2023 Wisconsin Weed Science Research Report

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Cropping Systems Weed Science
UNIVERSITY OF WISCONSIN–MADISON

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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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Project Goal: Evaluate the potential weed control benefit of adding DiFlexx to the tank with traditional PRE corn herbicides.

Site Description:

Location:	Janesville, WI	**Crop:**	Corn
Field #:	3	**Hybrid:**	DKC50-87 RIB
Soil type:	Plano silt loam	**Planting Date:**	5/4
% OM:	3.0	**Emergence Date:**	5/13
pH:	6.5	**Population:**	34,000 seeds/acre
Fertilization:	160 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:	5/4
Treatment:	PRE (A)
Air Temp (°F):	74
2” Soil Temp (°F):	58
Soil moisture [surface]:	moist
RH %:	30
Cloud cover %	20
Wind speed (mph)/direction	3-9/NW
Rainfall (in) 1 wk after APP:	0.68”
GPA:	15
PSI:	38
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	DiFlexx	4 lbae/gal	4	8 fl oz/a	PRE	A
3	Balance Flexx	2 lb/gal	27	4.5 fl oz/a	PRE	A
4	Balance Flexx	2 lb/gal	27	4.5 fl oz/a	PRE	A
	Atrazine 4L	4 lb/gal	5	2 pt/a	PRE	A
5	Harness	7 lb/gal	15	2 pt/a	PRE	A
6	Harness Xtra	6 lb/gal	5, 15	1.6 qt/a	PRE	A
7	Harness Max	3.85 lb/gal	15, 27	2 qt/a	PRE	A
	Atrazine 4L	4 lb/gal	5	2 pt/a	PRE	A
8	Balance Flexx	2 lb/gal	27	4.5 fl oz/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	PRE	A
9	Balance Flexx	2 lb/gal	27	4.5 fl oz/a	PRE	A
	Atrazine 4L	4 lb/gal	5	2 pt/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	PRE	A
10	Harness	7 lb/gal	15	2 pt/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	PRE	A
11	Harness Xtra	6 lb/gal	5, 15	1.6 qt/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	PRE	A
12	Harness Max	3.85 lb/gal	15, 27	2 qt/a	PRE	A
	Atrazine 4L	4 lb/gal	5	2 pt/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	PRE	A
13	Resicore XL	3.26 lb/gal	4, 15, 27	2.5 qt/a	PRE	A
14	Resicore XL	3.26 lb/gal	4, 15, 27	2.5 qt/a	PRE	A
	DiFlexx	4 lbae/gal	4	8 fl oz/a	PRE	A

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to evaluate the potential benefit of adding DiFlexx to the tank with traditional PRE corn herbicides. There was no significant injury from any of the herbicide programs evaluated (data not shown).

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.

The addition of DiFlexx to the tank with the traditional PRE corn herbicides improved giant ragweed control of most treatments (Table 1). Averaged across all treatments, giant ragweed control of PRE herbicides with DiFlexx was 80% vs 67% without DiFlexx 21 days after application. Dicamba has been shown to provide a short period of residual control of broadleaf weeds with very little required moisture for activation. A similar trend was observed in trials conducted in 2021 and 2022 which evaluated pairing XtendiMax with soybean PRE herbicides (see trial# 21-ARL-SB01 in the **2021 Wisconsin Weed Science Research Report** and 22-ARL-SB01 in the **2022 Wisconsin Weed Science Research Report**). When paired with traditional PRE herbicides, there appears to be a benefit of dicamba for residual weed control in the interim between application and activating precipitation in dry springs.

Plot photos from throughout the growing season are available at **DiFlexx Paired Soil Residual Herbicide Programs** published on **wiscweeds.info**

Table 1. Giant ragweed control ratings for trial #23-ROK-CN01 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	G. Ragweed (%)	
		21 DAT	35 DAT
1	Check Untreated	0	0
One-Pass – PRE (5/4)			
2	DiFlexx (8 fl oz)	74	74
3	Balance Flexx (4.5 fl oz)	57	65
4	Balance Flexx (4.5 fl oz) + Atrazine 4L (2 pt)	69	75
8	Balance Flexx (4.5 fl oz) + DiFlexx (8 fl oz)	61	62
9	Balance Flexx (4.5 fl oz) + Atrazine 4L (2 pt) + DiFlexx (8 fl oz)	80	80
5	Harness (2 pt)	50	44
10	Harness (2 pt) + DiFlexx (8 fl oz)	81	68
6	Harness Xtra (1.6 qt)	62	57
11	Harness Xtra (1.6 qt) + DiFlexx (8 fl oz)	82	74
7	Harness Max (2 qt) + Atrazine 4L (2 pt)	86	76
12	Harness Max (2 qt) + Atrazine 4L (2 pt) + DiFlexx (8 fl oz)	90	84
13	Resicore XL (2.5 qt)	78	74
14	Resicore XL (2.5 qt) + DiFlexx (8 fl oz)	90	83
	LSD (α=0.10)	**12**	**11**
	p value	**<0.001**	**<0.001**

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

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 #:	4	**Hybrid:**	DKC50-87 RIB
Soil type:	Plano silt loam	**Planting Date:**	5/4
% OM:	3.0	**Emergence Date:**	5/13
pH:	6.5	**Population:**	34,000 seeds/acre
Fertilization:	160 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:	5/4	5/25	6/2
Treatment:	PRE (A)	EPOST (B)	POST (C)
Air Temp (°F):	74	65	83
2" Soil Temp (°F):	58	62	-
Soil moisture [surface]:	moist	dry	wet
RH %:	30	35	55
Cloud cover %	20	30	2
Wind speed (mph)/direction	3-9/NW	2-10/SW	1-3/E
Rainfall (in) 1 wk after APP:	0.68"	0.35"	0.56"
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	26

Crop and weed information at application:

	Date:	5/4	5/25	6/2
Corn	Height:	-	2-3"	6-9"
	Stage:	-	V2	V4
Giant ragweed	Height:	-	1-3"	1-7"
	Density:	-	20-59 m^2	10-51 m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Resicore XL	3.26 lb/gal	4, 15, 27	2.8 qt/a	PRE	A
	atrazine 4L	4 lb/gal	5	1 pt/a	PRE	A
3	Resicore XL	3.26 lb/gal	4, 15, 27	2 qt/a	EPOST	B
	atrazine 4L	4 lb/gal	5	1 pt/a	EPOST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	32 fl oz/a	EPOST	B
	COC			1% v/v	EPOST	B
	AMSOL			2.5% v/v	EPOST	B
4	Anthem Maxx	4.3 lb/gal	14, 15	4 fl oz/a	EPOST	B
	Callisto	4 lb/gal	27	3 fl oz/a	EPOST	B
	atrazine 4L	4 lb/gal	5	2 pt/a	EPOST	B
	Roundup PowerMAX 3	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	Resicore XL	3.26 lb/gal	4, 15, 27	2 qt/a	PRE	A
	Kyro	3.07 lb/gal	4, 15, 27	45 fl oz/a	POST	C
	atrazine 4L	4 lb/gal	5	1 pt/a	POST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	32 fl oz/a	POST	C
	COC			1% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
6	Surpass NXT	7 lb/gal	15	2 pt/a	PRE	A
	atrazine 4L	4 lb/gal	5	2 pt/a	PRE	A
	Resicore XL	3.26 lb/gal	4, 15, 27	1.4 qt/a	POST	C
	atrazine 4L	4 lb/gal	5	1 pt/a	POST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	32 fl oz/a	POST	C
	COC			1% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
7	Verdict	5.57 lb/gal	15, 27	16 fl oz/a	PRE	A
	Armezon PRO	5.35 lb/gal	15, 27	16 fl oz/a	POST	C
	atrazine 4L	4 lb/gal	5	1 pt/a	POST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	15 fl oz/a	POST	C
	AMSOL			2.5% v/v	POST	C
8	Verdict	5.57 lb/gal	15, 27	10 fl oz/a	PRE	A
	Callisto	4 lb/gal	27	3 fl oz/a	PRE	A
	Armezon PRO	5.35 lb/gal	15, 27	16 fl oz/a	POST	C
	atrazine 4L	4 lb/gal	5	1 pt/a	POST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	15 fl oz/a	POST	C
	AMSOL			2.5% v/v	POST	C

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
9	Anthem Maxx	4.3 lb/gal	14, 15	4 fl oz/a	PRE	A
	Callisto	4 lb/gal	27	5 fl oz/a	PRE	A
	atrazine 4L	4 lb/gal	5	2 pt/a	PRE	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	Status	56% w/w	4, 19	5 oz/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
	atrazine 4L	4 lb/gal	5	1 pt/a	POST	C
	NIS			0.25% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
11	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
	Status	56% w/w	4, 19	2.5 oz/a	POST	C
	atrazine 4L	4 lb/gal	5	1 pt/a	POST	C
	NIS			0.25% v/v	POST	C
	AMSOL			2.5% v/v	POST	C

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

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. None of the PRE herbicides caused visible corn injury symptoms 21 days after application (data not shown). Leaf necrosis was observed 8 days after the EPOST application and 13 days after the POST application (Table 2). Corn growth was not significantly impacted as there was no visible corn injury 25 days after the last POST application (data not shown).

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. 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%) 21 days after application; however, at the time of POST application (29 DAA) control fell below 70% for all PRE treatments. All of the 2-pass programs provided good (>80%) giant ragweed control at harvest. Giant ragweed control was poor (51%) for the 1-pass PRE program at corn harvest.

Corn yield was significantly impacted by herbicide program (Table 2). Averaged across all treatments, yield of the 2-pass PRE *fb* POST programs = 200 bu/acre, 1-pass EPOST = 201 bu/acre, and 1-pass PRE only = 107 bu/acre. The untreated check yield = 37 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, crop injury, and corn grain yield for trial #23-ROK-CN02 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Injury (%)		Giant Ragweed (%)				Yield[b] bu acre^{-1}
		6/2	6/15	5/25	6/2	6/15	10/17	
1	Check Untreated	0	0	0	0	0	0	37 c
One-Pass – PRE (5/4)								
2	Resicore XL (2.8 qt)	1.5	0	95	61	58	51	107 b
One-Pass – EPOST (5/25)				EPOST				
3	Resicore XL (2 qt) + atrazine 4L (1 pt) + Roundup PM3 (32 oz) + COC (1% v/v) + AMS[c]	10.0	4.3	0	81	89	84	208 a
4	Anthem Maxx (4 oz) + Callisto (3 oz) + atrazine (2 pt) + Roundup PM3 (30 oz) + NIS (0.25% v/v) + AMS[c]	2.3	1.3	0	80	85	79	194 a
Two-Pass – PRE (5/4) *fb* POST (6/2)					POST			
5	Resicore XL (2 qt) ***fb*** Kyro (45 oz) + atrazine 4L (1 pt) + Roundup PM3 (32 oz) + COC (1% v/v) + AMS[c]	2.8	6.0	84	55	87	82	202 a
6	Surpass NXT (2 pt) + atrazine 4L (2 pt) ***fb*** Resicore XL (1.4 qt) + atrazine 4L (1 pt) + Roundup PM3 (32 oz) + COC (1% v/v) + AMS[c]	2.0	8.0	82	41	87	83	197 a
7	Verdict (16 oz) ***fb*** Armezon PRO (16 oz) + atrazine 4L (1 pt) + Roundup PM3 (15 oz) + AMS[c]	1.8	2.0	94	67	89	85	195 a
8	Verdict (10 oz) + Callisto (3 oz) ***fb*** Armezon PRO (16 oz) + atrazine 4L (1 pt) + Roundup PM3 (15 oz) + AMS[c]	2.3	2.0	89	62	87	85	197 a
9	Anthem Maxx (4 oz) + Callisto (5 oz) + atrazine 4L (2 pt) ***fb*** Roundup PM3 (30 oz) + Status (5 oz) + NIS (0.25% v/v) + AMS[c]	2.3	0.5	85	55	89	85	199 a
10	Lumax EZ (1.5 qt) ***fb*** Acuron GT (3.75 pt) + atrazine 4L (1 pt) + NIS (0.25% v/v) + AMS[c]	1.0	3.0	61	24	88	85	196 a
11	Acuron (1.5 qt) ***fb*** Halex GT (3.6 pt) + Status (2.5 oz) + atrazine 4L (1 pt) + NIS (0.25% v/v) + AMS[c]	3.3	3.3	83	60	91	94	214 a
	LSD (α=0.10)	**1.5**	**1.5**	**6**	**19**	**15**	**11**	**25**
	p value	**<.001**	**<.001**	**<.001**	**<.001**	**0.029**	**<.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

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 #:	453	**Hybrid:**	P9998Q
Soil type:	Plano silt loam	**Planting Date:**	4/28
% OM:	3.8	**Emergence Date:**	5/15
pH:	6.5	**Population:**	35,000 seeds/acre
Fertilization:	152 lbs N/acre	**Depth:**	2 in
Previous crop:	Soybean	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 25 ft
Weed species:	common ragweed (AMBEL), common lambsquarters (CHEAL), giant foxtail (SETFA), woolly cupgrass (ERBVI)		

Herbicide Application Information:

Date:	4/28	5/30	6/6
Treatment:	PRE (A)	EPOST (B)	POST (C)
Air Temp (°F):	66	83	72
2" Soil Temp (°F):	52	82	75
Soil moisture [surface]:	moist	dry	dry
RH %:	37	37	67
Cloud cover %	10	18	15
Wind speed (mph)/direction	2-3/SE	1-5/NW	1-6/NE
Rainfall (in) 1 wk after APP:	0.56"	0.15"	0.52"
GPA:	15	15	15
PSI:	40	36	36
Nozzle:	TTI 110015	TT 110015	TT 110015
Nozzle spacing (in):	20	20	20
Boom Height (in):	20	23	24

Crop and weed information at application:

	Date:	4/28	5/30	6/6
Corn	Height:	-	4.5"	7"
	Stage:	-	V2/V3	V4
common ragweed	Height:	-	1-3"	1-4"
	Density:	-	3-8/ft^2	0-30/m^2
common lambsquarters	Height:	-	0.25-2"	0.5-1"
	Density:	-	2-7/ft^2	0-6/m^2
giant foxtail	Height:	-	1-4"	1-6"
	Density:	-	2-11/ft^2	3-68/m^2
woolly cupgrass	Height:	-	1-4"	1-4.5"
	Density:	-	4-22/ft^2	0-188/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Resicore XL	3.26 lb/gal	4, 15, 27	2.8 qt/a	PRE	A
3	Acuron Flexi	3.26 lb/gal	15, 27	2.25 qt/a	PRE	A
	Princep 4L	4 lb/gal	5	1 qt/a	PRE	A
4	Resicore XL	3.26 lb/gal	4, 15, 27	2 qt/a	EPOST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	32 fl oz/a	EPOST	B
	COC			1% v/v	EPOST	B
	AMSOL			2.5% v/v	EPOST	B
5	Anthem Maxx	4.3 lb/gal	14, 15	4 fl oz/a	EPOST	B
	Callisto	4 lb/gal	27	3 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
	AMSOL			2.5% v/v	EPOST	B
6	Surpass NXT	7 lb/gal	15	2 pt/a	PRE	A
	Kyro	3.07 lb/gal	4, 15, 27	45 fl oz/a	POST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	32 fl oz/a	POST	C
	COC			1% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
7	Surpass NXT	7 lb/gal	15	2 pt/a	PRE	A
	Kyro	3.07 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
	AMSOL			2.5% v/v	POST	C
8	Verdict	5.57 lb/gal	14, 15	16 fl oz/a	PRE	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	15 fl oz/a	POST	C
	Status	56% w/w	4	5 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
9	Anthem Maxx	4.3 lb/gal	14, 15	4 fl oz/a	PRE	A
	Callisto	4 lb/gal	27	4 fl oz/a	PRE	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	30 fl oz/a	POST	C
	Status	56% w/w	4	5 oz/a	POST	C
	NIS			0.25% v/v	POST	C
	AMSOL			2.5% v/v	POST	C
10	Calibra	3.1 lb/gal	15, 27	1.4 qt	PRE	A
	Princep 4L	4 lb/gal	5	1 qt	PRE	A
	Acuron GT	4.3 lb/gal	9, 15, 27	3.75 pt	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
11	**Intrava DX***	3.3 lb/gal	5	21 fl oz/a	PRE	A
	Intermoc	3.57 lb/gal	10, 15	64 fl oz/a	POST	C
	AMS			3 lb/a	POST	C
12	**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: AMS (dry) = BlueAg spray grade ammonium sulfate; AMSOL = AMS; COC = Crop Oil; NIS = Prefer 90

***Intrava DX** is a new corn herbicide pre-mix developed by UPL NA, Inc., consisting of two active ingredients from group 5, amicarbazone and metribuzin. EPA registration was submitted April 2023 and is currently pending approval.

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. None of the herbicide programs we evaluated caused visible corn injury symptoms at any point in the growing season (data not shown). However, a lack of early season moisture severely stressed corn, especially treatments with poor early season weed control. This trial was located in a field with a heavy population density of annual grasses (giant foxtail; woolly cupgrass) and common ragweed, as well as a moderate population density of common lambsquarters. All of the corn herbicide programs provided excellent season long control of common lambsquarters (Table 3). Most herbicide programs provided good-excellent end of season control of common ragweed; however, early season residual control did differ amongst the PRE herbicides evaluated (Table 3). Both of the one-pass PRE only herbicide programs failed to adequately control (<70%) giant foxtail and woolly cupgrass at the end of the season (Table 4). The one-pass EPOST and two-pass herbicide programs provided good to excellent end-of-season grass control, with the exception of treatment 7, which did not include glyphosate or glufosinate in the tank.

