (10 oz) + Valor EZ (2.5 fl oz)	3.0	0.0	100	89	97
8	Metricor DF (6 oz) + Zidua SC (3.5 fl oz)	0.8	0.0	99	90	99
9	Metricor DF (10 oz) + Zidua SC (3.5 fl oz)	2.0	0.0	100	92	98
10	Valor EZ (2.5 fl oz) + Zidua SC (3.5 fl oz)	4.0	0.0	100	96	100
11	Metricor DF (6 oz) + Valor EZ (2.5 fl oz) + Zidua SC (3.5 fl oz)	5.3	0.0	100	98	100
12	Metricor DF (10 oz) + Valor EZ (2.5 fl oz) + Zidua SC (3.5 fl oz)	4.5	0.0	100	98	99
13	Surveil (3.5 oz)	4.3	0.0	100	83	97
14	Metricor (6 oz) + Surveil (3.5 oz)	3.0	0.0	100	85	94
15	Metricor (10 oz) + Surveil (3.5 oz)	4.5	0.0	100	88	97
16	Metricor (6 oz) + Surveil (3.5 oz) + Zidua SC (3.5 fl oz)	7.0	0.0	100	98	100
17	Metricor (10 oz) + Surveil (3.5 oz) + Zidua SC (3.5 fl oz)	4.8	0.0	100	99	100
18	Fierce MTZ (1.25 pt)	3.8	0.0	100	98	100
19	Fierce MTZ (1.25 pt) + Metricor DF (1 oz)	4.5	0.0	100	97	100
20	Fierce MTZ (1.25 pt) + Metricor DF (5 oz)	3.5	0.0	100	97	100
	LSD (α=0.10)	**1.2**	**ns**	**3**	**5**	**12**
	p value	**<0.001**	**ns**	**<0.001**	**<0.001**	**<0.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]Biomass reduction (%) relative to the untreated check. Biomass was sampled from two 0.25 m^2 quadrats plot^{-1}.

Table 22. Glyphosate-resistant waterhemp control and soybean yield of POST herbicide systems from four Enlist soybean herbicide trials located in Brooklyn, WI in 2024.[a]

POST Herbicide Systems	n[b]	Waterhemp[c] (%)			Yield (bu/a)
		14 DAT	28 DAT	Harvest	
POST Tank Mixes					
Enlist One + Roundup PowerMAX3	16	93	94	97	65
Enlist One + Roundup PowerMAX3 + Group 15	36	92	92	97	65
Enlist One + Liberty	16	96	94	96	64
Enlist One + Liberty + Group 15	40	97	95	97	67
Liberty + Group 15	32	93	95	94	66
Liberty + Roundup PowerMAX3 + Group 15	28	84	78	76	58
Liberty + Flexstar	8	97	97	95	60
Group 15 Layered Residual (Yes/No)					
YES	108	94	94	96	66
NO	24	95	94	97	66

[a]All data recorded from plots that had received a PRE herbicide application.

[b]Number of observations (plots) in each POST herbicide system

[c]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

Waterhemp at POST Application*	
Avg Height (in)	Density (m2)
2	38
3.5	80

*POST application made on the same day (6/27)

Increase in waterhemp density and height at POST application

=

Decrease in Liberty efficacy

Take Home Points:

- All tank mixes with Enlist One provided excellent postemergence waterhemp control.
- Liberty performance was dependent on waterhemp height and density at the time of application.
- Adding a group 15 herbicide to the tank at the POST application did not improve end-of-season waterhemp control or soybean yield in these studies.

Project Goals: Evaluate postemergence waterhemp control of common soybean herbicides and tank mixes.

Site Description:

Location:	Brooklyn, WI	**Crop:**	none
Field #:	OB-4	**Variety:**	-
Soil type:	Kegonsa loam	**Planting Date:**	-
% OM:	1.6	**Emergence Date:**	-
pH:	6.9	**Population:**	-
Fertilization:	-	**Depth:**	-
Previous crop:	corn	**Row spacing:**	-
Tillage:	conventional	**Plot Size:**	8 x 25 ft
Weed species:	gly-R waterhemp (AMATA)		

Herbicide Application Information:

Date:	6/27
Treatment:	POST (A)
Air Temp (°F):	72
2" Soil Temp (°F):	-
Soil moisture [surface]:	moist
RH %:	56
Cloud cover %	30
Wind speed (mph)/direction	2-5/W
Rainfall (in) 1 wk after APP:	1.70"
GPA:	15
PSI:	40
Nozzle:	AIXR 110015
Nozzle spacing (in):	20
Boom Height (in):	30

Crop and weed information at application:

		Date: 6/27
waterhemp	Height:	1-10" Avg=4"
	Density:	116-404/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	A
	Enversa	3 lb/gal	15	3 pt/a	POST	A
	AMSOL			2.5% v/v	POST	A
3	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	A
	Enversa	3 lb/gal	15	3 pt/a	POST	A
	AMSOL			2.5% v/v	POST	A
4	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	A
	Enversa	3 lb/gal	15	3 pt/a	POST	A
	AMSOL			2.5% v/v	POST	A
5	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	A
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	A
	Enversa	3 lb/gal	15	3 pt/a	POST	A
	AMSOL			2.5% v/v	POST	A
6	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	A
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	A
	Enversa	3 lb/gal	15	3 pt/a	POST	A
	AMSOL			2.5% v/v	POST	A
7	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	A
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	A
	Roundup PowerMAX3	4.8 lbae/gal	9	22 fl oz/a	POST	A
	Enversa	3 lb/gal	15	3 pt/a	POST	A
	AMSOL			2.5% v/v	POST	A
8	Flexstar	1.88 lb/gal	14	1 pt/a	POST	A
	Enversa	3 lb/gal	15	3 pt/a	POST	A
	AMSOL			2.5% v/v	POST	A
9	Xtendimax	2.89 lbae/gal	4	22 fl oz/a	POST	A
	Enversa	3 lb/gal	15	3 pt/a	POST	A
	Class Act Ridion			1% v/v	POST	A

Adjuvants: AMSOL = liquid ammonium sulfate; Class Act Ridion = non-AMS water conditioner + NIS

*All treatments included Enversa (encapusulated acetochlor) for residual control after the POST application was made.

Trial Summary:

The trial was established at the O'Brien Hybrids farm located north of Brooklyn, WI to evaluate postemergence waterhemp control of common soybean herbicides and tank mixes in a non-crop scenario. The field was infested with a natural population of glyphosate-resistant waterhemp.

None of the treatments containing only one active ingredient that has activity on emerged waterhemp provided adequate control 2 weeks after application (Table 23). Waterhemp density was very high at the time of application and while the average height was 4 inches, there were waterhemp plants up to 10 inches. We believe both of these components may have factored into the overall poor control we observed from Enlist One, Xtendimax, and Liberty. While the single active ingredient treatments performed quite poor, tank mixes of Enlist with Liberty and/or Roundup PowerMAX3 provided good to excellent control 2-3 weeks after application. Interestly, the Enlist One + Roundup PowerMAX3 tank mix provided the best control even though this population of waterhemp is glyphosate resistant. We plan to further investigate this phenomenom to identify why this may have occurred and to see if it is replicated in future trials. Results from this trial suggests that tank-mixing one or more herbicides can help improve burndown control of watermemp, particularly in scenarios with dense, tall waterhemp populations.

Plot photos from throughout the growing season are **Postemergence Foliar Control of Waterhemp** published on **wiscweeds.info**.

Take Home Points:

- Enlist One, Liberty, Flexstar, Xtendimax, and Roundup PowerMAX3 applied alone did not provide satisfactory control of glyphosate-resistant waterhemp.
- Tank mixing Enlist One with Liberty and/or Roundup PowerMAX3 provided the best control of glyphosate-resistant waterhemp.