Corn grain yield differed amongst treatments (Tables 3, 4). Poor end-of-season grass or common ragweed control appeared to be the driving factor amongst the lower yielding treatments (3 ,4, 7). Averaged across all treatments, yield of the 2-pass PRE *fb* POST programs = 191 bu acre^{-1}, 1-pass EPOST = 180 bu acre^{-1}, and 1-pass PRE only = 160 bu acre^{-1}. The untreated check yield = 7 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. Broadleaf weed control ratings and corn yield for trial #23-ARL-CN03 at Arlington, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Common Ragweed (%)					Lambsquarters (%)			Yield[b] bu acre^{-1}
		5/19	6/6	6/19	7/6	10/19	6/6	6/19	10/19	
1	Untreated Check	0	0	0	0	0	0	0	0	7 c
One-Pass – PRE (4/28)										
2	Resicore XL (2.8 qt)	99	100	97	95	94	100	100	100	180 a
3	Acuron Flexi (2.25 qt) + Princep 4L (1 qt)	99	98	97	91	88	100	100	100	140 b
One-Pass – EPOST (5/30)		EPOST					EPOST			
4	Resicore XL (2 qt) + Roundup PM3 (32 fl oz) + 1% v/v COC + 2.5% v/v AMS	0	93	96	98	92	90	100	100	191 a
5	Anthem Maxx (4 oz) + Callisto (3 oz) + Roundup PM3 (30 oz)+ 0.25% v/v NIS+ 2.5% v/v AMS	0	98	95	90	60	99	100	100	170 ab
Two-Pass – PRE (4/28) *fb* POST (6/6)		POST					POST			
6	Surpass NXT (2 pt) ***fb*** Kyro (45 fl oz) + Roundup PM3 (32 fl oz) + 1% v/v COC + 2.5% v/v AMS	96	83	97	100	100	100	100	100	194 a
7	Surpass NXT (2 pt) ***fb*** Kyro (45 fl oz) + Accent Q (0.9 oz) + 1% v/v COC + 2.5% v/v AMS	94	79	85	99	100	100	100	100	166 ab
8	Verdict (16 fl oz) ***fb*** Roundup PM3 (15 fl oz) + Status (5 oz) + Zidua SC (2.5 fl oz) + 1% v/v COC + 2.5% v/v AMS	99	98	100	100	99	100	100	100	201 a
9	Anthem Maxx (4 fl oz) + Callisto (4 fl oz) ***fb*** Roundup PM3 (30 oz) + Status (5 oz) + 0.25% v/v NIS + 2.5% v/v AMS	91	85	98	100	100	100	100	100	188 a
10	Calibra (1.4 qt) + Princep 4L (1 qt) ***fb*** Acuron GT (3.75 pt) + 0.25% v/v NIS + 2.5% v/v AMS	97	91	97	99	99	100	100	100	199 a
11	Intrava DX (21 fl oz) ***fb*** Intermoc (64 fl oz) + AMS (3 lb)	94	90	100	100	97	100	100	100	186 a
12	Intrava DX (21 fl oz) + Moccasin II Plus (1.33 pt) ***fb*** Intermoc (64 fl oz) + AMS (3 lb)	97	92	100	100	100	100	100	100	203 a
	LSD (α=0.10)	**4**	**5**	**3**	**4**	**8**	**1**	**ns**	**ns**	**28**
	p value	**0.013**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**0.465**	**1.00**	**<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.

Table 4. Annual grass weed control ratings and corn yield for trial #23-ARL-CN03 at Arlington, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Wolly Cupgrass[c] (%)					Giant Foxtail (%)			Yield[b] bu acre^{-1}
		5/19	6/6	6/19	7/6	10/19	6/6	6/19	7/6	
1	Untreated Check	0	0	0	0	0	0	0	0	7 c
One-Pass – PRE (4/28)										
2	Resicore XL (2.8 qt)	99	96	90	81	66	99	94	86	180 a
3	Acuron Flexi (2.25 qt) + Princep 4L (1 qt)	95	86	77	68	56	98	94	84	140 b
One-Pass – EPOST (5/30)		**EPOST**					**EPOST**			
4	Resicore XL (2 qt) + Roundup PM3 (32 fl oz) + 1% v/v COC + 2.5% v/v AMS	0	97	100	99	87	97	100	99	191 a
5	Anthem Maxx (4 oz) + Callisto (3 oz) + Roundup PM3 (30 oz)+ 0.25% v/v NIS+ 2.5% v/v AMS	0	98	100	99	97	98	100	100	170 ab
Two-Pass – PRE (4/28) *fb* POST (6/6)		**POST**					**POST**			
6	Surpass NXT (2 pt) ***fb*** Kyro (45 fl oz) + Roundup PM3 (32 fl oz) + 1% v/v COC + 2.5% v/v AMS	99	93	100	100	98	99	100	100	194 a
7	Surpass NXT (2 pt) ***fb*** Kyro (45 fl oz) + Accent Q (0.9 oz) + 1% v/v COC + 2.5% v/v AMS	98	88	84	82	69	99	95	96	166 ab
8	Verdict (16 fl oz) ***fb*** Roundup PM3 (15 fl oz) + Status (5 oz) + Zidua SC (2.5 fl oz) + 1% v/v COC + 2.5% v/v AMS	96	85	100	98	93	98	100	99	201 a
9	Anthem Maxx (4 fl oz) + Callisto (4 fl oz) ***fb*** Roundup PM3 (30 oz) + Status (5 oz) + 0.25% v/v NIS + 2.5% v/v AMS	87	67	100	99	94	88	100	100	188 a
10	Calibra (1.4 qt) + Princep 4L (1 qt) ***fb*** Acuron GT (3.75 pt) + 0.25% v/v NIS + 2.5% v/v AMS	93	75	100	99	96	96	100	100	199 a
11	Intrava DX (21 fl oz) ***fb*** Intermoc (64 fl oz) + AMS (3 lb)	82	61	100	97	86	90	99	97	186 a
12	Intrava DX (21 fl oz) + Moccasin II Plus (1.33 pt) ***fb*** Intermoc (64 fl oz) + AMS (3 lb)	96	87	100	99	94	98	100	99	203 a
	LSD (α=0.10)	**3**	**9**	**6**	**7**	**8**	**3**	**2**	**3**	**28**
	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.

[c]5/19 and 10/19 ratings were a combination of woolly cupgrass, giant foxtail, and other minor grass species present in the trial.

Trial: Maverick Herbicide PRE Weed Control Comparisons **23-ROK-CN04**

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

Site Description:

Location:	Janesville, WI	**Crop:**	Corn
Field #:	4	**Hybrid:**	DKC50-87 RIB
Soil type:	Plano silt loam	**Planting Date:**	5/4
% OM:	3.0	**Emergence Date:**	5/13
pH:	6.5	**Population:**	34,000 seeds/acre
Fertilization:	160 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:	5/4	6/6
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	74	89
2" Soil Temp (°F):	58	65
Soil moisture [surface]:	moist	dry
RH %:	30	45
Cloud cover %	20	80
Wind speed (mph)/direction	3-9/NW	1-5/E
Rainfall (in) 1 wk after APP:	0.68"	0.91"
GPA:	15	15
PSI:	38	38
Nozzle:	TTI 110015	TTI 110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	26

Crop and weed information at application:

	Date:	5/4	6/6
Corn	Height:	-	5"
	Stage:	-	V4
Giant ragweed	Height:	-	2-6"
	Density:	-	6-10 ft^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Acuron	3.44 lb/gal	5, 15, 27	3 qt/a	PRE	A
3	Bicep Lite II Magnum	6 lb/gal	5, 15	2 qt/a	PRE	A
4	Resicore XL	3.26 lb/gal	4, 15, 27	2.75 qt/a	PRE	A
5	Maverick	2.04 lb/gal	4, 15, 27	24 fl oz/a	PRE	A
6	Maverick	2.04 lb/gal	4, 15, 27	32 fl oz/a	PRE	A
7	Maverick	2.04 lb/gal	4, 15, 27	32 fl oz/a	PRE	A
	atrazine 4L	4 lb/gal	5	1.5 pt/a	PRE	A
8	Trivolt SC	3.65 lb/gal	2, 15, 27	20 fl oz/a	PRE	A

POST (B) Application: Applied to all treatments 33 days after PRE, except the untreated check.

Roundup PowerMAX 3 (22 fl oz) + Status (5 oz) + NIS (0.25% v/v) + AMS (3 lb)

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to evaluate the residual weed control and crop safety of Maverick corn herbicide compared to other competitor premium corn herbicide offerings.

None of the PRE herbicides caused significant corn injury (>5%) at 14 or 27 days after application (data not shown).

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. Several of the of the PRE herbicides provided good to excellent control (>80%) at 27 days after application (Table 5). Only Bicep Lite II Magnum did not provide adequate control at this timing. Following the POST application of Roundup PowerMAX 3 + Status, end-of-season giant ragweed control was excellent for all PRE herbicide treatments.

Even though end-season control was similar across treatments, corn yield was significantly impacted by PRE herbicide program (Table 5). This suggests that corn yield potential was decreased in treatments with more weed-crop competition early in the season.

Plot photos from throughout the growing season are available at **Maverick Herbicide PRE Weed Control Comparisons** published on **wiscweeds.info**

Table 5. Giant ragweed control ratings and corn grain yield for trial #23-ROK-CN04 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Giant Ragweed (%) 5/31	6/27	10/17	Yield[b] bu acre^{-1}
1	Untreated Check	0	0	0	38 -
Two-Pass – PRE (5/4) *fb* POST[c] (6/6)		**POST**			
2	Acuron (3 qt)	93	95	99	214 a
3	Bicep Lite II Magnum (2 qt)	58	97	99	188 b
4	Resicore XL (2.75 qt)	89	97	99	202 ab
5	Maverick (24 fl oz)	86	93	98	201 ab
6	Maverick (32 fl oz)	86	95	97	197 ab
7	Maverick (32 fl oz) + atrazine 4L (1.5 pt)	88	94	98	203 ab
8	Trivolt SC (20 fl oz)	83	99	99	194 b
	LSD (α=0.10)	**13**	**ns**	**ns**	**12**
	p value	**0.003**	**0.563**	**0.830**	**0.039**

[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. Did not include check in the analysis.

[c]POST Application = Roundup PowerMAX 3 (22 fl oz) + Status (5 oz) + NIS (0.25% v/v) + AMS (3 lb)

Project Goal: Evaluate sequential split applications of Maverick compared to other competitor premium corn herbicide offerings.

Site Description:

Location:	Janesville, WI	**Crop:**	Corn
Field #:	8	**Hybrid:**	NK9653-EZ1
Soil type:	Plano silt loam	**Planting Date:**	5/11
% OM:	3.4	**Emergence Date:**	5/22
pH:	6.5	**Population:**	36,000 seeds/acre
Fertilization:	160 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); glyphosate-R waterhemp (AMATA)		

Herbicide Application Information:

Date:	5/11	6/6
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	84	89
2" Soil Temp (°F):	-	65
Soil moisture [surface]:	dry	dry
RH %:	29	45
Cloud cover %	5	80
Wind speed (mph)/direction	2-9/SE	1-5/E
Rainfall (in) 1 wk after APP:	1.30"	0.91"
GPA:	15	15
PSI:	38	38
Nozzle:	TTI 110015	TT 110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	26

Crop and weed information at application:

	Date:	5/11	6/6
Corn	Height:	-	5"
	Stage:	-	V4
giant ragweed	Height:	-	1-6" avg=3"
	Density:	-	6-30/m^2
waterhemp	Height:	-	
	Density:	-	sparse*

*Most waterhemp emerged after the POST application was made

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
	Acuron	3.44 lb/gal	5, 15, 27	1.5 qt/a	POST	B
	Roundup PowerMAX II	4.5 lb ae/gal	9	28 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS (dry)			8.5 lb/100 gal	POST	B
3	Bicep Lite II Magnum	6 lb/gal	5, 15	2 qt/a	PRE	A
	Acuron GT	4.3 lb/gal	9, 15, 27	3.75 pt/a	POST	B
	AMS (dry)			8.5 lb/100 gal	POST	B
4	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 PowerMAX II	4.5 lb ae/gal	9	28 fl oz/a	POST	B
	AMS (dry)			8.5 lb/100 gal	POST	B
5	Resicore XL	3.26 lb/gal	4, 15, 27	1.4 qt/a	PRE	A
	Kyro	3.07 lb/gal	4, 15, 27	45 fl oz/a	POST	B
	Roundup PowerMAX II	4.5 lb ae/gal	9	28 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS (dry)			8.5 lb/100 gal	POST	B
6	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 PowerMAX II	4.5 lb ae/gal	9	28 fl oz/a	POST	C
	NIS			0.25% v/v	POST	C
	AMS (dry)			8.5 lb/100 gal	POST	C
7	Maverick	2.04 lb/gal	4, 15, 27	18 fl oz	PRE	A
	Maverick	2.04 lb/gal	4, 15, 27	14 fl oz/a	POST	C
	atrazine 4L	4 lb/gal	5	2 pt/a	POST	C
	Roundup PowerMAX II	4.5 lb ae/gal	9	28 fl oz/a	POST	C
	NIS			0.25% v/v	POST	C
	AMS (dry)			8.5 lb/100 gal	POST	C

Adjuvants: AMS = BlueAg spray grade ammonium sulfate; NIS = Induce

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to evaluate sequential split applications of Maverick compared to other competitor premium corn herbicide offerings.

None of the PRE herbicides we evaluated caused significant (>5%) corn injury (data not shown). Leaf necrosis (burn) was observed at 8 and 21 days after the POST herbicide application in some treatments (Table 6). The POST application of Acuron caused the greatest level of necrosis of 7 and 5% at 8 and 21 DAB, respectively.

Glyphosate-resistant waterhemp and giant ragweed were the predominant species in the trial area. Most of the herbicide programs we evaluated provided good (>85%) season-long control of both waterhemp and giant ragweed (Table 6). Only the Bicep Lite II Magnum followed by Acuron GT herbicide program (trt 3) failed to provide good control of the weed species in the trial area. This is the only treatment that did not have mesotrione as part of the PRE herbicide and thus weed control was consistently lower than the other herbicide programs evaluated.

Corn yield of most of the herbicide programs was very similar (Table 6). Only treatment 3 showed a decrease in yield relative to the other herbicide programs. Averaged across all treatments, yield of the 2-pass PRE *fb* POST programs = 185 bu acre^{-1}. The untreated check yielded 16 bu acre^{-1}, a 91% reduction.

Plot photos from throughout the growing season are available at **Maverick Herbicide Split-Application Comparisons** published on **wiscweeds.info**

Table 6. Weed control ratings and corn yield for trial #23-ROK-CN05 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Injury (%)		Giant Ragweed (%)				Waterhemp (%)			Yield[b]
		6/14	6/27	6/6	6/27	7/5	10/18	6/27	7/5	10/18	bu acre^{-1}
1	Untreated Check	0	0	0	0	0	0	0	0	0	16 c
Two-Pass – PRE (5/11) *fb* POST (6/6)											
2	Acuron (1.5 qt) ***fb*** Acuron (1.5 qt) + Roundup PMII (28 fl oz) + NIS (0.25% v/v) + AMS[c]	6.8	5.3	73	95	90	88	95	93	86	193 a
3	Bicep Lite II Magnum (2 qt) ***fb*** Acuron GT (3.75 pt) + AMS	0.3	0.0	50	89	87	77	86	79	47	164 b
4	Resicore XL (1.4 qt) ***fb*** Resicore XL (1.4 qt) + Roundup PMII (28 fl oz) + AMS[c]	0.3	0.0	80	95	93	90	97	95	89	197 a
5	Resicore XL (1.4 qt) ***fb*** Kyro (45 fl oz) + Roundup PMII (28 fl oz) + NIS (0.25% v/v) + AMS[c]	3.0	2.3	79	91	90	86	94	89	88	184 a
6	Maverick (18 fl oz) ***fb*** Maverick (14 fl oz) + Roundup PMII (28 fl oz) + NIS (0.25% v/v) + AMS[c]	0.3	0.0	70	90	88	88	96	95	89	185 a
7	Maverick (18 fl oz) ***fb*** Maverick (14 fl oz) + atrazine 4L (2 pt) + Roundup PMII (28 fl oz) + NIS (0.25% v/v) + AMS[c]	3.0	0.5	75	95	93	94	99	97	93	190 a
	LSD (α=0.10)	**1.4**	**1**	**ns**	**4**	**ns**	**10**	**6**	**9**	**13**	**11**
	p value	**<.001**	**<.001**	**0.236**	**0.07**	**0.366**	**0.097**	**0.051**	**0.026**	**<.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]Spray grade dry AMS applied at 8.5 lb/100 gal

Project Goal: Compare residual weed control of ***Surtain** and active ingredient (ai) components to Acuron and Resicore XL and their ai components.

***Surtain** is a new corn herbicide pre-mix, developed by BASF, containing encapsulated saflufenacil (Sharpen) and pyroxasulfone (Zidua). As of publication, EPA registration of Surtain is still pending but expected in 2024.

Site Description:

Location:	Janesville, WI	**Crop:**	Corn
Field #:	3	**Hybrid:**	DKC50-87 RIB
Soil type:	Plano silt loam	**Planting Date:**	5/4
% OM:	3.0	**Emergence Date:**	5/13
pH:	6.5	**Population:**	34,000 seeds/acre
Fertilization:	160 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:	5/4
Treatment:	PRE (A)
Air Temp (°F):	74
2” Soil Temp (°F):	58
Soil moisture [surface]:	moist
RH %:	30
Cloud cover %	20
Wind speed (mph)/direction	3-9/NW
Rainfall (in) 1 wk after APP:	0.68”
GPA:	15
PSI:	38
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	Sharpen	2.85 lb/gal	14	3.05 fl oz/a	PRE	A
3	Zidua SC	4.17 lb/gal	15	3.33 fl oz/a	PRE	A
4	Surtain	1.62 lb/gal	14, 15	14 fl oz/a	PRE	A
5	Sharpen	2.85 lb/gal	14	3.71 fl oz/a	PRE	A
6	Zidua SC	4.17 lb/gal	15	4.05 fl oz/a	PRE	A
7	Surtain	1.62 lb/gal	14, 15	17 fl oz/a	PRE	A
8	Resicore XL	3.26 lb/gal	4, 15, 27	1.25 qt/a	PRE	A
9	Callisto	4 lb/gal	27	3 fl oz/a	PRE	A
10	Surpass NXT	7 lb/gal	15	16 fl oz/a	PRE	A
11	Stinger	3 lbae/gal	4	2.5 fl oz/a	PRE	A
12	Acuron	3.44 lb/gal	5, 15, 27	1.5 qt/a	PRE	A
13	Dual II Magnum	7.64 lb/gal	15	13.5 fl oz/a	PRE	A
14	atrazine 4L	4 lb/gal	5	0.75 pt/a	PRE	A

Rate equivalents of herbicide premixes at rates used in trial.