Table 23. Waterhemp control ratings for trial #24-BRO-BG01 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Waterhemp (%)			
		6 DAT	13 DAT	20 DAT	26 DAT
1	Untreated Check	0	0	0	0
One-Pass – POST (6/27)					
2	Enlist One (2 pt) + Enversa (3 pt) + AMS[b]	84	77	80	70
3	Liberty (32 oz) + Enversa (3 pt) + AMS[b]	87	75	61	50
4	Roundup PM3 (22 oz) + Enversa (3 pt) + AMS[b]	33	34	31	26
5	Enlist One (2 pt) + Liberty (32 oz) + Enversa (3 pt) + AMS[b]	90	90	88	81
6	Enlist One (2 pt) + Roundup PM3 (22 oz) + Enversa (3 pt) + AMS[b]	87	87	94	93
7	Enlist One (2 pt) + Liberty (32 oz) + RU PM3 (22 oz) + Enversa (3 pt) + AMS[b]	89	83	85	76
8	Flexstar (1 pt) + Enversa (3 pt) + AMS[b]	79	54	45	38
9	Xtendimax (22 oz) + Enversa (3 pt) + Class Act Ridion (1% v/v)	70	66	71	66
	LSD (α=0.10)	**8**	**7**	**7**	**9**
	p value	**<.001**	**<.001**	**<.001**	**<.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]AMSOL (liquid) applied at 2.5% v/v

Trial: Syngenta Corn Herbicides Residual Waterhemp Control **24-ROK-BG09**

Project Goals: Compare various rates of Syngenta corn herbicides and determine how many days it takes for each to fall below 90% waterhemp control.

Site Description:

Location:	Janesville, WI	**Crop:**	none
Field #:	9	**Variety:**	-
Soil type:	Plano silt loam	**Planting Date:**	-
% OM:	3.5	**Emergence Date:**	-
pH:	6.9	**Population:**	-
Fertilization:	181 lb N/acre	**Depth:**	-
Previous crop:	soybean	**Row spacing:**	-
Tillage:	conventional	**Plot Size:**	8 x 25 ft
Weed species:	gly-R waterhemp (AMATA)		

Herbicide Application Information:

Date:	5/13	6/6*
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	73	64
2" Soil Temp (°F):	66	63
Soil moisture [surface]:	moist	slightly wet
RH %:	71	74
Cloud cover %	90	0
Wind speed (mph)/direction	3-7/NE	3-7/WNW
Rainfall (in) 1 wk after APP:	0.22"	0.4"
Rainfall (in) 2 wks after APP:	2.33"	2.34"
GPA:	15	15
PSI:	38	38
Nozzle:	TTI 110015	TTI 110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	22