Herbicide Premix	Rate	Rate Equivalents (rate acre^{-1})
Surtain	14 fl oz/a	3.05 fl oz Sharpen + 3.33 fl oz Zidua SC
Surtain	17 fl oz/a	3.71 fl oz Sharpen + 4.05 fl oz Zidua SC
Resicore	1.25 qt/a	2 pt Surpass NXT + 3 fl oz Callisto + 2.5 fl oz Stinger
Acuron	1.5 qt/a	13.5 fl oz Dual II Magnum + 2.9 fl oz Callisto + 0.75 pt AAtrex 4L + 0.36 oz bicyclopyrone

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to compare the residual weed control of **Surtain** and active ingredient (ai) components to Acuron and Resicore XL and their ai components. **Surtain** is a new corn herbicide pre-mix, developed by BASF, containing encapsulated saflufenacil (Sharpen) and pyroxasulfone (Zidua). As of publication, EPA registration is still pending. The encapsulation of saflufenacil enables the safe application to emerged corn, thus increasing the application flexibility relative to Verdict, which can only be sprayed prior to corn emergence. There was no significant injury from any of the PRE herbicide programs evaluated (data not shown).

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. The herbicide premixes and their ai components provided varying levels of giant ragweed control throughout the growing season (Table 7). Of note, the non-encapsulated Sharpen alone treatment had significantly greater levels of control than Surtain with the same ai load of saflufenacil. The difference in control could potentially be due to low precipitation amounts in the weeks following application. Encapsulated herbicides require more precipitation to release the active ingredient into the soil solution and activate the herbicide. Also of note, the rates of Resicore and Acuron applied in this trial are reflective of rates used in a planned split-application (PRE followed by POST).

Table 7. Giant ragweed control ratings for trial #23-ROK-CN06 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Giant Ragweed (%)				
		21 DAT	27 DAT	35 DAT	42 DAT	54 DAT
1	Untreated Check	0	0	0	0	0
One-Pass – PRE (5/4)						
4	Surtain (14 fl oz)	67	66	56	23	15
2	Sharpen (3.05 fl oz)	81	86	79	66	43
3	Zidua SC (3.33 fl oz)	20	21	18	12	5
7	Surtain (17 fl oz)	69	75	65	36	23
5	Sharpen (3.71 fl oz)	88	89	83	71	63
6	Zidua SC (4.05 fl oz)	27	16	13	8	8
8	Resicore (1.25 qt)	58	72	58	31	14
9	Callisto (3 fl oz)	33	65	52	24	13
10	Surpass NXT (16 fl oz)	30	16	15	7	6
11	Stinger (2.5 fl oz)	21	38	33	15	8
12	Acuron (1.5 qt)	68	81	75	58	46
13	Dual II Magnum (13.45 fl oz)	29	24	19	11	5
14	atrazine 4L (0.75 pt)	32	18	18	8	4
	LSD (α=0.10)	**19**	**13**	**13**	**12**	**14**
	p value	**<0.001**	**<0.001**	**<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.

Plot photos from throughout the growing season are available at **Components of Corn Herbicide Premixes Comparison** published on **wiscweeds.info**

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). As of publication, EPA registration of Surtain is still pending but expected in 2024.

Site Description:

Location:	Janesville, WI	**Crop:**	Corn
Field #:	3	**Hybrid:**	DKC50-87 RIB
Soil type:	Plano silt loam	**Planting Date:**	5/4
% OM:	3.0	**Emergence Date:**	5/13
pH:	6.5	**Population:**	34,000 seeds/acre
Fertilization:	160 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:	5/4	5/25	6/2
Treatment:	PRE (A)	EPOST (B)	POST (C)
Air Temp (°F):	74	65	83
2" Soil Temp (°F):	58	62	-
Soil moisture [surface]:	moist	dry	wet
RH %:	30	35	55
Cloud cover %	20	30	2
Wind speed (mph)/direction	3-9/NW	2-10/SW	1-3/E
Rainfall (in) 1 wk after APP:	0.68"	0.35"	0.56"
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:	5/4	5/25	6/2
Corn	Height:	-	2-3"	7"
	Stage:	-	V2	V4
giant ragweed	Height:	-	1-2.5"	1-6"
	Density:	-	30-70/m^2	12-35/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	Degree XTRA	4.04 lb/gal	5, 15	2 qt/a	PRE	A
4	Trivolt SC	3.65 lb/gal	2, 15, 27	12 fl oz/a	PRE	A
5	Surtain	1.62 lb/gal	14, 15	14 fl oz/a	PRE	A
7	Surtain	1.62 lb/gal	14, 15	17 fl oz/a	PRE	A
9	Surtain	1.62 lb/gal	14, 15	14 fl oz/a	EPOST	B
	Clarity	4 lbae/gal	4	8 fl oz/a	EPOST	B
	atrazine 4L	4 lb/gal	5	2 pt/a	EPOST	B
	Roundup PowerMAX 3	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
10	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
	atrazine 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
11	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 = BlueAg 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). As of publication, EPA registration is still pending but is expected in 2024. 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 (data not shown). The EPOST application of Surtain caused minor (6%) leaf necrosis (burn) 8 days after application (Table 8); 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. Surtain provided good (>80%) residual giant ragweed control 21 days after the PRE application (Table 8). Surtain and 1.5 qt Acuron had similar levels of control 21 DAT. Residual control decreased over time and by 54 days after application control was <35% for all PRE only treatments. The EPOST and PRE fb POST herbicide programs provided good (>80%) late season control. 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 **Surtain Weed Control and Crop Safety** published on **wiscweeds.info**

Table 8. Giant ragweed control ratings, crop injury, and corn grain yield for trial #23-ROK-CN07 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Injury[d] (%)		Giant Ragweed (%)				Yield[b] bu acre^{-1}
		6/2	6/8	5/25	6/2	6/8	6/27	
1	Check Untreated	0	0	0	0	0	0	- -
One-Pass – PRE (5/4)								
2	Acuron (1.5 qt)	0	0	82	70	69	30	- -
3	Degree XTRA (2 qt)	0	0	53	45	24	16	- -
4	Trivolt SC (12 fl oz)	0	0	70	64	65	31	- -
5	Surtain (14 fl oz)	0	0	80	57	42	18	- -
7	Surtain (17 fl oz)	0	0	81	63	43	17	- -
One-Pass – EPOST (5/25)				**EPOST**				
9	Surtain (14 fl oz) + Clarity (8 fl oz) + atrazine (2 pt) + Roundup PM3 (30 fl oz) + 1% COC + AMS[c]	5.5	4.8	0	86	87	83	165 -
Two-Pass – PRE (5/4) *fb* POST (6/2)					**POST**			
10	Surtain (14 fl oz) ***fb*** Armezon PRO (16 fl oz) + atrazine (1 pt) + Roundup PM3 (30 fl oz) + 1% COC + AMS[c]	0	8.0	81	64	90	86	167 -
11	Surtain (14 fl oz) ***fb*** Status (5 oz) + Zidua SC (2.5 fl oz) + Roundup PM3 (30 fl oz) + 0.25% NIS + AMS[c]	0	2.5	83	63	100	90	177 -
	LSD (α=0.10)	**0.3**	**0.6**	**5**	**13**	**14**	**16**	**ns**
	p value	**<.001**	**<.001**	**<.001**	**0.003**	**<.001**	**<.001**	**0.2109**

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

[b]Did not take yield data from PRE only treatments as there was very little corn in these plots due to heavy giant ragweed competion.

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

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

Trial: Syngenta Corn Herbicide Programs Following a Winter Rye Cover Crop 23-ROK-CN10

Project Goal: Evaluate Syngenta corn herbicide programs following a winter rye cover crop.

Site Description:

Location:	Janesville, WI	**Crop:**	Corn
Field #:	8	**Variety:**	NK9653-5222-EZ1
Soil type:	Plano silt loam	**Planting Date:**	5/11
% OM:	3.4	**Emergence Date:**	6/22
pH:	6.5	**Population:**	36,000 seeds/acre
Previous crop:	Soybean	**Depth:**	2 in
Tillage:	No-till	**Row spacing:**	30 in
Rye Plant Date:	10/28/22	**Plot Size:**	10 x 30 ft
Rye Seed Rate:	60 lb/a		
Fertilization:	160 lb N preplant (32% UAN @ 45 gal/a)		
	40 lb N at plant (32% UAN@11 gal/a) - surface applied behind closing wheels		
Weed species:	giant ragweed (AMBTR), glyphosate-resistant waterhemp (AMATA)		

Herbicide Application Information:

Date:	4/27	5/11	6/6
Treatment:	Pre-Plant (A)	PRE (B)	POST (C)
Air Temp (°F):	60	84	89
2" Soil Temp (°F):	50	55	65
Soil moisture [surface]:	moist	dry	dry
RH %:	57	29	45
Cloud cover %	10	5	80
Wind speed (mph)/direction	3-8/NW	2-9/SE	1-5/E
Rainfall (in) 1 wk after APP:	0.49"	1.3"	0.91"
GPA:	15	15	15
PSI:	38	38	38
Nozzle:	TTI 110015	TTI 110015	TTI 110015
Nozzle spacing (in):	20	20	20
Boom Height (in):	27	31	24

Crop and weed information at application:

	Date:	4/27	5/11	6/6*
Corn	Height:	-	-	3-6"
	Stage:	-	-	V4
annual rye	Height:	5-9" Avg=6.5"	7-16" Avg=11"	-
	Density:	-	-	-
giant ragweed	Height:	-	-	2-4"
	Density:	-	-	0.25-5/m^2
waterhemp	Height:	-	-	1-2"
	Density:	-	-	0-12/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.

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to evaluate Syngenta corn herbicide programs following a rye cover crop. A winter rye (aka cereal rye) cover crop was drilled in Fall 2022 (10/28/22) at 60 lb acre^{-1} following soybean harvest. Rye was terminated at two different times in spring 2023: 14 days before planting (early terminations) and the day corn was planted (plant green). Supplemental nitrogen was applied at corn planting. 40 lb N acre^{-1} (11 gal acre^{-1} 32% UAN) was surface applied behind the planter closing wheels offset two inches from the seed furrow. Corn stand was evaluated prior to harvest by counting the number of plants with ears from the center 2 rows of every plot. Harvest stand was not impacted by herbicide treatment or rye termination timing. The average corn population at harvest was 30,104 plants acre^{-1}.

Winter rye burndown control was acceptable for most of the herbicide programs we evaluated; however, some treatments did not provide complete rye control (Table 9).

Glyphosate-resistant waterhemp and giant ragweed were the predominant species in the trial area. Most of the herbicide programs we evaluated provided excellent (>90%) season-long control of giant ragweed (Table 9). Several of the herbicide programs provided good (>80%) end-of-season control of waterhemp; however, none were greater than 90%. Initial waterhemp control was excellent for all herbicide treatments 14 days after the POST application. This indicates that most of the waterhemp escapes emerged after the 6/20 rating.

Corn yield of all herbicide programs was statistically the same (Table 9). The two-pass early-termination treatment (trt 2) had a similar yield to the plant-green 2-pass treatments (trts 5-10). This suggests there was no yield penalty to planting green in this trial.

Plot photos from throughout the growing season are available at **Syngenta Corn Herbicide Programs Following a Winter Rye Cover Crop** published on **wiscweeds.info**

Table 9. Annual Rye and weed control ratings and corn grain yield for trial #23-ROK-CN10.[a]

Trt #	Herbicide (rate acre^{-1})	Rye (%)		Giant Ragweed (%)			Waterhemp (%)			Yield[b] bu acre^{-1}
		5/25	6/6	6/6	6/20	10/18	6/6	6/20	10/18	
1	**Early Termination** – Check[c]	100	100	0	0	0	0	0	0	91 b
3	**Plant Green** – Check[c]	100	97	80	69	44	76	64	40	109 b
Two-Pass – Pre-Plant (4/27) *fb* POST (6/6)										
2	**Early Termination** Acuron (1.5 qt) + Roundup PM3 (30 oz) + 2,4-D LV4 (1 pt) + AMS (2.5%) ***fb*** Halex GT (3.6 pt) + Clarity (4 oz) + atrazine (1 pt) + NIS (0.25%) + AMS (2.5%)	99	82	83	98	99	89	95	83	179 a
One-Pass – PRE (5/11)										
4	**Plant Green** Acuron (3 qt) + Roundup PM3 (30 oz) + 2,4-D LV4 (1 pt) + AMS (2.5%)	85	93	99	98	96	100	99	77	178 a
10	**Plant Green** Storen (2.4 qt) + atrazine (1.5 pt) + Roundup PM3 (30 oz) + 2,4-D LV4 (1 pt) + AMS (2.5%)	90	94	97	90	69	100	96	80	160 a
Two-Pass – PRE (5/11) *fb* POST (6/6)										
5	**Plant Green** Lumax EZ (1.5 qt) + Roundup PM3 (30 oz) + 2,4-D LV4 (1 pt) + AMS (2.5%) ***fb*** Acuron GT (3.75 pt) + atrazine (1 pt) + NIS (0.25%) + AMS (2.5%)	93	97	86	96	94	96	100	82	190 a
6	**Plant Green** Bicep Lite II Magnum (1 qt) + Roundup PM3 (30 oz) + 2,4-D LV4 (1 pt) + AMS (2.5%) ***fb*** Acuron GT (3.75 pt) + atrazine (1 pt) + NIS (0.25%) + AMS (2.5%)	95	96	86	97	96	88	100	61	178 a
7	**Plant Green** Acuron (1.5 qt) + Gramoxone SL 2.0 (3.75 pt) + 2,4-D LV4 (1 pt) + COC (1%) ***fb*** Halex GT (3.6 pt) + Clarity (4 oz) + atrazine (1 pt) + NIS (0.25%) + AMS (2.5%)	96	83	82	99	99	78	96	75	181 a
8	**Plant Green** Acuron (1.5 qt) + Roundup PM3 (30 oz) + 2,4-D LV4 (1 pt) + AMS (2.5%) ***fb*** Halex GT (3.6 pt) + Clarity (4 oz) + atrazine (1 pt) + NIS (0.25%) + AMS (2.5%)	93	95	85	98	94	100	100	81	189 a
9	**Plant Green** Storen (1.2 qt) + atrazine (.75 pt) + Roundup PM3 (30 oz) + 2,4-D LV4 (1 pt) + AMS (2.5%) ***fb*** Storen (1.2 qt) + atrazine (1 pt) + Roundup PM3 (26 oz) + AMS (2.5%)	90	96	89	98	95	100	100	88	191 a
11	**Plant Green** Acuron (2.5 qt) + Roundup PM3 (30 oz) + 2,4-D LV4 (1 pt) + AMS (2.5%) ***fb*** Roundup PM3 (30 oz) + Status (2.5 oz) + AMS (2.5%)	91	94	92	99	97	96	100	85	180 a
	LSD (α=0.10)	**4**	**6**	**15**	**9**	**13**	**14**	**6**	**14**	**25**
	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.

[c]Roundup PM3 (30 oz) + 2,4-D LV4 (1 pt) + AMS (2.5%) was applied to the checks at the appropriate timing: Early – 4/27; Plant Green – 5/11.

Trial: Storen Weed Control and Crop Safety **23-ARL-CN11**

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 #:	455	**Hybrid:**	NK9653-5222-EZ1
Soil type:	Plano silt loam	**Planting Date:**	4/27
% OM:	3.4	**Emergence Date:**	5/15
pH:	6.2	**Population:**	35,000 seeds/acre
Fertilization:	152 lbs N/acre	**Depth:**	2 in
Previous crop:	Soybean	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 25 ft
Weed species:	giant foxtail (SETFA), woolly cupgrass (ERBVI)		

Herbicide Application Information:

Date:	4/28	5/30
Treatment:	PRE (A)	EPOST (B)
Air Temp (°F):	66	83
2" Soil Temp (°F):	52	82
Soil moisture [surface]:	moist	dry
RH %:	37	37
Cloud cover %	10	18
Wind speed (mph)/direction	2-3/SE	1-5/NW
Rainfall (in) 1 wk after APP:	0.56"	0.15"
GPA:	15	15
PSI:	40	36
Nozzle:	TTI 110015	TT 110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	23

Crop and weed information at application:

	Date:	4/28	5/30
Corn	Height:	-	4.5"
	Stage:	-	V2/V3
giant foxtail	Height:	-	1-4"
	Density:	-	18-36/ft^2
woolly cupgrass	Height:	-	1-4"
	Density:	-	12-24/ft^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Storen	3.9 lb/gal	15, 27	2.1 qt/a	PRE	A
3	Storen	3.9 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 XL	3.26 lb/gal	4, 15, 27	2.5 qt/a	PRE	A
6	Resicore XL	3.26 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	3.9 lb/gal	15, 27	1.05 qt/a	PRE	A
	Storen	3.9 lb/gal	15, 27	1.05 qt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
12	Storen	3.9 lb/gal	15, 27	1.2 qt/a	PRE	A
	Storen	3.9 lb/gal	15, 27	1.2 qt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
13	Storen	3.9 lb/gal	15, 27	1.2 qt/a	PRE	A
	Halex GT	4.39 lb/gal	9, 15, 27	4 pt/a	POST	B
	Status	56% w/w	4, 19	5 oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
14	Acuron GT	4.3 lb/gal	9, 15, 27	3.75 pt	POST	B
	NIS			0.25% v/v	POST	B
	AMSOL			2.5% v/v	POST	B
15	Calibra	3.1 lb/gal	15, 27	1.4 qt	PRE	A
	Acuron GT	4.3 lb/gal	9, 15, 27	3.75 pt	POST	B
	NIS			0.25% v/v	POST	B
	AMSOL			2.5% v/v	POST	B

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.