*no waterhemp had emerged at the time of the POST (B) application

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Acuron	3.44 lb/gal	5, 15, 27	1.25 qt/a	PRE	A
3	Acuron	3.44 lb/gal	5, 15, 27	1.5 qt/a	PRE	A
4	Acuron	3.44 lb/gal	5, 15, 27	1.75 qt/a	PRE	A
5	Acuron	3.44 lb/gal	5, 15, 27	2 qt/a	PRE	A
6	Acuron	3.44 lb/gal	5, 15, 27	3 qt/a	PRE	A
7	Storen	3.25 lb/gal	15, 27	1 qt/a	PRE	A
	AAtrex	4 lb/gal	5	0.75 pt/a	PRE	A
8	Storen	3.25 lb/gal	15, 27	1.2 qt/a	PRE	A
	AAtrex	4 lb/gal	5	0.75 pt/a	PRE	A
9	Storen	3.25 lb/gal	15, 27	1.4 qt/a	PRE	A
	AAtrex	4 lb/gal	5	0.75 pt/a	PRE	A
10	Storen	3.25 lb/gal	15, 27	1.6 qt/a	PRE	A
	AAtrex	4 lb/gal	5	1 pt/a	PRE	A
11	Storen	3.25 lb/gal	15, 27	2 qt/a	PRE	A
	AAtrex	4 lb/gal	5	1.25 pt/a	PRE	A
12	Storen	3.25 lb/gal	15, 27	2.4 qt/a	PRE	A
	AAtrex	4 lb/gal	5	1.5 pt/a	PRE	A
13	Lexar EZ	3.7 lb/gal	5, 15, 27	1.75 qt/a	PRE	A
14	Acuron	3.44 lb/gal	5, 15, 27	1.5 qt/a	PRE	A
	Acuron	3.44 lb/gal	5, 15, 27	1.5 qt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	28 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
15	Storen	3.25 lb/gal	15, 27	1.3 qt/a	PRE	A
	AAtrex	4 lb/gal	5	0.75 pt/a	PRE	A
	Storen	3.25 lb/gal	15, 27	1.1 qt/a	POST	B
	AAtrex	4 lb/gal	5	0.75 pt/a	POST	B
	Roundup PowerMAX3	4.8 lbae/gal	9	28 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B

Adjuvants: AMSOL = liquid ammonium sulfate

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to compare various rates of Syngenta corn herbicides for residual waterhemp control in a non-crop scenario. The field was infested with a heavy population of glyphosate-resistant waterhemp.

All herbicides and rates we evaluated provided near 100% control up to 35 days after treatment (DAT) (Table 24). Both Acuron (1.25-1.75 qt acre^{-1}) and Lexar EZ (1.75 qt acre^{-1}) treatments started to break between 35 and 49 DAT. Amongst 1-pass treatments, only higher rates of Storen (2, 2.4 qt) + AAtrex (1.25, 1.5 pt) provided >90% control up to 64 DAT. Both overlapping residual (PRE fb POST) herbicide programs also had >90% waterhemp control 64 days after the initial PRE application. Furthermore, Storen + AAtrex followed by Storen + AAtrex (trt 15) provided >90% control up to 77 days after the initial PRE application.

Plot photos from throughout the growing season are **Syngenta Corn Herbicides Residual Waterhemp Control** published on **wiscweeds.info**.

Take Home Points:

- All herbicides and rates we evaluated provided near 100% control up to 35 days after application
- Higher rates of Storen + AAtrex tank mixes were more effective later in the season than either Acuron or Lexar EZ
- Overlapping residual herbicide programs of Acuron and Storen + AAtrex provided excellent waterhemp control up to 64 days after the PRE application.

Table 24. Waterhemp residual control ratings for trial #24-ROK-BG09 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Waterhemp (%)				
		22 DAT	35 DAT	49 DAT	64 DAT	77 DAT
1	Untreated Check	0	0	0	0	0
One-Pass – PRE (5/13)						
2	Acuron (1.25 qt)	100	100	83	62	44
3	Acuron (1.5 qt)	100	100	88	65	43
4	Acuron (1.75 qt)	100	99	85	65	45
5	Acuron (2 qt)	100	100	92	66	44
6	Acuron (3 qt)	100	100	95	75	56
7	Storen (1 qt) + AAtrex (0.75 pt)	100	100	95	71	50
8	Storen (1.2 qt) + AAtrex (0.75 pt)	100	100	97	77	68
9	Storen (1.4 qt) + AAtrex (0.75 pt)	100	100	97	81	69
10	Storen (1.6 qt) + AAtrex (1 pt)	100	100	98	81	66
11	Storen (2 qt) + AAtrex (1.25 pt)	100	100	99	91	81
12	Storen (2.4 qt) + AAtrex (1.5 pt)	100	100	99	92	84
13	Lexar EZ (1.75 qt)	100	99	84	61	33
Two-Pass – PRE (5/13) *fb* POST (6/6)		**POST**				
14	Acuron (1.5 qt) ***fb*** Acuron (1.5 qt) + Roundup PM3 (28 oz) + AMS[b]	100	100	100	92	80
15	Storen (1.3 qt) + AAtrex (0.75 pt) ***fb*** Storen (1.1 qt) + AAtrex (0.75 pt) + RU PM3 (28 oz) + AMS[b]	100	100	100	98	94
	LSD (α=0.10)	**ns**	**0.5**	**4**	**8**	**14**
	p value	**0.470**	**0.028**	**<0.001**	**<0.001**	**<0.001**

[a]Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

[b]AMSOL (liquid) applied at 2.5% v/v

Table 25. 2024 Temperature and Precipitation Summary

		Precipitation (in)			Average Temperature (F)		
Location	Month	2024	30-year norm**	2024 departure	2024	30-year norm**	2024 departure
Arlington*	May	7.32	3.69	3.63	60.4	55.7	4.7
	June	9.71	4.68	5.03	68.4	65.6	2.8
	July	5.33	4.16	1.17	69.5	69.4	0.1
	August	2.20	3.90	-1.70	68.4	67.3	1.1
	September	2.24	3.54	-1.30	63.2	59.3	3.9
	October	4.16	2.55	1.61	52.7	47.5	5.2
	Total	**30.96**	**22.52**	**8.44**	-	-	-
Brooklyn* (30-year norm from Stoughton NOAA station)	May	5.33	3.85	1.48	61.4	57.8	3.6
	June	5.40	4.34	1.06	69.5	67.4	2.1
	July	7.41	3.85	3.56	70.4	71.7	-1.3
	August	3.24	4.42	-1.18	69.2	69.5	-0.3
	September	3.28	3.60	-0.32	64.3	61.2	3.1
	October	1.15	2.62	-1.47	53.6	48.9	4.7
	Total	**25.81**	**22.68**	**3.31**	-	-	-
Janesville* (30-year norm from Beloit NOAA station)	May	4.48	3.80	0.68	62.4	58.7	3.7
	June	9.47	4.73	4.74	70.1	68.6	1.5
	July	6.33	3.85	2.48	70.7	72.5	-1.8
	August	2.43	4.27	-1.84	69.6	70.8	-1.2
	September	1.77	3.65	-1.88	64.9	62.9	2.0
	October	0.49	2.76	-2.27	54.4	51.0	3.4
	Total	**24.97**	**23.06**	**1.91**	-	-	-

*2024 data recorded from on-site weather stations.

**Source: Wisconsin State Climatology Office; 30-year normals from 1981 to 2010.

Index of Weed Species Evaluated

Weed (common name)	Bayer Code	Page Number(s)
dandelion	TAROF	53
fall panicum	PANDI	41, 74, 78
foxtail, giant	SETFA	20, 32, 36
lambsquarters, common	CHEAL	57
marestail	ERICA	53
ragweed, common	AMBEL	20, 32
ragweed, giant	AMBTR	9, 15, 24, 28, 36, 46, 47, 49, 57, 62
shepherd's purse	CAPBP	53
waterhemp, common	AMATA	36, 41, 45, 66, 71, 74, 78, 83, 89, 93, 97, 98, 102, 106

Index of Adjuvants

Adjuvant Brand	Adjuvant Type	Page Number(s)
Agri-Dex	crop oil concentrate	51, 85
AMSOL	AMS (liquid)	7, 11, 17, 30, 43, 64, 68, 100, 104
AMSOL/Dry	AMS (dry)	12, 18, 22, 26, 34, 38, 51, 55, 59, 76, 80, 85, 91
Class Act Ridion	non-AMS water conditioner + NIS	7, 12, 18, 100
Crop Oil	crop oil concentrate	7, 12, 18, 22, 26, 38, 43, 59, 76, 86
Destiny HC	high surfactant oil concentrate	38
Induce	non-ionic surfactant	22, 26
Intact	drift retardant and deposition aid	87
Prefer90	non-ionic surfactant	7, 11, 17, 30, 34, 38, 59
Upland MSO	methylated seed oil	7, 12, 18, 38, 51, 60
Velexi	liquid fertilizer (1-0-0)	86