None of the herbicide programs evaluated caused visible corn injury symptoms at any point in the growing season (data not shown). However, a lack of early season moisture severely stressed corn, especially the POST only herbicide program (trt 1) due to heavy weed competition. Corn growth was stunted by 20-50% compared to plots with good weed control.

This trial was located in a field with a heavy population density of annual grasses (giant foxtail; woolly cupgrass). Both full and foundation rates of Storen provided good (>85%) residual control of both woolly cupgrass and giant foxtail 32 days after PRE application (Table 10). However, reduced (half) rates failed to provide >70% control. At 47 days after application (6/28), none of the PRE herbicides had >70% residual woolly cupgrass control. Moreover, end-of-season grass control was poor (<60%) for all PRE only treatments. The one-pass POST only and all 2-pass PRE *fb* POST herbicide programs provided good end-of-season grass control and had statistically similar yields (Table 10). Averaged across all treatments, yields of the 2-pass and 1-pass POST herbicide programs = 207 bu acre^{-1} and the 1-pass PRE only = 136 bu acre^{-1}. The untreated check yield = 9 bu acre^{-1}.

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

Table 10. Annual grass weed control ratings and corn yield for trial #23-ARL-CN11 at Arlington, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Wolly Cupgrass (%)				Giant Foxtail (%)			Yield[b] bu acre^{-1}
		5/30	6/13	6/28	10/19[c]	5/30	6/13	6/28	
1	Untreated Check	0	0	0	0	0	0	0	9 g
One-Pass – PRE (4/28)									
2	Storen (2.1 qt)	86	-	59	43	93	-	73	151 bcd
3	Storen (2.4 qt)	90	-	58	46	93	-	67	152 bcd
4	Acuron Flexi (2.25 qt)	80	-	51	46	91	-	71	127 de
5	Resicore XL (2.5 qt)	93	-	63	49	97	-	79	166 bc
6	Resicore XL (3 qt)	94	-	70	51	98	-	86	176 ab
7	Trivolt SC (17.5 fl oz)	72	-	46	50	83	-	53	130 cde
8	Trivolt SC (20 fl oz)	79	-	51	52	87	-	61	149 bcd
9	Maverick (24 fl oz)	63	-	30	34	69	-	31	70 f
10	Maverick (32 fl oz)	68	-	60	38	76	-	38	100 e
One-Pass – POST (5/30)		**POST**				**POST**			
14	Acuron GT (3.75 pt) + NIS (0.25% v/v) + AMS[d]	0	99	99	84	0	99	99	203 a
Two-Pass – PRE (4/28) *fb* POST (5/30)		**POST**				**POST**			
11	Storen (1.05 qt) ***fb*** Storen (1.05 qt) + Roundup PM3 (28 fl oz) + AMS[d]	67	99	95	88	80	98	95	211 a
12	Storen (1.2 qt) ***fb*** Storen (1.2 qt) + Roundup PM3 (28 fl oz) + AMS[d]	64	99	96	90	84	99	95	211 a
13	Storen (1.2 qt) ***fb*** Halex GT (4 pt) + Status (5 oz) + NIS (0.25% v/v) + AMS[d]	73	99	95	91	85	99	95	206 a
15	Calibra (1.4 qt) ***fb*** Acuron GT (3.75 pt) + NIS (0.25% v/v) + AMS[d]	63	100	96	86	83	98	96	206 a
	LSD (α=0.10)	**10**	**ns**	**9**	**8**	**5**	**ns**	**11**	**25**
	p value	**<.001**	**0.279**	**<.001**	**<.001**	**<.001**	**0.592**	**<.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]10/19 ratings were a combination of woolly cupgrass, giant foxtail, and other minor grass species present in the trial.

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

Project Goal: Evaluate the residual weed control and crop safety of Albaugh, LLC PRE corn herbicides compared to other competitor corn herbicide offerings.

Site Description:

Location:	Janesville, WI	**Crop:**	Corn
Field #:	4	**Hybrid:**	DKC50-87 RIB
Soil type:	Plano silt loam	**Planting Date:**	5/4
% OM:	3.0	**Emergence Date:**	5/13
pH:	6.5	**Population:**	34,000 seeds/acre
Fertilization:	160 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:	5/4
Treatment:	PRE (A)
Air Temp (°F):	74
2” Soil Temp (°F):	58
Soil moisture [surface]:	moist
RH %:	30
Cloud cover %	20
Wind speed (mph)/direction	3-9/NW
Rainfall (in) 1 wk after APP:	0.68”
GPA:	15
PSI:	38
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	Durus	5.07 lb/gal	5, 15, 27	2.6 qt/a	PRE	A
3	Durus	5.07 lb/gal	5, 15, 27	2.6 qt/a	PRE	A
	Caballero	2.01 lb/gal	2, 4	6 fl oz/a	PRE	A
4	Priority MA	3.6 lb/gal	5, 15, 27	3.5 qt/a	PRE	A
5	Priority MA	3.6 lb/gal	5, 15, 27	3.5 qt/a	PRE	A
	Caballero	2.01 lb/gal	2, 4	6 fl oz/a	PRE	A
6	SureStart II	4.25 lb/gal	2, 4, 15	1.5 pt/a	PRE	A
7	Acuron	3.44 lb/gal	5, 15, 27	3 qt/a	PRE	A
8	Resicore	3.26 lb/gal	4, 15, 27	2.75 qt/a	PRE	A
9	Maverick	2.04 lb/gal	4, 15, 27	28 fl oz/a	PRE	A

Rate equivalents of herbicide premixes at rates used in trial.

Herbicide Premix	Rate	Rate Equivalents (rate acre^{-1})
Durus	2.6 qt	2.1 pt Surpass NXT + 6.2 fl oz Callisto + 2.5 pt AAtrex 4L
Priority MA	3.5 qt	25 fl oz Dual II Magnum + 6.1 fl oz Callisto + 2.9 pt AAtrex 4L
Caballero	6 fl oz	2.3 fl oz Stinger + 0.45 oz Python
SureStart II	1.5 pt	0.8 pt Surpass NXT + 2.3 fl oz Stinger + 0.45 oz Python
Resicore	2.75 qt/a	2.2 pt Surpass NXT + 6.6 fl oz Callisto + 5.6 fl oz Stinger
Acuron	1.5 qt/a	27 fl oz Dual II Magnum + 5.8 fl oz Callisto + 1.5 pt AAtrex 4L + 0.72 oz bicyclopyrone
Maverick	28 fl oz	4.65 fl oz Zidua SC + 5.8 fl oz Callisto + 4.9 fl oz Stinger

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to evaluate the residual weed control and crop safety of Albaugh, LLC corn herbicides compared to other competitor corn herbicide offerings.

None of the PRE herbicides caused significant corn injury (>5%) at 21, 27 or 35 days after application (data not shown).

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. All of the of the PRE herbicides provided good to excellent control (>80%) at 27 days after application (Table 11). A POST herbicide would typically be applied at this point; however, the objective of the study was to evaluate season-long residual control of the PRE herbicides. Several herbicides had >70% control up to 47 DAT; however, control fell below 60% at corn harvest for all but Acuron (73%) and Resicore (60%). These two treatments (7, 8) also had statistically higher corn yields than all other treatments.

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

Table 11. Giant ragweed control ratings and corn grain yield for trial #23-ROK-CN12 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Giant Ragweed (%)					Yield[b] bu acre^{-1}
		21 DAT	27 DAT	35 DAT	47 DAT	10/17	
1	Check Untreated	0	0	0	0	0	13 c
One-Pass – PRE (5/4)							
2	Durus (2.6 qt)	65	81	56	59	30	42 b
3	Durus (2.6 qt) + Caballero (6 fl oz)	85	90	72	73	42	66 b
4	Priority MA (3.5 qt)	78	88	71	75	40	61 b
5	Priority MA (3.5 qt) + Caballero (6 fl oz)	83	90	77	76	55	78 b
6	SureStart II (1.5 pt)	75	81	65	60	40	46 b
7	Acuron (3 qt)	82	94	81	83	73	132 a
8	Resicore (2.75 qt)	85	92	79	75	60	108 a
9	Maverick (28 fl oz)	75	89	78	72	37	61 b
	LSD (α=0.10)	**10**	**5**	**11**	**13**	**15**	**23**
	p value	**0.034**	**<.001**	**0.017**	**0.065**	**0.002**	**<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.

Trial: Storen Giant Ragweed Control Comparisons **23-ROK-CN15**

Project Goal: Compare giant ragweed control of Storen to other Syngenta corn herbicide standards and Resicore XL.

***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:	Janesville, WI	**Crop:**	Corn
Field #:	4	**Hybrid:**	NK9653-5222-EZ1
Soil type:	Plano silt loam	**Planting Date:**	5/4
% OM:	3.0	**Emergence Date:**	5/13
pH:	6.5	**Population:**	34,000 seeds/acre
Fertilization:	160 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:	5/4	6/2
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	74	83
2" Soil Temp (°F):	58	-
Soil moisture [surface]:	moist	wet
RH %:	30	55
Cloud cover %	20	2
Wind speed (mph)/direction	3-9/NW	1-3/E
Rainfall (in) 1 wk after APP:	0.68"	0.56"
GPA:	15	15
PSI:	38	38
Nozzle:	TTI 110015	AIXR 110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	25

Crop and weed information at application:

	Date:	5/4	6/2
Corn	Height:		6-9"
	Stage:		V4
Giant ragweed	Height:		1-5"
	Density:		4-13/m^2

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Acuron	3.44 lb/gal	5, 15, 27	3 qt/a	PRE	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	POST	B
	Status	56% w/w	4, 19	2.5 oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
3	Storen	3.25 lb/gal	15, 27	2.4 qt/a	PRE	A
	AAtrex	4 lb/gal	5	1.5 pt/a	PRE	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	POST	B
	Status	56% w/w	4, 19	2.5 oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
4	Resicore XL	3.26 lb/gal	4, 15, 27	3 qt/a	PRE	A
	AAtrex	4 lb/gal	5	1.5 pt/a	PRE	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	POST	B
	Status	56% w/w	4, 19	2.5 oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
5	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 PowerMAX 3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
6	Storen	3.25 lb/gal	15, 27	1.2 qt/a	PRE	A
	AAtrex	4 lb/gal	5	0.75 pt/a	PRE	A
	Storen	3.25 lb/gal	15, 27	1.2 qt/a	POST	B
	AAtrex	4 lb/gal	5	0.75 pt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B
7	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	B
	AAtrex	4 lb/gal	5	0.5 pt/a	POST	B
	NIS			0.25% v/v	POST	B
	AMSOL			2.5% v/v	POST	B
8	Resicore XL	3.26 lb/gal	4, 15, 27	1.5 qt/a	PRE	A
	AAtrex	4 lb/gal	5	0.75 pt/a	PRE	A
	Resicore XL	3.26 lb/gal	4, 15, 27	1.5 qt/a	POST	B
	AAtrex	4 lb/gal	5	0.75 pt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	AMSOL			2.5% v/v	POST	B

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

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to compare giant ragweed control of **Storen** to other Syngenta corn herbicide standards and Resicore XL. **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.

None of the PRE herbicides caused visible corn injury symptoms 21 and 29 days after application (data not shown). Minor (<4%) injury symptoms were observed 13 days after the POST application (data not shown).

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. The average control of giant ragweed was not impacted by herbicide program at any rating timing (Table 12). Both full rate PRE fb Roundup + Status and split-application, half rate PRE fb half rate POST, herbicide programs were effective at providing season long control of giant ragweed.

Corn yield was statistically the same for all herbicide programs (Table 12). Averaged across all treatments, yield of the 2-pass PRE *fb* POST programs = 192 bu acre^{-1}, while the untreated check yield = 33 bu acre^{-1}.

Plot photos from throughout the growing season are available at **Storen Giant Ragweed Control Comparisons** published on **wiscweeds.info**

Table 12. Giant ragweed control ratings and corn grain yield for trial #23-ROK-CN15 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Giant Ragweed (%)				Yield[b] bu acre^{-1}
		5/25	6/2	6/15	10/17	
1	Check Untreated	0	0	0	0	33 b
Two-Pass – PRE (5/4) *fb* POST (6/2)		**POST**				
2	Acuron (3 qt) ***fb*** Roundup PM3 (28 fl oz) + Status (2.5 oz) + AMS[c]	92	81	91	95	191 a
3	Storen (2.4 qt) + AAtrex (1.5 pt) ***fb*** Roundup PM3 (28 fl oz) + Status (2.5 oz) + AMS[c]	85	76	91	87	187 a
4	Resicore XL (3 qt) + AAtrex (1.5 pt) ***fb*** Roundup PM3 (28 fl oz) + Status (2.5 oz) + AMS[c]	92	66	89	90	194 a
5	Acuron (1.5 qt) ***fb*** Acuron (1.5 qt) + Roundup PM3 (26 fl oz) + AMS[c]	87	69	88	91	199 a
6	Storen (1.2 qt) + AAtrex (0.75 pt) ***fb*** Storen (1.2 qt) + AAtrex (0.75 pt) + Roundup PM3 (26 fl oz) + AMS[c]	82	72	88	87	191 a
7	Lumax EZ (1.5 qt) ***fb*** Acuron GT (3.75 pt) + AAtrex (0.5 pt) + NIS (0.25% v/v) + AMS[c]	79	63	91	89	190 a
8	Resicore XL (1.5 qt) + AAtrex (0.75 pt) ***fb*** Resicore XL (1.5 qt) + AAtrex (0.75 pt) + Roundup PM3 (26 fl oz) + AMS[c]	86	70	93	90	197 a
	LSD (α=0.10)	**ns**	**ns**	**ns**	**ns**	**24**
	p value	**0.26**	**0.285**	**0.792**	**0.411**	**<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

Trial: Herbicide Programs for Conventional Corn **23-BRO-CN17**

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-7	**Hybrid:**	OB 1105
Soil type:	Dresden loam	**Planting Date:**	5/17
% OM:	1.7	**Emergence Date:**	5/26
pH:	7.3	**Population:**	35,000 seeds/acre
Fertilization:	125 lbs N/acre 150 lbs potash/a	**Depth:**	2 in
Previous crop:	Soybean	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	waterhemp (AMATA); velvetleaf (ABUTH); woolly cupgrass (ERBVI)		

Herbicide Application Information:

Date:	5/17	6/12
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	75	62
2" Soil Temp (°F):	67	63
Soil moisture [surface]:	moist	moist
RH %:	25	53
Cloud cover %	0	20
Wind speed (mph)/direction	1-5/S	4-8/N
Rainfall (in) 1 wk after APP:	0.62"	0.7"
GPA:	15	15
PSI:	39	38
Nozzle:	TTI 110015	TT 110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	24

Crop and weed information at application:

	Date:	5/17	6/12
corn	Height:	-	9-12"
	Stage:	-	V5
waterhemp	Height:	-	0.5-3"
	Density:	-	0-1 m^2
velvetleaf	Height:	-	0.5-2.5"
	Stage:	-	0-9 m^2
woolly cupgrass	Height:	-	1-3"
	Density:	-	0-3 m^2

Overall weed density in the trial area was quite low.

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
	Capreno	3.45 lb/gal	2, 27	3 fl oz/a	POST	B
	Superb HC			0.5% v/v	POST	B
	AMS			2 lb/a	POST	B
3	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	B
	COC			1% v/v	POST	B
	AMS			2 lb/a	POST	B
4	Acuron Flexi	3.26 lb/gal	15, 27	1.1 qt/a	PRE	A
	Princep 4L	4 lb/gal	5	1 qt/a	PRE	A
	Acuron Flexi	3.26 lb/gal	15, 27	1.1 qt/a	POST	B
	Accent Q	54/5% w/w	2	0.9 oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			2 lb/a	POST	B
5	Verdict	5.57 lb/gal	14, 15	16 fl oz/a	PRE	A
	Armezon	2.8 lb/gal	27	1 fl oz/a	POST	B
	Status	56% w/w	4	5 oz/a	POST	B
	MSO			1% v/v	POST	B
	AMS			2 lb/a	POST	B
6	Verdict	5.57 lb/gal	14, 15	10 fl oz/a	PRE	A
	Callisto	4 lb/gal	27	3 fl oz/a	PRE	A
	Armezon PRO	5.35 lb/gal	15, 27	16 fl oz/a	POST	B
	MSO			1% v/v	POST	B
	AMS			2 lb/a	POST	B
7	SureStart II	4.25 lb/gal	2, 4, 15	2 pt/a	PRE	A
	Accent Q	54.5% w/w	2	0.9 oz/a	POST	B
	Status	56% w/w	4	5 oz/a	POST	B
	COC			1% v/v	POST	B
	AMS			2 lb/a	POST	B
8	Harness	7 lb/gal	15	2 pt/a	PRE	A
	Princep 4L	4 lb/gal	5	1 qt/a	PRE	A
	Revulin Q	51.2% w/w	2, 27	4 oz/a	POST	B
	Status	56% w/w	4	5 oz/a	POST	B
	COC			1% v/v	POST	B
	AMS			2 lb/a	POST	B
9	Harness	7 lb/gal	15	2 pt/a	PRE	A
	Princep 4L	4 lb/gal	5	1 qt/a	PRE	A
	Revulin Q	51.2% w/w	2, 27	4 oz/a	POST	B
	Status	56% w/w	4	5 oz/a	POST	B
	Zidua SC	4.17 lb/gal	15	3 fl oz/a	POST	B
	COC			1% v/v	POST	B
	AMS			2 lb/a	POST	B

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
10	Surpass NXT	7 lb/gal	15	2 pt/a	PRE	A
	Kyro	3.1 lb/gal	4, 15, 27	45 fl oz/a	POST	B
	Accent Q	54.5% w/w	2	0.9 oz/a	POST	B
	COC			1% v/v	POST	B
	AMS			2 lb/a	POST	B
11	Maverick	2.04 lb/gal	4, 15, 27	24 fl oz/a	PRE	A
	Laudis	3.5 lb/gal	27	3 fl oz/a	POST	B
	Destiny HC			0.5% v/v	POST	B
	AMS			2 lb/a	POST	B
12	Acuron Flexi	3.26 lb/gal	15, 27	2.25 qt	PRE	A
	Princep 4L	4 lb/gal	5	1 qt	PRE	A

Adjuvants: AMS = BlueAg spray grade ammonium sulfate; COC = Crop Oil; MSO = Emulate; NIS = Prefer 90; Destiny HC = high surfactant methylated oil concentrate (HSMOC); Superb HC = high surfactant oil concentrate (HSOC)

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 V4/V5 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 have herbicide resistant traits. Furthermore, atrazine was not included in any treatments at the field was located in an atrazine prohibition area.