Index of Herbicides Evaluated

Herbicide	Active Ingredient(s)	Page Number(s)
AAtrex 4L	atrazine	7, 11, 22, 35, 104
Accent Q	nicosulfuron + safener	38
Acuron	bicyclopyrone+mesotrione+ atrazine+S-metolachlor	11, 22, 34, 104
Acuron Flexi	bicyclopyrone + mesotrione + S-metolachlor	30
Acuron GT	bicyclopyrone+mesotrione+S-metolachlor+ glyphosate	11, 17, 26
Anthem Maxx	pyroxasulfone + fluthiacet	59, 81, 86
Argos	mesotrione	26
Armezon	topramezone	22, 38, 43
Armezon PRO	topramezone + dimethenamid-P	12, 22, 34
Authority Edge	sulfentrazone + pyroxasulfone	87
Authority First	sulfentrazone + cloransulam	59
Authority Supreme	sulfentrazone + pyroxasulfone	86
Basagran 5L	bentazon	43, 60
Bicep II Magnum	S-metolachlor + atrazine	34
Boundary	S-metolachlor + metribuzin	51, 86
Callisto	mesotrione	11, 17, 38, 43
Clarity	dicamba (DGA salt)	22, 30
Coyote	S-metolachlor + mesotrione	13, 38
DiFlexx	dicamba (DGA salt)	7, 12, 18, 38
DiFlexx Duo	dicamba (DGA salt) + tembotrione	38
Dual II Magnum	S-metolachlor	38, 55, 59, 64, 73, 76, 80, 85
Enlist One	2,4-D (choline salt)	51, 60, 64, 68, 76, 80, 85, 100
Enversa	acetochlor	64, 68, 100
Fierce EZ	flumioxazin + pyroxasulfone	85, 91
Fierce MTZ	flumioxazin + pyroxasulfone + metribuzin	86, 95
Fierce XLT	flumioxazin + pyroxasulfone + chlorimuron	59, 86
FirstRate	cloransulam	59, 86
Flexstar	fomesafen	59, 68, 80, 100
Flexstar GT	fomesafen + glyphosate	59
Halex GT	S-metolachlor + mesotrione + glyphosate	11, 26, 30, 34
Harness	acetochlor	7, 12, 18
Harness MAX	acetochlor + mesotrione	7, 11, 17, 38
Harness XTRA 5.6L	acetochlor + atrazine	34
Interline	glufosinate	55
InterMoc	glufosinate + S-metolachlor	13, 18, 86
***Intrava DX**	amicarbazone + metribuzin	13, 18, 38
Kyro	topramezone + acetochlor + clopyralid	34, 38
Laudis	tembotrione	7, 12, 18, 38
Lexar EZ	mesotrione + atrazine + S-metolachlor	104
Liberty	glufosinate	59, 64, 68, 80, 85, 100

*Pending approval for use in Wisconsin as of January 2025.