There was no significant corn injury from any of the PRE or POST herbicides evaluated (data not shown). Overall weed pressure in the trial area was low by herbicide research plot standards. However, it was typical of what could be expected in grower's field. All the herbicide programs evaluated provided excellent season long weed control of glyphosate-resistant waterhemp, velvetleaf, and woolly cupgrass (Table 13). Corn grain yield did not significantly differ amongst herbicide programs (average yield = 212 bu $acre^{-1}$).

Similar trials were conducted in 2021 and 2022 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

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

Table 13. Weed control ratings, and corn grain yield for trial #23-BRO-CN17 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Waterhemp %			Velvetleaf %			Woolly Cupgrass %			Yield bu acre^{-1}
		6/7	6/29	10/6	6/7	6/29	10/6	6/7	6/29	10/6	
1	Untreated Check	0	0	0	0	0	0	0	0	0	196.3
One-Pass – PRE (5/17)											
12	Acuron Flexi (2.25 qt) + Princep 4L (1 qt)	100	92	89	100	100	100	99	96	95	211.0
Two-Pass – PRE (5/17) *fb* POST (6/12)											
2	Harness Max (2 qt) ***fb*** Capreno (3 oz) + Superb HC (0.5% v/v) + AMS (2 lb)	100	99	99	100	100	100	98	96	96	221.2
3	Harness Max (2 qt) ***fb*** Diflexx Duo (28 oz) + COC (1% v/v) + AMS (2 lb)	100	100	100	100	100	100	98	96	97	207.3
4	Acuron Flexi (1.1 qt) + Princep 4L (1 qt) ***fb*** Acuron Flexi (1.1 qt) + Accent Q (0.9 oz) + NIS (0.25% v/v) + AMS (2 lb)	97	95	93	100	100	100	94	97	99	215.0
5	Verdict (16 oz) ***fb*** Armezon (1 oz) + Status (5 oz) + MSO (1% v/v) + AMS (2 lb)	94	91	91	96	100	100	96	96	94	210.5
6	Verdict (10 oz) + Callisto (3 oz) ***fb*** Armezon PRO (16 oz) + MSO (1% v/v) + AMS (2 lb)	96	89	92	100	100	100	92	87	90	203.7
7	Surestart II (2 pt) ***fb*** Accent Q (0.9 oz) + Status (5 oz) + COC (1% v/v) + AMS (2 lb)	99	96	95	93	100	100	95	94	94	209.0
8	Harness (2 pt) + Princep 4L (1 qt) ***fb*** Revulin Q (4 oz) + Status (5 oz) + COC (1% v/v) + AMS (2 lb)	99	100	99	90	100	100	99	99	95	194.0
9	Harness (2 pt) + Princep 4L (1 qt) ***fb*** Revulin Q (4 oz) + Status (5 oz) + Zidua SC (3 oz) + COC (1% v/v) + AMS (2 lb)	99	99	100	79	100	100	97	96	94	216.7
10	Surpass NXT (2 pt) ***fb*** Kyro (45 oz) + Accent Q (0.9 oz) + COC (1% v/v) + AMS (2 lb)	95	94	95	85	98	100	96	98	99	234.1
11	Maverick (24 oz) ***fb*** Laudis (3 oz) + Destiny HC (0.5% v/v) + AMS (2 lb)	99	94	95	100	100	100	97	95	97	205.9
	LSD (α=0.10)	**3**	**6**	**6**	**6**	**1**	**ns**	**ns**	**ns**	**4**	**ns**
	p value	**0.056**	**0.023**	**0.013**	**<.001**	**0.004**	**1.0**	**0.261**	**0.116**	**0.076**	**0.696**

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

Project Goal: Evaluate the potential benefit of adding XtendiMax to the tank with traditional PRE herbicides.

Site Description:

Location:	Janesville, WI	**Crop:**	Soybean
Field #:	7	**Variety:**	AG20XF1
Soil type:	Plano silt loam	**Planting Date:**	5/11
% OM:	3.4	**Emergence Date:**	5/22
pH:	6.5	**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:	5/11
Treatment:	PRE (A)
Air Temp (°F):	84
2” Soil Temp (°F):	55
Soil moisture [surface]:	moist
RH %:	29
Cloud cover %	5
Wind speed (mph)/direction	1-9/SE
Rainfall (in) 1 wk after APP:	1.30”
GPA:	15
PSI:	38
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	Warrant	3 lb/gal	15	48 fl oz/a	PRE	A
	Mauler	4 lb/gal	5	8 fl oz/a	PRE	A
3	Warrant	3 lb/gal	15	48 fl oz/a	PRE	A
4	Warrant Ultra	3.45 lb/gal	14, 15	50 fl oz/a	PRE	A
5	Warrant	3 lb/gal	15	48 fl oz/a	PRE	A
	Mauler	4 lb/gal	5	8 fl oz/a	PRE	A
	XtendiMax	2.89 lbae/gal	4	22 fl oz/a	PRE	A
	VaporGrip Xtra			20 fl oz/a	PRE	A
6	Warrant	3 lb/gal	15	48 fl oz/a	PRE	A
	XtendiMax	2.89 lbae/gal	4	22 fl oz/a	PRE	A
	VaporGrip Xtra			20 fl oz/a	PRE	A
7	Warrant Ultra	3.45 lb/gal	14, 15	50 fl oz/a	PRE	A
	XtendiMax	2.89 lbae/gal	4	22 fl oz/a	PRE	A
	VaporGrip Xtra			20 fl oz/a	PRE	A
8	XtendiMAX	2.89 lbae/gal	4	22 fl oz/a	PRE	A
	VaporGrip Xtra			20 fl oz/a	PRE	A
9	Authority First	70% w/w	2, 14	6 oz/a	PRE	A
10	Authority First	70% w/w	2, 14	6 oz/a	PRE	A
	XtendiMax	2.89 lbae/gal	4	22 fl oz/a	PRE	A
	VaporGrip Xtra			20 fl oz/a	PRE	A

Adjuvants: VaporGrip Xtra = volatility reducing agent.

Trial Summary:

The trial was established at the Rock County Farm in Janesville, WI to evaluate the potential benefit of adding XtendiMax to the tank with traditional PRE herbicides. None of the PRE herbicides caused visible soybean injury symptoms 14 and 22 days after application (data not shown).

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. The addition of XtendiMax to the tank with traditional PRE herbicides greatly improved giant ragweed control of all treatments (Table 14). Averaged across all treatments, giant ragweed control of PRE herbicides with XtendiMax was 90% vs 57% without XtendiMax 22 days after application. XtendiMax herbicide has been shown to provide a short period of residual control of broadleaf weeds with very little required moisture for activation. A similar trend was observed in trials conducted in 2021 and 2022 at the Arlington Ag Research Station (see trial# 21-ARL-SB01 in the **2021 Wisconsin Weed Science Research Report** and 22-ARL-SB01 in the **2022 Wisconsin Weed Science Research Report**).

Plot photos from throughout the growing season are available at **XtendiMax Paired Soil Residual Herbicide Programs** published on **wiscweeds.info**

Table 14. Giant ragweed control ratings for trial #23-ROK-SB01 at Janesville, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Giant Ragweed (%)		
		14 DAT	22 DAT	35 DAT
1	Untreated Check	0	0	0
One-Pass – PRE (5/11)				
2	Warrant (48 fl oz) + Mauler (8 fl oz)	61	35	18
5	Warrant (48 fl oz) + Mauler (8 fl oz) + XtendiMax (22 fl oz)*	86	87	58
3	Warrant (48 fl oz)	75	49	31
6	Warrant (48 fl oz) + XtendiMax (22 fl oz)*	94	87	60
4	Warrant Ultra (50 fl oz)	85	62	50
7	Warrant Ultra (50 fl oz) + XtendiMax (22 fl oz)*	97	93	80
9	Authority First (6 oz)	86	81	66
10	Authority First (6 oz) + XtendiMax (22 fl oz)*	98	95	81
8	XtendiMax (22 fl oz)*	88	86	45
	Average control of PRE herbicides without dicamba	77	57	41
	Average control of PRE herbicides with dicamba	94	90	70
	LSD (α=0.10)	**18**	**17**	**22**
	p value	**0.045**	**<0.001**	**<0.001**

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

*All treatments with XtendiMax included 20 fl oz/a VaporGrip Xtra, a volatility reduceding agent.

Trial: Evaluation of No-Till Herbicide Programs in Enlist Soybean **23-ARL-SB04**

Project Goal: Evaluate multiple two-pass herbicide programs in a no-till Enlist soybean system.

Site Description:

Location:	Arlington, WI	**Crop:**	Enlist Soybean
Field #:	452	**Variety:**	P10A66E
Soil type:	Plano silt loam	**Planting Date:**	5/18
% OM:	3.2	**Emergence Date:**	5/31
pH:	6.7	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.5 in
Previous crop:	Corn	**Row spacing:**	30 in
Tillage:	No-Till	**Plot Size:**	10 x 23 ft
Weed species:	dandelion (TAROF)		

Herbicide Application Information:

Date:	5/10	6/19
Treatment:	Pre-plant (A)	POST (B)
Air Temp (°F):	77	78
2" Soil Temp (°F):	65	70
Soil moisture [surface]:	moist	dry
RH %:	48	50
Cloud cover %	10	60
Wind speed (mph)/direction	1-3/W	1-3/NW
Rainfall (in) 1 wk after APP:	0.25"	0.60"
GPA:	15	15
PSI:	36	36
Nozzle:	TTI 110015	AIXR 110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	22

Crop and weed information at application:

	Date:	5/10	6/19*
Soybean	Height:	-	3-5"
	Stage:	-	V2
dandelion	Diameter:	3-12"	6-13"
		Avg=7"	Avg=11"
	Density:	8-20/m^2	4-12/m^2

*Weed density recorded from plots with a previous herbicide treatment.

Density and height varied depending on the effectiveness of the Pre-plant herbicide program

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PP	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	24 fl oz/a	PP	A
	2,4-D LV4	3.8 lbae/gal	4	1 pt/a	PP	A
	AMS			8.5 lb/100 gal	PP	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	B
	AMS			8.5 lb/100 gal	POST	B
3	Fierce MTZ	2.64 lb/gal	5, 14, 15	1 pt/a	PP	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	24 fl oz/a	PP	A
	2,4-D LV4	3.8 lbae/gal	4	1 pt/a	PP	A
	AMS			8.5 lb/100 gal	PP	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	B
	AMS			8.5 lb/100 gal	POST	B
4	Fierce XLT	62.4% w/w	2, 14, 15	3.75 oz/a	PP	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	24 fl oz/a	PP	A
	2,4-D LV4	3.8 lbae/gal	4	1 pt/a	PP	A
	AMS			8.5 lb/100 gal	PP	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	B
	AMS			8.5 lb/100 gal	POST	B
5	Authority Supreme	4.16 lb/gal	14, 15	6.5 fl oz/a	PP	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	24 fl oz/a	PP	A
	2,4-D LV4	3.8 lbae/gal	4	1 pt/a	PP	A
	AMS			8.5 lb/100 gal	PP	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	9	32 fl oz/a	POST	B
	Anthem Maxx	4.3 lb/gal	14, 15	2.5 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
6	Authority Edge	4.25 lb/gal	14, 15	7 fl oz/a	PP	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	24 fl oz/a	PP	A
	2,4-D LV4	3.8 lbae/gal	4	1 pt/a	PP	A
	AMS			8.5 lb/100 gal	PP	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Liberty	2.34 lb/gal	9	32 fl oz/a	POST	B
	Anthem Maxx	4.3 lb/gal	14, 15	3 fl oz/a	POST	B
	AMS			3 lb/a	POST	B

Adjuvants: AMS = BlueAg spray grade ammonium sulfate

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
7	Reviton	2.83 lb/gal	14	1 fl oz/a	PP	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	20 fl oz/a	PP	A
	Helmet MTZ	6.5 lb/gal	5, 15	2.1 pt/a	PP	A
	Destiny HC			1% v/v	PP	A
	AMS			8.5 lb/100 gal	PP	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
	AMS			3 lb/a	POST	B
8	Reviton	2.83 lb/gal	14	1 fl oz/a	PP	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	20 fl oz/a	PP	A
	Zone Elite	7 lb/gal	14, 15	32 fl oz/a	PP	A
	Destiny HC			1% v/v	PP	A
	AMS			8.5 lb/100 gal	PP	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
	AMS			3 lb/a	POST	B
9	Reviton	2.83 lb/gal	14	1 fl oz/a	PP	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	20 fl oz/a	PP	A
	Helmet MTZ	6.5 lb/gal	5, 15	2.1 pt/a	PP	A
	2,4-D LV4	3.8 lbae/gal	4	1 pt/a	PP	A
	Destiny HC			1% v/v	PP	A
	AMS			8.5 lb/100 gal	PP	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
	AMS			3 lb/a	POST	B
10	Tendovo	4.03 lb/gal	2, 5, 15	2.1 qt/a	PP	A
	Roundup PowerMAX 3	4.8 lbae/gal	9	24 fl oz/a	PP	A
	2,4-D LV4	3.8 lbae/gal	4	1 pt/a	PP	A
	AMS			8.5 lb/100 gal	PP	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1.25 pt/a	POST	B
	AMS			8.5 lb/100 gal	POST	B
11	Prefix	4.03 lb/gal	14, 15	2 pt/a	PP	A
	Pursuit	4.8 lbae/gal	2	3 fl oz/a	PP	A
	Roundup PowerMAX 3	3.8 lbae/gal	9	24 fl oz/a	PP	A
	2,4-D LV4		4	1 pt/a	PP	A
	AMS	3.8 lbae/gal		8.5 lb/100 gal	PP	A
	Enlist One	4.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX 3	7.64 lb/gal	9	26 fl oz/a	POST	B
	Dual II Magnum		15	1.5 pt/a	POST	B
	AMS			8.5 lb/100 gal	POST	B

Adjuvants: AMS = BlueAg spray grade ammonium sulfate; Destiny HC = high surfactant methylated oil concentrate

Trial Summary:

The trial was established at the Arlington Ag Research Station to evaluate multiple two-pass herbicide programs in a no-till Enlist soybean system. There was no visible soybean injury observed 22 or 40 days after the pre-plant herbicide application (data not shown). Minor (4-6%) soybean leaf necrosis (burn) was observed in all treatments 17 days after the POST application (data not shown).

The trial was conducted in a long term no-till field with a moderate to heavy population density of dandelion. All pre-plant herbicide applications were made 9 days prior to soybean planting. Several herbicide programs provided season-long control of dandelion (Table 15). POST herbicide tank mixes of Enlist + Roundup had greater end-of-season dandelion control than tank mixes of Enlist + Liberty. Averaged across all treatments, Enlist + Roundup = 97% vs Enlist + Liberty = 77%. Initial control of treatments containing Liberty was excellent (>95%) 17 days after application; however, dandelion regrowth occurred following the initial burndown of the above ground biomass. A similar pattern occurred in pre-plant burndown treatments containing Reviton.

Soybean yield of the various herbicide programs was very similar and did not statistically differ (Table 15). Yield across all herbicide treatments = 63 bu acre^{-1}, while the untreated check was 14 bu acre^{-1}.

Plot photos from throughout the growing season are available at **Evaluation of No-Till Herbicide Programs in Enlist Soybean** published on **wiscweeds.info**

Table 15. Weed control ratings and soybean yield for trial #23-ARL-SB04 at Arlington, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Dandelion (%)					Yield[b] bu acre^{-1}
		5/19	6/1	6/19	7/6	10/16	
1	Untreated Check	0	0	0	0	0	14 b
Two-Pass – Pre-Plant (5/10) fb POST (6/19)				POST			
2	Fierce EZ (6 oz) + Roundup PM3 (24 oz) + 2,4-D LV4 (1 pt) + AMS[c] ***fb*** Enlist One (2 pt) + Roundup PM3 (30 oz) + Perpetuo (6 oz) + AMS[c]	91	92	88	94	98	66 a
3	Fierce MTZ (1 pt) + Roundup PM3 (24 oz) + 2,4-D LV4 (1 pt) + AMS[c] ***fb*** Enlist One (2 pt) + Roundup PM3 (30 oz) + Perpetuo (6 oz) + AMS[c]	88	87	76	89	96	68 a
4	Fierce XLT (3.75 oz) + Roundup PM3 (24 oz) + 2,4-D LV4 (1 pt) + AMS[c] ***fb*** Enlist One (2 pt) + Roundup PM3 (30 oz) + Perpetuo (6 oz) + AMS[c]	86	87	83	94	98	66 a
5	Authority Supreme (6.5 oz) + Roundup PM3 (24 oz) + 2,4-D LV4 (1 pt) + AMS[c] ***fb*** Enlist One (2 pt) + Liberty (32 oz) + Anthem Maxx (2.5 oz) + AMS (3 lb)	80	81	76	99	77	64 a
6	Authority Edge (7 oz) + Roundup PM3 (24 oz) + 2,4-D LV4 (1 pt) + AMS[c] ***fb*** Enlist One (2 pt) + Liberty (32 oz) + Anthem Maxx (3 oz) + AMS (3 lb)	75	78	64	99	78	63 a
7	Reviton (1 oz) + Roundup PM3 (20 oz) + Helmet MTZ (2.1 pt) + Destiny HC (1% v/v) + AMS[c] ***fb*** Enlist One (2 pt) + Liberty (32 oz) + AMS (3 lb)	99	71	43	97	73	59 a
8	Reviton (1 oz) + Roundup PM3 (20 oz) + Zone Elite (32 oz) + Destiny HC (1% v/v) + AMS[c] ***fb*** Enlist One (2 pt) + Liberty (32 oz) + AMS (3 lb)	100	84	60	98	83	64 a
9	Reviton (1 oz) + Roundup PM3 (20 oz) + Helmet MTZ (2.1 pt) + 2,4-D LV4 (1 pt) + Destiny HC (1% v/v) + AMS[c] ***fb*** Enlist One (2 pt) + Liberty (32 oz) + AMS (3 lb)	99	65	31	99	75	62 a
10	Tendovo (2.1 qt) + Roundup PM3 (24 oz) + 2,4-D LV4 (1 pt) + AMS[c] ***fb*** Enlist One (2 pt) + Roundup PM3 (26 oz) + Dual II Magnum (1.25 pt) + AMS[c]	63	53	80	95	98	59 a
11	Prefix (2 pt) + Pursuit (3 oz) + Roundup PM3 (24 oz) + 2,4-D LV4 (1 pt) + AMS[c] ***fb*** Enlist One (2 pt) + Roundup PM3 (26 oz) + Dual II Magnum (1.5 pt) + AMS[c]	89	89	79	92	94	61 a
	LSD (α=0.10)	**4**	**6**	**20**	**4**	**6**	**8**
	p value	**<.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.

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

Project Goal: Evaluate the residual weed control and crop safety of Zidua PRO herbicide compared to competitor soybean herbicides.

Site Description:

Location:	Arlington, WI	**Crop:**	XtendFlex soybean
Field #:	362	**Variety:**	AG20XF1
Soil type:	Plano silt loam	**Planting Date:**	5/23
% OM:	3.3	**Emergence Date:**	6/6
pH:	6.5	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.25 in
Previous crop:	Silage Corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	common ragweed (AMBEL); common lambsquarters (CHEAL); velvetleaf (ABUTH); giant foxtail (SETFA)		

Herbicide Application Information:

Date:	5/5
Treatment:	PRE (A)
Air Temp (°F):	80
2" Soil Temp (°F):	62
Soil moisture [surface]:	moist
RH %:	42
Cloud cover %	50
Wind speed (mph)/direction	4-8/S
Rainfall (in) 1 wk after APP:	0.57"
GPA:	15
PSI:	38
Nozzle:	TTI 110015
Nozzle spacing (in):	20
Boom Height (in):	20

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Check					
2	Zidua PRO	4.09 lb/gal	2, 14, 15	6 fl oz/a	PRE	A
3	Tendovo	4.03 lb/gal	2, 5, 15	1.5 qt/a	PRE	A
4	Kyber	2.64 lb/gal	5, 14, 15	1 pt/a	PRE	A
5	Boundary	6.5 lb/gal	5, 15	1.5 pt/a	PRE	A
6	Authority Supreme	4.16 lb/gal	14, 15	6.5 fl oz/a	PRE	A
7	Sonic	70% w/w	2, 14	5 oz/a	PRE	A

Trial Summary:

The trial was established at the Arlington Ag Research Station to evaluate the residual weed control and crop safety of Zidua PRO herbicide compared to competitor soybean herbicides. None of the PRE herbicides caused visible soybean injury symptoms 21 and 27 days after application (data not shown). Soybean stand was also collected at 21 days after planting (7 days after soybean emergence) with no differences among treatments. Average soybean stand across all treatments was 117,500 plants $acre^{-1}$.

This trial was located in a field with a heavy population density of common ragweed as well as moderate population densities of common lambsquarters, velvetleaf, and giant foxtail. Zidua PRO provided good to excellent control of all weed species up to 27 days after application (Table 16). Herbicides without an ALS active ingredient (trts 4, 5, 6) did not provide adequate common ragweed control at any rating timing. Averaged across all treatments, common ragweed control 27 days after application of herbicides with an ALS active ingredient was 85% vs 34% without.

Plot photos from throughout the growing season are available at **Zidua PRO Residual Weed Control Comparisons** published on **wiscweeds.info**

Table 16. Residual weed control ratings for trial #23-ARL-SB05.[a]

Trt #	Herbicide (rate acre^{-1})	Common Ragweed (%)				Velvetleaf (%)				Lambsquarters (%)			Giant Foxtail (%)		
		14 DAT	21 DAT	27 DAT	45 DAT	14 DAT	21 DAT	27 DAT	45 DAT	21 DAT	27 DAT	45 DAT	21 DAT	27 DAT	45 DAT
1	Untreated Check	0	0	0	0	0	0	0	0	0	0	0	0	0	0
One-Pass – PRE (5/5)															
2	Zidua PRO (6 fl oz)	94	94	83	71	98	95	94	82	99	99	98	98	91	66
3	Tendovo (1.5 qt)	88	83	81	69	86	85	86	34	98	83	88	95	86	69
4	Kyber/Fierce MTZ (1 pt)	66	42	36	11	88	92	85	63	99	85	89	72	56	33
5	Boundary (1.5 pt)	63	51	48	14	68	74	75	45	97	74	82	89	80	64
6	Authority Supreme (6.5 fl oz)	56	33	19	0	76	75	68	51	99	94	98	86	71	65
7	Sonic (5 oz)	96	96	91	87	97	96	97	65	99	99	99	88	74	6
	LSD (α=0.10)	**7**	**13**	**14**	**9**	**14**	**11**	**15**	**ns**	**ns**	**12**	**6**	**8**	**16**	**18**
	p value	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**0.012**	**0.01**	**0.034**	**0.221**	**0.589**	**0.007**	**0.001**	**0.002**	**0.026**	**<0.001**

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

Trial: Syngenta Herbicide Programs in Enlist Soybean **23-BRO-SB08**

Project Goal: Compare PRE rates and POST application timings of soybean herbicides.

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-6	**Variety:**	NK20-B6E
Soil type:	Dresden loam	**Planting Date:**	5/17
% OM:	1.7	**Emergence Date:**	5/26
pH:	7.3	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.5 in
Previous crop:	Seed corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	gly-R waterhemp (AMATA); velvetleaf (ABUTH); woolly cupgrass (ERBVI)		

Herbicide Application Information:

Date:	5/17	6/14	6/29
Treatment:	PRE (A)	POST (B)	LPOST (C)
Air Temp (°F):	55	75	84
2" Soil Temp (°F):	54	69	75
Soil moisture [surface]:	moist	moist	dry
RH %:	47	62	49
Cloud cover %	65	45	100
Wind speed (mph)/direction	1-7/E	1-4/W	0-2/E
Rainfall (in) 1 wk after APP:	0.62"	0.58"	1.54"
GPA:	15	15	15
PSI:	40	40	40
Nozzle:	TTI 110015	AIXR110015	AIXR110015
Nozzle spacing (in):	20	20	20
Boom Height (in):	20	25	25

Crop and weed information at application:

	Date:	5/17	6/14*	6/29*
Soybean	Height:	-	3-4"	-
	Stage:	-	V3	V4/V5
waterhemp	Height:	-	1-5"	2-6"
	Density:	-	0-3/ft^2	1-5/ft^2
velvetleaf	Height:	-	-	-
	Density:	-	-	-
woolly cupgrass	Height:	-	2-6"	1-6"
	Density:	-	3-6/ft^2	2-12/ft^2

*Weed density recorded from plots with a previous herbicide treatment.
Density and height varied depending on the effectiveness of the PRE herbicide.

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Check					
2	Tendovo	4.03 lb/gal	2, 5, 15	1.5 qt/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	POST	B
	AMS (liquid)			2.5% v/v	POST	B
3	Tendovo	4.03 lb/gal	2, 5, 15	1.5 qt/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	15	28 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	9	1.25 pt/a	POST	B
	AMS (liquid)			2.5% v/v	POST	B
4	Tendovo	4.03 lb/gal	2, 5, 15	1.5 qt/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	LPOST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	LPOST	C
	AMS (liquid)			2.5% v/v	LPOST	C
5	Tendovo	4.03 lb/gal	2, 5, 15	1.5 qt/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	LPOST	C
	Roundup PowerMAX 3	4.8 lbae/gal	15	28 fl oz/a	LPOST	C
	Dual II Magnum	7.64 lb/gal	9	1.25 pt/a	LPOST	C
	AMS (liquid)			2.5% v/v	LPOST	C
6	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	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	POST	B
	AMS (liquid)			2.5% v/v	POST	B
7	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	B
	Roundup PowerMAX 3	4.8 lbae/gal	15	28 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	9	1.25 pt/a	POST	B
	AMS (liquid)			2.5% v/v	POST	B
8	Tendovo	4.03 lb/gal	2, 5, 15	2.1 qt/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	LPOST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	LPOST	C
	AMS (liquid)			2.5% v/v	LPOST	C
9	Tendovo	4.03 lb/gal	2, 5, 15	2.1 qt/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	LPOST	C
	Roundup PowerMAX 3	4.8 lbae/gal	15	28 fl oz/a	LPOST	C
	Dual II Magnum	7.64 lb/gal	9	1.25 pt/a	LPOST	C
	AMS (liquid)			2.5% v/v	LPOST	C

Adjuvants: AMS (liquid) = AMSOL

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
10	Prefix	5.29 lb/gal	14, 15	2 pt/a	PRE	A
	Metricor DF	75% w/w	5	8 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1.25 pt/a	POST	B
	AMS (liquid)			2.5% v/v	POST	B
11	Prefix	5.29 lb/gal	14, 15	2 pt/a	PRE	A
	Metricor DF	75% w/w	5	8 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	LPOST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	LPOST	C
	Dual II Magnum	7.64 lb/gal	15	1.25 pt/a	LPOST	C
	AMS (liquid)			2.5% v/v	LPOST	C
12	Zidua PRO	4.09 lb/gal	2, 14, 15	4.5 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	LPOST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	LPOST	C
	Dual II Magnum	7.64 lb/gal	15	1.25 pt/a	LPOST	C
	AMS (liquid)			2.5% v/v	LPOST	C
13	Zidua PRO	4.09 lb/gal	2, 14, 15	6 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	LPOST	C
	Roundup PowerMAX 3	4.8 lbae/gal	9	28 fl oz/a	LPOST	C
	Dual II Magnum	7.64 lb/gal	15	1.25 pt/a	LPOST	C
	AMS (liquid)			2.5% v/v	LPOST	C

Adjuvants: AMS (liquid) = AMSOL

Trial Summary:

The trial was established at the O'Brien Hybrids farm located north of Brooklyn, WI to compare PRE rates and POST application timings of soybean herbicides. There was no observable soybean injury from the PRE herbicides 28 days after application (data not shown). All of the POST and LPOST herbicide programs caused soybean leaf necrosis (Table 18). Necrosis was observed ~2 weeks after herbicide application. Treatments containing Dual II Magnum exhibited higher levels of leaf necrosis.

The trial was conducted in a field infested with a natural population of glyphosate-resistant waterhemp as well as a high population density of woolly cupgrass and a low-moderate population of velvetleaf. Almost all the herbicide programs evaluated provided excellent end-of-season control of all weed species (Tables 17, 18). The PRE *fb* LPOST herbicide programs had slightly better waterhemp and woolly cupgrass control than the PRE *fb* POST programs, although control was more dependent on the herbicides used. The high rate (2.1 qt/a) of Tendovo had greater waterhemp and woolly cupgrass control than the low rate (1.5 qt/a). At 28 days after application, waterhemp: high = 98% vs low = 87%; woolly cupgrass: high = 83% vs low = 77%. At 43 days after PRE application, waterhemp: high = 86% vs low = 78%; woolly cupgrass: high = 85% vs low = 79%.

Soybean yield of the various herbicide programs was very similar and did not statistically differ (Tables 17, 18). Yield across all herbicide treatments = 55 bu acre^{-1}, while the untreated check was 29 bu acre^{-1}.

Plot photos from throughout the growing season are available at **Syngenta Herbicide Programs in Enlist Soybean** published on **wiscweeds.info**

Table 17. Broadleaf weed control ratings, and soybean yield for trial #23-BRO-SB08 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Waterhemp (%)					Velvetleaf (%)			Yield[b] bu acre^{-1}
		6/8	6/14	6/29	7/13	10/3	6/14	6/29	10/3	
1	Untreated Check	0	0	0	0	0	0	0	0	29 b
Two-Pass – PRE (5/17) fb POST (6/14)		POST					POST			
2	Tendovo (1.5 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + AMS[c]	100	85	100	98	93	100	100	100	53 a
3	Tendovo (1.5 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	95	80	99	98	96	100	100	100	54 a
6	Tendovo (2.1 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + AMS[c]	100	100	99	98	96	100	100	100	55 a
7	Tendovo (2.1 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	100	95	100	99	96	100	100	100	54 a
10	Prefix (2 pt) + Metricor DF (8 oz) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	100	90	100	100	100	80	100	100	55 a
Two-Pass – PRE (5/17) fb LPOST (6/29)		LPOST					LPOST			
4	Tendovo (1.5 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + AMS[c]	100	88	76	97	100	100	99	100	57 a
5	Tendovo (1.5 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	100	95	81	94	99	100	100	100	54 a
8	Tendovo (2.1 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + AMS[c]	100	100	85	98	100	100	100	100	56 a
9	Tendovo (2.1 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	98	95	88	97	99	100	100	100	54 a
11	Prefix (2 pt) + Metricor DF (8 oz) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	100	100	86	98	99	88	73	100	54 a
12	Zidua PRO (4.5 oz) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	88	88	75	94	97	100	100	100	57 a
13	Zidua PRO (6 oz) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	98	65	84	96	99	100	100	100	55 a
	LSD (α=0.10)	**6**	**18**	**7**	**ns**	**3**	**11**	**5**	**ns**	**4**
	p value	**0.026**	**0.10**	**<.001**	**0.219**	**0.027**	**0.083**	**<.001**	**0.467**	**<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]All POST applications included AMSOL (liquid AMS) applied at 2.5% v/v.

Table 18. Crop injury, woolly cupgrass control ratings, and soybean yield for trial #23-BRO-SB08 at Brooklyn, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Necrosis (%)		Woolly Cupgrass (%)					Yield[b] bu acre^{-1}
		6/29	7/13	6/8	6/14	6/29	7/13	10/3	
1	Untreated Check	0	0	0	0	0	0	0	29 b
Two-Pass – PRE (5/17) fb POST (6/14)				**POST**					
2	Tendovo (1.5 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + AMS[c]	4.0	0.0	81	79	100	95	88	53 a
3	Tendovo (1.5 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	7.0	0.0	72	70	99	97	93	54 a
6	Tendovo (2.1 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + AMS[c]	4.3	0.0	86	88	98	97	91	55 a
7	Tendovo (2.1 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	6.3	0.0	88	84	100	98	95	54 a
10	Prefix (2 pt) + Metricor DF (8 oz) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	6.3	0.0	90	89	100	99	97	55 a
Two-Pass – PRE (5/17) fb LPOST (6/29)				**LPOST**					
4	Tendovo (1.5 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + AMS[c]	0.0	4.0	83	76	78	100	100	57 a
5	Tendovo (1.5 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	0.0	5.3	87	83	79	100	100	54 a
8	Tendovo (2.1 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + AMS[c]	0.0	4.3	87	82	85	100	100	56 a
9	Tendovo (2.1 qt) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	0.0	5.3	83	80	85	100	100	54 a
11	Prefix (2 pt) + Metricor DF (8 oz) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	0.0	5.8	77	75	85	100	100	54 a
12	Zidua PRO (4.5 oz) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	0.0	5.5	72	64	75	100	100	57 a
13	Zidua PRO (6 oz) ***fb*** Enlist One (2 pt) + Roundup PM3 (28 oz) + Dual II Magnum (1.25 pt) + AMS[c]	0.0	5.3	86	78	83	99	100	55 a
	LSD (α=0.10)	**1**	**0.6**	**ns**	**ns**	**6**	**3**	**4**	**4**
	p value	**<.001**	**<.001**	**0.113**	**0.115**	**<.001**	**0.01**	**<.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]All POST applications included AMSOL (liquid AMS) applied at 2.5% v/v.

Trial: Syngenta Soybean Herbicide Programs following a Winter Rye Cover Crop 23-BRO-SB09

Project Goal: Evaluate Syngenta soybean herbicide programs following a winter rye cover crop.

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-6	**Variety:**	NK20-B6E
Soil type:	Dresden loam	**Planting Date:**	5/17
% OM:	1.7	**Emergence Date:**	5/27
pH:	7.3	**Population:**	140,000 seeds/acre
Previous crop:	Seed corn	**Depth:**	1.5 in
Tillage:	no-till	**Row spacing:**	30 in
Rye Plant Date:	9/29/22	**Plot Size:**	10 x 30 ft
Rye Seed Rate:	60 lb/a		
Weed species:	gly-R waterhemp (AMATA); woolly cupgrass (ERBVI)		

Herbicide Application Information:

Date:	4/28	5/17	5/25	6/22
Treatment:	Pre-Plant (A)	At Plant (B)	EPOST (C)	POST (D)
Air Temp (°F):	69	75	59	86
2" Soil Temp (°F):	48	65	45	70
Soil moisture [surface]:	moist	dry	wet	dry
RH %:	48	24	47	55
Cloud cover %	40	0	5	0
Wind speed (mph)/direction	1-3/W	1-4/S	5-10/E	1-3/NW
Rainfall (in) 1 wk after APP:	0.37"	0.62"	1.17"	0.32"
GPA:	15	15	15	15
PSI:	38	39	39	39
Nozzle:	TTI 110015	TTI 110015	TTI 110015	TTI 110015
Nozzle spacing (in):	20	20	20	20
Boom Height (in):	25	-	-	25

Crop and weed information at application:

	Date:	4/28	5/17	5/25	6/22*
Soybean	Height:	-	-	-	5"
	Stage:	-	-	-	V4
annual rye	Height:	3-6"	30"	40"	-
	Stage:	4 tillers	heading	anthesis	-
waterhemp	Height:	-			1-3"
	Density:	-			0-2/ft^2
woolly cupgrass	Height:	-			1-6"
	Density:	-			2-8/ft^2

*Weed density recorded from plots with a previous herbicide treatment.