Herbicide	Active Ingredient(s)	Page Number(s)
Liberty ULTRA	glufosinate	13, 55, 60, 76, 87
Lumax EZ	mesotrione + atrazine + S-metolachlor	11
Matador-S	S-metolachlor + metribuzin + imazethapyr	51
Maverick	mesotrione + clopyralid + pyroxasulfone	17, 30, 34, 38
Metricor DF	metribuzin	43, 91, 95
Moccasin	S-metolachlor	86
Moccasin II Plus	S-metolachlor	13, 18, 38
Motif	mesotrione	13, 39
Moxy 2E	bromoxynil	43
Outlook	dimethenamid	73, 87
Perpetuo	flumiclorac + pyroxasulfone	59, 85
Poast	sethoxydim	60
Prefix	S-metolachlor + fomesafen	59, 80, 85
Preview 2.1SC	sulfentrazone + metribuzin	86, 91
Princep 4L	simazine	17, 30, 35, 38
Priority MA	mesotrine + metolachlor + atrazine	11
Priority Meso	metolachlor + mesotrione	17
Priority S MA	mesotrine + S-metolachlor + atrazine	11
Priority S Meso	S-metolachlor + mesotrione	17
Pursuit	imazethapyr	59, 85
Resicore	clopyralid + acetochlor + mesotrione	22, 26, 30
Resicore XL	clopyralid + acetochlor + mesotrione	34
Roundup PowerMAX 3	glyphosate (potassium salt)	7, 11, 17, 22, 26, 30, 34, 51, 55, 59, 64, 68, 76, 80, 85, 100, 104
Satelite HydroCap	pendimethalin	86
Select Max	clethodim	76
Sequence	S-metolachlor + glyphosate	27
Sonic	sulfentrazone + cloransulam	64, 68
Spartan	sulfentrazone	91
Status	dicamba (sodium salt) + diflufenzopyr	7, 12, 17, 22, 26, 35, 38
Storen	mesotrione + S-metolachlore + pyroxasulfone + bicyclopyrone	11, 17, 22, 30, 38, 104
Storm	acifluorfen + bentazon	60
Surmise 5	glufosinate	55
Surpass NXT	acetochlor	38
Surtain	saflufenacil + pyroxasulfone	12, 18, 22
Surveil	flumioxazin + cloransulam	60, 95
Tendovo	S-metolachlor + metribuzin + cloransulam	59, 80, 85
Tricor DF	metribuzin	85
TripleFlex II	acetochlor + clopyralid + flumetsulam	7, 12
TriVolt SC	isoxaflutole + flufenacet + thiencarbazone	7, 11, 17, 22, 30, 38
Valor EZ	flumioxazin	95

Herbicide	Active Ingredient(s)	Page Number(s)
Valor XLT	flumioxazin + chloriumuron	59
Verdict	saflufenacil + dimethenamid-P	7, 12, 18, 26, 34, 38, 76
***Voraxor**	saflufenacil + trifludimoxazin	51
Warrant	acetochlor	7, 12, 18, 64, 73, 81
Xtendimax	dicamba (DGA salt) with VaporGrip® Technology	100
Zalo	glufosiante + quizalofop	86
Zidua PRO	pyroxasulfone + saflufenzcil + imazethapyr	55, 60, 87
Zidua SC	pyroxasulfone	18, 22, 26, 51, 55, 64, 73, 76, 81, 86, 95

*Pending approval for use in Wisconsin as of January 2025.

Index of Trial Sponsors

Company	Trial Number (s)*
Albaugh	BG02, BG03, CN03, CN04
AMVAC	SB13
BASF	BG10, BG11, BG12, CN03, CN04, CN05, CN06, SB04, SB05, SB06, SB07, SB08, SB09, SB10, SB13, SB21
Bayer Crop Science	CN01, CN02, CN03, CN04, CN11, SB01
CHS Agronomy	BG04, BG05, BG06, BG07
Corteva Agriscience	BG01, SB02, SB03
Exacto	CN14, SB14, SB15, SB23, SB24
FMC	SB13, SB21
Sipcam Agro	CN08
Speed Agro	CN13
Syngenta	BG09, CN03, CN04, CN09, SB12, SB13
United Soybean Board	USB01, USB02, USB03
UPL	CN03, CN04, CN11, SB13
Valent	CN04, CN10, SB11, SB13, SB21
Winfield United	BG08, CN07
Wisconsin Corn Growers Association	CN12
Wisconsin Weed Science	CN03, CN04, CN11, CN12, SB13, SB21

*Not all trials listed are presented in this research report.