Density and height varied depending on the effectiveness of the PRE herbicide.

Trial Summary:

The trial was established at the O'Brien Hybrids farm located north of Brooklyn, WI to evaluate Syngenta soybean herbicide programs following a winter rye (aka cereal rye) cover crop. A winter rye cover crop was drilled in Fall 2022 (9/29/22) at 60 lb acre^{-1} following seed corn harvest. Winter rye was terminated at three different timings in spring 2023: 19 days before planting (early termination), the day soybean was planted (at plant termination) and 8 days after soybean planting (late termination). In some treatments a residual herbicide was applied pre-plant or at plant without Roundup in the tank allowing the rye to continue to grow until it was terminated later in the season. Winter rye burndown control was acceptable for most of the herbicide programs we evaluated; however, some treatments were slower to kill the rye particularly the later applications when rye was more advanced. (Table 19). The rye eventually died in all treatments and no green biomass was present later in the season.

Only minor (<3%) soybean injury was observed following herbicide applications (data not shown). Soybean stand was evaluated prior to harvest by counting the number of podded plants from 10 row ft in every plot. Harvest stand was impacted by herbicide treatment and rye termination timing although most treatments were statistically similar (Table 20).

The trial was conducted in a field infested with a natural population of glyphosate-resistant waterhemp as well as a moderate population density of woolly cupgrass. Several of the herbicide programs provided acceptable end-of-season control of both weed species (Table 20). In this study, POST application and rye termination timing rather than herbicide program appear to be more important to achieving high levels of weed control (Table 19). The poor weed control in the plant-green with late rye termination system is likely due to the early POST herbicide application date (5/25). Few weeds had emerged by that date and most of the weed escapes emerged later in the season well after the POST application. A third herbicide application in mid- to late-June would have been warranted in this system.

Soybean yield of most of the treatments were statistically the same (Table 20). The two-pass early-termination treatment (trt 2) had a similar yield to several of the plant green at plant termination and plant-green late termination treatments. This suggests there was no yield penalty to planting green in this trial.

Table 19. End-of-season weed control and soybean yield of various rye termination and POST herbicide application timings.

Trts	System	Rye Termination	POST application	End-of-Season Weed Control		Soybean Yield (bu acre^{-1})
				Waterhemp	Woolly Cupgrass	
3, 5, 6	Plant Green	at plant	6/22	97	90	47
4, 7, 8	Plant Green	1 wk after plant	5/25	64	72	41

Plot photos from throughout the growing season are available at **Syngenta Soybean Herbicide Programs following a Winter Rye Cover Crop** published on **wiscweeds.info**

Table 20. Annual Rye and weed control ratings and soybean yield for trial #23-BRO-SB09.[a]

Trt #	Herbicide (rate acre^{-1})	Harvest Stand	Rye	Waterhemp			Woolly Cupgrass			Yield[b] bu acre^{-1}
		plants/a	5/31	6/22	7/5	10/5	6/22	7/5	10/5	
1	**Early Termination** – Check[c]	79,247	100	0	0	0	0	0	0	34 ab
9	**Plant Green – Late Termination** – Check[C]	66,765	84	95	94	0	90	74	3	22 b
Two-Pass – Pre-Plant/At-Plant *fb* EPOST/POST										
2	**Early Termination: Pre-Plant (4/28) *fb* POST (6/22)** Tendovo (2.1 qt) + Roundup PM3 (30 oz) + 2,4-D LV4 (1 pt) + AMS[d] ***fb*** Enlist One (2 pt) + Roundup PM3 (25 oz) + Dual II Magnum (1.25 pt) + AMS[d]	84,473	100	88	98	93	90	99	92	49 a
3	**Plant Green @Plant Termination: At-Plant (5/17) *fb* POST (6/22)** Tendovo (2.1 qt) + Roundup PM3 (30 oz) + AMS[d] ***fb*** Enlist One (2 pt) + Roundup PM3 (25 oz) + Dual II Magnum (1.25 pt) + AMS[d]	92,746	94	100	100	96	97	100	93	44 a
5	**Plant Green @Plant Termination: At-Plant (5/17) *fb* POST (6/22)** Prefix (2 pt) + Metricor (8 oz) + Enlist One (1.5 pt) + Roundup PM3 (30 oz) + AMS[d] ***fb*** Enlist One (2 pt) + Roundup PM3 (25 oz) + Dual II Magnum (1.25 pt) + AMS[d]	91,439	94	95	100	99	91	100	95	49 a
6	**Plant Green @Plant Termination: At-Plant (5/17) *fb* POST (6/22)** Zidua PRO (6 oz) + Enlist One (1.5 pt) + Roundup PM3 (30 oz) + AMS[d] ***fb*** Enlist One (2 pt) + Roundup PM3 (25 oz) + Dual II Magnum (1.25 pt) + AMS[d]	80,554	100	100	100	97	98	100	84	48 a
4	**Plant Green – Late Termination: Pre-Plant (4/28) *fb* EPOST (5/25)** Tendovo (2.1 qt) + 2,4-D LV4 (1 pt) ***fb*** Enlist One (2 pt) + Roundup PM3 (30 oz) + Dual II Magnum (1.25 pt) + AMS[d]	87,085	88	92	90	48	95	89	70	47 a
7	**Plant Green – Late Termination: At-Plant (5/17) *fb* EPOST (5/25)** Tendovo (2.1 qt) + NIS (0.25% v/v) ***fb*** Enlist One (2 pt) + Roundup PM3 (30 oz) + Dual II Magnum (1.25 pt) + AMS[d]	83,166	75	96	93	62	97	89	74	45 a
8	**Plant Green – Late Termination: At-Plant (5/17) *fb* EPOST (5/25)** Prefix (2 pt) + Metricor (8 oz) + Enlist One (1.5 pt) ***fb*** Enlist One (2 pt) + Roundup PM3 (30 oz) + Dual II Magnum (1.25 pt) + AMS[d]	88,246	68	99	100	77	98	89	71	32 ab
One-Pass – EPOST (5/25)										
10	**Plant Green – Late Termination** Prefix (2 pt) + Pursuit (3 oz) + Enlist One (2 pt) + Roundup PM3 (30 oz) + AMS[d]	93,181	86	97	95	98	99	95	65	42 a
11	**Plant Green – Late Termination** Enlist One (2 pt) + Roundup PM3 (30 oz) + Dual II Magnum (1.25 pt) + AMS[d]	64,443	84	99	98	94	96	84	41	33 ab
	LSD (α=0.10)	**14,179**	**5**	**ns**	**ns**	**16**	**5**	**7**	**14**	**10**
	p value	**0.027**	**<.001**	**0.459**	**0.119**	**<.001**	**0.059**	**0.001**	**<.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]Roundup PM3 (30 oz) + 2,4-D LV4 (1 pt) + AMS (2.5%) was applied to the early check on 4/28; Enlist One (2 pt) + Roundup PM3 (30 oz) + AMS (2.5%) was applied to late check on 5/25.

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

Trial: Evaluation of Layered Residual Herbicide Programs in Enlist Soybean **23-BRO-SB10**

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

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-6	**Variety:**	P10A66E
Soil type:	Dresden loam	**Planting Date:**	5/17
% OM:	1.7	**Emergence Date:**	5/26
pH:	7.3	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.5 in
Previous crop:	Seed corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	glyphosate-resistant waterhemp (AMATA); woolly cupgrass (ERBVI)		

Herbicide Application Information:

Date:	5/17	6/22
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	55	86
2" Soil Temp (°F):	54	77
Soil moisture [surface]:	moist	dry
RH %:	47	55
Cloud cover %	65	0
Wind speed (mph)/direction	1-7/E	0-3/NW
Rainfall (in) 1 wk after APP:	0.52"	0.32"
GPA:	15	15
PSI:	35	38
Nozzle:	TTI 110015	AIXR*/TT**
Nozzle spacing (in):	20	20
Boom Height (in):	20	25

*Used AIXR 110015 nozzles for all treatments ***with*** Enlist One

Used TT 110015 nozzles for all treatments ***without* Enlist One

Crop and weed information at application:

	Date:	5/17	6/22*
Soybean	Height:	-	4-7"
	Stage:	-	V4/V5
waterhemp	Height:	-	0.5-4" Avg=3"
	Density:	-	0-12/m^2
woolly cupgrass	Height:	-	1-6" Avg=4"
	Density:	-	12-16/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	Sonic	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	32 fl oz/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
3	Sonic	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	32 fl oz/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	EverpreX	7.62 lb/gal	15	1 pt/a	POST	B
	AMS			3 lb/a	POST	B
4	Sonic	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	32 fl oz/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
5	Sonic	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	32 fl oz/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	30 fl oz/a	POST	B
	EverpreX	7.62 lb/gal	15	1 pt/a	POST	B
	AMS			3 lb/a	POST	B
6	Sonic	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	32 fl oz/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	20 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
7	Sonic	70% w/w	2, 14	5 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	32 fl oz/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	20 fl oz/a	POST	B
	EverpreX	7.62 lb/gal	15	1 pt/a	POST	B
	AMS			3 lb/a	POST	B
8	Fierce EZ	3.04 lb/gal	14, 15	6 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	32 fl oz/a	POST	B
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	B
	Select Max	1 lb/gal	1	9 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
9	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	B
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	B
	Select Max	1 lb/gal	1	9 fl oz/a	POST	B
	NIS			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B

Adjuvants: AMS = BlueAg spray grade ammonium sulfate; non-ionic surfactant (NIS) = Induce

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
10	Fierce MTZ	2.64 lb/gal	5, 14, 15	1 pt/a	PRE	A
	Enlist One	3.8 lbae/gal	4	32 fl oz/a	POST	B
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	B
	Select Max	1 lb/gal	1	9 fl oz/a	POST	B
	Induce			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
11	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	B
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	B
	Select Max	1 lb/gal	1	9 fl oz/a	POST	B
	Induce			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
12	Fierce XLT	62.4% w/w	2, 14, 15	3.75 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	32 fl oz/a	POST	B
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	B
	Select Max	1 lb/gal	1	9 fl oz/a	POST	B
	Induce			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
13	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	B
	Perpetuo	2.3 lb/gal	14, 15	6 fl oz/a	POST	B
	Select Max	1 lb/gal	1	9 fl oz/a	POST	B
	Induce			0.25% v/v	POST	B
	AMS			3 lb/a	POST	B
14	Authority Supreme	4.16 lb/gal	14, 15	6.5 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	32 fl oz/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	Anthem Maxx	4.3 lb/gal	14, 15	2.5 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
15	Authority Edge	4.25 lb/gal	14, 15	7 fl oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	32 fl oz/a	POST	B
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	Anthem Maxx	4.3 lb/gal	14, 15	3 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
16	Zidua PRO	4.09 lb/gal	2, 14, 15	6 fl oz/a	PRE	A
	Liberty	2.34 lb/gal	10	32 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1.33 pt/a	POST	B
	AMS			3 lb/a	POST	B
17	Zidua PRO	4.09 lb/gal	2, 14, 15	6 fl oz/a	PRE	A
	Liberty	2.34 lb/gal	10	32 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 = BlueAg spray grade ammonium sulfate; non-ionic surfactant (NIS) = Induce

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
18	Moccasin MTZ	4.47 lb/gal	5, 15	2.67 pt/a	PRE	A
	InterMoc	3.57 lb/gal	10, 15	64 fl oz/a	POST	B
	AMS			3 lb/a	POST	B
19	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	B
	AMS			3 lb/a	POST	B
20	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	B
	AMS			3 lb/a	POST	B
21	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	B
	Velexi	1% N		12.8 fl oz/	POST	B
	AMS			3 lb/a	POST	B
22	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	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1.25 pt/a	POST	B
	AMS			3 lb/a	POST	B
23	Prefix	5.29 lb/gal	14, 15	2.5 pt/a	PRE	A
	Metricor DF	75% w/w	5	8 oz/a	PRE	A
	Enlist One	3.8 lbae/gal	4	2 pt/a	POST	B
	Roundup PowerMAX 3	4.8 lbae/gal	9	26 fl oz/a	POST	B
	Dual II Magnum	7.64 lb/gal	15	1.5 pt/a	POST	B
	AMS			3 lb/a	POST	B
24	Untreated Check					

Adjuvants: AMS = BlueAg spray grade ammonium sulfate; non-ionic surfactant (NIS) = Induce

Trial Summary:

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

Soybean injury was observed 22 days after PRE application (Table 21). Symptoms were typical of group 15 herbicide injury: leaf drawstringing, heart-shaped leaves. Fierce branded products had the greatest level of injury at 8%, while all other PRE herbicides had <5% injury. Soybean injury (leaf necrosis, heart-shaped leaves) was also observed 13 days after the POST herbicide application (Table 21). POST applications containing a PPO active ingredient (Perpetuo, Anthem Maxx) caused greater levels of leaf necrosis.

The trial was conducted in a field infested with a natural population of glyphosate-resistant waterhemp as well as a high population density of woolly cupgrass. All of the PRE herbicides provided acceptable early-season residual control of waterhemp 36 days after application (Table 21). However, woolly cupgrass control was less than 80% for all PRE herbicides except Zidua PRO (81%) and Prefix + Metricor DF (96%). Most of the POST herbicide programs we evaluated were effective at controlling both species (Table 21). Woolly cupgrass control was poor for all POST applications that did not have glyphosate or glufosinate in the tank (trts 8, 10, 12).

Yield differed statistically among herbicide programs (Table 21). The lowest yielding treatments were correlated with the poor woolly cupgrass control of treatments 8, 10, 12.

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

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

Table 21. Crop injury, weed control ratings, and soybean yield for trial #23-BRO-SB10 at Brooklyn, WI.[a]

Trt #		Herbicide (rate acre^{-1})	Injury (%)		Waterhemp (%)				Woolly Cupgrass (%)				Yield[b] bu acre^{-1}
			6/8	7/5	6/8	6/22	7/5	10/3	6/8	6/22	7/5	10/3	
1, 24		Untreated Check	0	0	0	0	0	0	0	0	0	0	24 d
	PRE (5/17)	POST (6/22)	POST		POST				POST				
2	Sonic (5 oz)	Enlist One (32 oz) + Liberty (32 oz) + AMS*	0.8	4.3	97	72	96	89	65	54	96	95	62 ab
3		Enlist One (32 oz) + Liberty (32 oz) + EverpreX (1 pt) + AMS*	0.5	5.0	98	85	95	95	70	64	98	99	61 abc
4		Enlist One (32 oz) + Roundup PM3 (30 oz) + AMS*	1.0	2.0	100	66	92	97	68	58	100	100	64 a
5		Enlist One (32 oz) + Roundup PM3 (30 oz) + EverpreX (1 pt) + AMS*	1.0	4.0	98	71	96	96	74	69	100	100	59 abc
6		Enlist One (32 oz) + Liberty (32 oz) + Roundup PM3 (20 oz) AMS*	2.3	3.8	95	83	97	93	76	64	98	96	62 ab
7		Enlist One (32 oz)+Liberty (32 oz)+Roundup PM3 (20 oz)+EverpreX (1 pt)+AMS*	0.8	5.0	95	86	99	97	72	76	98	98	60 abc
8	Fierce EZ (6 oz)	Enlist One (32 oz) + Perpetuo (6 oz) + Select Max (9 oz) + NIS 0.25% v/v + AMS*	9.0	8.5	100	89	95	99	83	67	81	68	55 abc
9		Liberty (32 oz) + Perpetuo (6 oz) + Select Max (9 oz) + NIS 0.25% v/v + AMS*	9.5	8.5	100	97	100	97	77	60	100	99	61 abc
10	Fierce MTZ (1 pt)	Enlist One (32 oz) + Perpetuo (6 oz) + Select Max (9 oz) + NIS 0.25% v/v + AMS*	9.5	10.5	100	98	96	94	73	53	78	66	53 bc
11		Liberty (32 oz) + Perpetuo (6 oz) + Select Max (9 oz) + NIS 0.25% v/v + AMS*	9.0	9.0	100	93	99	99	81	63	99	98	58 abc
12	Fierce XLT (3.75 oz)	Enlist One (32 oz) + Perpetuo (6 oz) + Select Max (9 oz) + NIS 0.25% v/v + AMS*	7.0	9.3	100	99	97	99	68	51	75	63	52 c
13		Liberty (32 oz) + Perpetuo (6 oz) + Select Max (9 oz) + NIS 0.25% v/v + AMS*	4.8	0.0	100	90	98	92	73	48	100	99	59 abc
14	Authority Supreme (6.5 oz)	Enlist One (32 oz) + Liberty (32 oz) + Anthem Maxx (2.5 oz) + AMS*	2.8	10.3	100	77	98	93	76	66	97	93	61 abc
15	Authority Edge (7 oz)	Enlist One (32 oz) + Liberty (32 oz) + Anthem Maxx (3 oz) + AMS*	3.8	12.3	94	91	100	99	77	71	98	93	57 abc
16	Zidua PRO (6 oz)	Liberty (32 oz) + Dual II Magnum (1.33 pt) + AMS*	2.5	4.8	100	91	95	94	85	83	99	98	61 abc
17		Liberty (32 oz) + Zidua SC (2.5 oz) + AMS*	4.5	4.8	100	92	99	97	82	78	100	98	60 abc
18	Moccasin MTZ (2.67 pt)	InterMoc (64 oz) + AMS*	2.8	2.8	100	96	98	95	77	60	100	98	60 abc
19	Preview 2.1SC (21 oz)	InterMoc (64 oz) + AMS*	0.5	1.0	98	95	95	85	70	34	100	99	59 abc
21		InterMoc (64 oz) + Velexi (12.8 oz) + AMS*	0.0	3.5	100	86	96	91	79	73	99	97	60 abc
20	Preview 2.1SC (21 oz) + Moccasin (1.1 pt)	InterMoc (64 oz) + AMS*	3.5	2.8	100	98	99	95	85	59	99	98	63 ab
22	Tendovo (2.1 qt)	Enlist One (32 oz) + Roundup PM3 (26 oz) + Dual II Magnum (1.25 pt) + AMS*	3.3	4.8	100	94	99	99	87	79	99	98	60 abc
23	Prefix (2.5 pt) + Metricor DF (8 oz)	Enlist One (32 oz) + Roundup PM3 (26 oz) + Dual II Magnum (1.5 pt) + AMS*	4.3	5.5	100	92	98	99	91	96	100	100	64 a
		LSD (α=0.10)	1.9	1.4	ns	ns	3	5	10	21	2	4	5
		p value	<.001	<.001	0.588	0.142	0.02	<.001	0.003	0.008	<.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.
*Spray grade AMS applied at 3 lb/a.

Project Goal: Evaluate the efficacy and crop safety of Authority brand herbicides with and without metribuzin and similar competitor PRE herbicides in Enlist soybeans.

Site Description:

Location:	Brooklyn, WI	**Crop:**	Enlist Soybean
Field #:	OB-6	**Variety:**	P10A66E
Soil type:	Dresden loam	**Planting Date:**	5/17
% OM:	1.7	**Emergence Date:**	5/26
pH:	7.3	**Population:**	140,000 seeds/acre
Fertilization:	-	**Depth:**	1.5 in
Previous crop:	Seed corn	**Row spacing:**	30 in
Tillage:	Conventional	**Plot Size:**	10 x 30 ft
Weed species:	glyphosate-resistant waterhemp (AMATA); woolly cupgrass (ERBVI); velvetleaf (ABUTH)		

Herbicide Application Information:

Date:	5/17	6/22
Treatment:	PRE (A)	POST (B)
Air Temp (°F):	55	86
2" Soil Temp (°F):	54	77
Soil moisture [surface]:	moist	dry
RH %:	47	55
Cloud cover %	65	0
Wind speed (mph)/direction	1-7/E	0-3/NW
Rainfall (in) 1 wk after APP:	0.52"	0.32"
GPA:	15	15
PSI:	40	41
Nozzle:	TTI 110015	AIXR110015
Nozzle spacing (in):	20	20
Boom Height (in):	20	25

Crop and weed information at application:

	Date:	5/17	6/22*
Soybean	Height:	-	5-7"
	Stage:	-	V4/V5
waterhemp	Height:	-	1-5" Avg=3"
	Density:	-	0-8/m^2
woolly cupgrass	Height:	-	1-7" Avg=4"
	Density:	-	8-32/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	Authority Supreme	4.16 lb/gal	14, 15	8 fl oz/a	PRE	A
3	Authority Supreme	4.16 lb/gal	14, 15	8 fl oz/a	PRE	A
	Metricor DF	75% w/w	5	6 oz/a	PRE	A
4	Authority Edge	4.25 lb/gal	14, 15	8 fl oz/a	PRE	A
5	Authority Edge	4.25 lb/gal	14, 15	8 fl oz/a	PRE	A
	Metricor DF	75% w/w	5	6 oz/a	PRE	A
6	Authority First	70% w/w	2, 14	6.4 oz/a	PRE	A
7	Authority First	70% w/w	2, 14	6.4 oz/a	PRE	A
	Metricor DF	75% w/w	5	6 oz/a	PRE	A
8	Kyber	2.64 lb/gal	5, 14, 15	1 pt/a	PRE	A
9	Zidua PRO	4.09 lb/gal	2, 14, 15	6 fl oz/a	PRE	A
10	Boundary	6.5 lb/gal	5, 15	29 fl oz/a	PRE	A
11	Anthem Maxx	4.3 lb/gal	14, 15	4 fl oz/a	PRE	A
12	Anthem Maxx	4.3 lb/gal	14, 15	4 fl oz/a	PRE	A
	Metricor DF	75% w/w	5	6 oz/a	PRE	A

POST (B) Herbicide Program: Applied to all treatments except the untreated check.

- **POST (B):** Enlist One (32 fl oz/a) + Liberty (32 fl oz/a) + AMS (2 lb/a)

Adjuvants: AMS = BlueAg spray grade ammonium sulfate

Trial Summary:

This trial evaluated the efficacy and crop safety of Authority brand herbicides with and without metribuzin and similar competitor PRE herbicides in Enlist soybeans. Soybean injury was observed 22 days after PRE application (Table 22). Symptoms included leaf deformation (leaf drawstringing, heart-shaped leaves). Kyber (trt 8) was the only treatment with >5% soybean injury while all other products had <3% injury. Soybean injury (leaf necrosis) was also observed 13 days after the POST herbicide application (Table 22); however, there was no significant difference amongst treatments.

The trial was conducted in a field infested with a natural population of glyphosate-resistant waterhemp as well as a high population density of woolly cupgrass and a low-moderate population of velvetleaf. Most of the PRE herbicides we evaluated provided good (>80%) control of waterhemp 36 days after application (Table 22). Adding 6 oz of Metricor DF improved waterhemp control of Authority First and Anthem Maxx. The addition of Metricor DF did not improve control of velvetleaf or woolly cupgrass. The POST application of Enlist One + Liberty effectively controlled most of the weeds present at application.

Soybean yield of the various herbicide programs was very similar and did not statistically differ (Table 22). Yield across all herbicide treatments = 63 bu acre^{-1}, while the untreated check was 23 bu acre^{-1}.

Similar trials were conducted in 2022. See trials #23-BRO-SB13 and #23-ROK-SB13 in the **2022 Wisconsin Weed Science Research Report**.

Plot photos from throughout the growing season are available at **Authority Brand Soybean Herbicide Programs** published on **wiscweeds.info**

Table 22. Crop injury, weed control ratings, and soybean yield for trial #23-BRO-SB13.[a]

Trt #	Herbicide (rate acre^{-1})	Injury (%)		Waterhemp (%)				Velvetleaf (%)				Woolly Cupgrass (%)				Yield[b] bu acre^{-1}
		6/8	7/5	6/8	6/22	7/5	10/3	6/8	6/22	7/5	10/3	6/8	6/22	7/5	10/3	
1	Untreated Check	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23 b
Two-Pass – PRE (5/17) *fb* POST[c] (6/22)				POST				POST				POST				
2	Authority Supreme (8 fl oz)	1.0	3.3	97	87	98	96	99	98	100	100	89	77	95	93	63 a
3	Authority Supreme (8 fl oz) + Metricor DF (6 oz)	2.3	3.5	96	92	100	98	99	98	100	100	87	77	93	86	63 a
4	Authority Edge (8 fl oz)	1.0	4.0	98	90	98	95	98	96	100	100	82	64	93	90	61 a
5	Authority Edge (8 fl oz) + Metricor DF (6 oz)	1.3	3.3	99	90	100	95	99	99	100	100	82	67	94	87	61 a
6	Authority First (6.4 oz)	0.3	4.0	91	76	94	89	99	100	100	100	86	67	98	93	63 a
7	Authority First (6.4 oz) + Metricor DF (6 oz)	0.5	3.3	96	85	98	94	100	100	100	100	85	67	99	96	65 a
8	Kyber (1 pt)	6.0	5.5	98	88	96	97	99	97	100	100	91	70	89	89	63 a
9	Zidua PRO (6 fl oz)	0.5	5.3	93	81	95	93	100	100	100	100	89	71	98	92	63 a
10	Boundary (29 fl oz)	2.8	3.3	98	85	100	94	76	67	100	99	77	56	88	81	61 a
11	Anthem Maxx (4 fl oz)	1.3	5.0	89	77	93	90	90	89	100	100	86	69	88	86	64 a
12	Anthem Maxx (4 fl oz) + Metricor DF (6 oz)	1.5	3.5	100	91	100	98	92	90	100	100	90	77	94	90	63 a
	LSD (α=0.10)	**1.0**	**ns**	**6**	**9**	**ns**	**4**	**4**	**4**	**ns**	**ns**	**6**	**8**	**ns**	**7**	**4**
	p value	**<.001**	**0.641**	**0.037**	**0.063**	**0.133**	**0.015**	**<.001**	**<.001**	**1.0**	**0.537**	**0.009**	**0.003**	**0.121**	**0.071**	**<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]POST application - Enlist One (32 fl oz) + Liberty (32 fl oz) + AMS (2 lb/a) applied to all treatments except the untreated check.

Trial: Anthem Flex Residual Control in Spring Wheat **23-ARL-WT01**

Project Goal: Evaluate the residual weed control and crop safety of Anthem Flex in spring wheat.

Site Description:

Location:	Arlington, WI	**Crop:**	Hard Red Spring Wheat
Field #:	455	**Hybrid:**	Shelly
Soil type:	Plano silt loam	**Planting Date:**	4/14/23
% OM:	3.4	**Emergence Date:**	4/30/23
pH:	6.2	**Population:**	95 lb/a
Fertilization:	67 lbs N/acre	**Depth:**	1.5 in
Previous crop:	Soybean	**Row spacing:**	7.5 in
Tillage:	Conventional	**Plot Size:**	10 x 25 ft
Weed species:	giant foxtail (SETFA), woolly cupgrass (ERBVI)		

Herbicide Application Information:

Date:	4/26
Treatment:	PRE (A)
Air Temp (°F):	57
2" Soil Temp (°F):	45
Soil moisture [surface]:	moist
RH %:	51
Cloud cover %	70
Wind speed (mph)/direction	0-3/SW
Rainfall (in) 1 wk after APP:	0.56"
GPA:	15
PSI:	38
Nozzle:	TTI 110015
Nozzle spacing (in):	20
Boom Height (in):	20

Crop and weed information at application:

Date:		4/26
Spring Wheat	Stage:	germinated seed with >0.5" shoot*

*Shoot was still below soil surface at application. Wheat emerged 4 days after application.

Trt #	Treatment	Formulation	SOA Group	Rate	App Timing	App Code
1	Untreated Check					
2	Anthem Flex	4 lb/gal	14, 15	4.5 fl oz/a	PRE	A

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 Anthem Flex in spring wheat. This trial was located in a field with a heavy population density of annual grasses (giant foxtail; woolly cupgrass). The PRE application was made after the wheat seed had germinated and had >0.5-in shoot and was still below soil surface at application. Wheat emerged 4 days after application. Anthem Flex did not cause any spring wheat injury at 20 and 28 days after application (data not shown). Anthem Flex provided excellent control of both giant foxtail and woolly cupgrass up to 40 days after application (Table 23). Yield data is unavailable as plots were not harvested.

Plot photos from throughout the growing season are available at **Anthem Flex Residual Control in Spring Wheat** published on **wiscweeds.info**

Table 23. Annual grass weed control ratings for trial #23-ARL-WT01 at Arlington, WI.[a]

Trt #	Herbicide (rate acre^{-1})	Wolly Cupgrass (%)				Giant Foxtail (%)		
		20 DAA	28 DAA	40 DAA	96 DAA[b]	20 DAA	28 DAA	40 DAA
1	Untreated Check	0	0	0	0	0	0	0
One-Pass – PRE (4/26)								
2	Anthem Flex (4.5 fl oz)	95	97	98	83	95	97	98

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

[b]96 DAA ratings were a combination of woolly cupgrass, giant foxtail, and other minor grass species present in the trial.

Table 24. 2023 Temperature and Precipitation Summary

		Precipitation (in)			Average Temperature (F)		
Location	**Month**	**2023**	**30-year norm****	**2023 departure**	**2023**	**30-year norm****	**2023 departure**
Arlington*	May	1.02	3.69	-2.67	59.0	55.7	3.3
	June	0.98	4.68	-3.7	67.9	65.6	2.3
	July	8.20	4.16	4.04	69.7	69.4	0.3
	August	3.23	3.90	-0.67	68.7	67.3	1.4
	September	1.85	3.54	-1.69	63.9	59.3	4.6
	October	3.06	2.55	0.51	50.2	47.5	2.7
	Total	**18.34**	**22.52**	**-4.18**	-	-	-
Brooklyn* (30-year norm from Stoughton NOAA station)	May	2.18 (0.5 ir.)	3.85	-1.67	60.2	57.8	2.4
	June	2.26 (1.58 ir.)	4.34	-2.08	68.5	67.4	1.1
	July	5.16	3.85	1.31	70.9	71.7	-0.8
	August	1.9	4.42	-2.52	69.9	69.5	0.4
	September	3.37	3.60	-0.23	64.7	61.2	3.5
	October	3.56	2.62	0.94	50.8	48.9	1.9
	Total	**14.87 (2.08 ir.)**	**22.68**	**-7.81**	-	-	-
Janesville* (30-year norm from Beloit NOAA station)	May	2.52	3.80	-1.28	60.8	58.7	2.1
	June	1.78	4.73	-2.95	69.0	68.6	0.4
	July	3.20	3.85	-0.65	71.7	72.5	-0.8
	August	2.48	4.27	-1.79	70.1	70.8	-0.7
	September	3.61	3.65	-0.04	65.2	62.9	2.3
	October	4.66	2.76	1.9	51.4	51.0	0.4
	Total	**18.25**	**23.06**	**-4.81**	-	-	-
Lancaster*	May	3.22	4.13	-0.91	61.9	57.3	4.6
	June	1.62	5.26	-3.64	70.1	66.9	3.2
	July	4.13	4.32	-0.19	71.1	70.8	0.3
	August	1.65	4.20	-2.55	71.1	69.0	2.1
	September	2.53	3.14	-0.61	64.9	60.8	4.1
	October	3.03	2.58	0.45	51.4	48.6	2.8
	Total	**16.18**	**23.63**	**-7.45**	-	-	-

*2023 data recorded from on-site weather stations.
**Source: Wisconsin State Climatology Office; 30-year normals from 1981 to 2010.
ir. = overhead sprinkler irrigation

Index of Weed Species Evaluated

Weed (common name)	Bayer Code	Page Number(s)
dandelion	TAROF	53
foxtail, giant	SETFA	13, 34, 56 ,77
grasses, annual	GGGAN	13, 34, 77
lambsquarters, common	CHEAL	12, 56
ragweed, common	AMBEL	12, 56
ragweed, giant	AMBTR	4, 8, 16, 20, 23, 27, 30, 37, 41, 48
velvetleaf	ABUTH	45, 56, 61, 75
waterhemp, common	AMATA	20, 30, 45, 61, 65, 71, 75
woolly cupgrass	ERBVI	13, 34, 45, 62, 65, 71, 75, 77

Index of Adjuvants

Adjuvant Brand	Adjuvant Type	Page Number(s)
AMSOL	AMS (liquid)	6, 10, 32, 39, 58
BlueAg spray grade AMS	AMS (dry)	11, 15, 18, 25, 30, 43, 50, 65, 67, 73
CropOil	crop oil concentrate	6, 10, 25, 30, 43
Destiny HC	high surfactant oil concentrate	44, 51
Emulate	methylated seed oil	43
Induce	non-ionic surfactant	68
Prefer90	non-ionic surfactant	6, 10, 15, 18, 25, 30, 32, 39, 43, 65, 67
Superb HC	high surfactant oil concentrate	43
VaporGrip Xtra	volatility reducing agent	47

Index of Herbicides Evaluated

Herbicide	Active Ingredient(s)	Page Number(s)
2,4-D ester, LO-VOL 4	2,4-D	30, 50, 65
Aatrex/atrazine 4L	atrazine	2, 6, 15, 18, 22, 25, 30, 39
Accent Q	nicosulfuron + safener	10, 43
Acuron	bicyclopyrone+mesotrione+ atrazine+S-metolachlor	7, 15, 18, 22, 25, 30, 36, 39
Acuron GT	bicyclopyrone+mesotrione+S-metolachlor+ glyphosate	7, 10, 18, 30, 32, 39
Acuron Flexi	bicyclopyrone + mesotrione + S-metolachlor	10, 32, 43
Anthem Flex	pyroxasulfone + carfentrazone	76
Anthem Maxx	pyroxasulfone + fluthiacet	6, 10, 50, 68, 73
Armezon	topramezone	43
Armezon PRO	topramezone + dimethenamid-P	6, 25, 43
Authority Edge	sulfentrazone + pyroxasulfone	50, 68, 73
Authority First DF	sulfentrazone + cloransulam	47, 73
Authority Supreme	sulfentrazone + pyroxasulfone	50, 55, 68, 73
Balance Flexx	isoxaflutole	2
Bicep Lite II Magnum	S-metolachlor + atrazine	15, 18, 30
Boundary	S-metolachlor + metribuzin	55, 73
Caballero	clopyralid + flumetsulam	36
Calibra	S-metolachlor + mesotrione	10, 32
Callisto	mesotrione	6, 10, 22, 43
Capreno	tembotrione + thiencarbazone	43
Clarity	dicamba (DGA salt)	25, 30
Degree XTRA	acetochlor + atrazine	25
DiFlexx	dicamba (DGA salt)	2
DiFlexx Duo	dicamba (DGA salt) + tembotrione	43
Dual II Magnum	S-metolachlor	22, 51, 58, 65, 68
Durus	mesotrione + acetochlor + atrazine	36
Enlist One	2,4-D (choline salt)	50, 58, 65, 67, 73
EverpreX	*S*-metolachlor	67
Fierce EZ	flumioxazin + pyroxasulfone	50, 67
Fierce MTZ	flumioxazin + pyroxasulfone + metribuzin	50, 68
Fierce XLT	flumioxazin + pyroxasulfone + chlorimuron	50, 68
Gramoxone SL 2.0	paraquat	30
Halex GT	S-metolachlor + mesotrione + glyphosate	7, 30, 32
Harness	acetochlor	2, 43
Harness MAX	acetochlor + mesotrione	2, 43
Harness Xtra	acetochlor + atrazine	2
Helmet MTZ	metolachlor + metribuzin	51
InterMoc	glufosinate + *S*-metolachlor	11, 69
Intrava DX*	amicarbazone + metribuzin	11
Kyber	flumioxazin + pyroxasulfone + metribuzin	55, 73

*Pending approval for use in Wisconsin as of January 2024.

Herbicide	Active Ingredient(s)	Page Number(s)
Kyro	topramezone + acetochlor + clopyralid	6, 10, 18, 44
Laudis	tembotrione	44
Liberty	glufosinate	50, 67, 73
Lumax EZ	mesotrione + atrazine + S-metolachlor	7, 30, 39
Mauler	metribuzin	47
Maverick	mesotrione + clopyralid + pyroxasulfone	15, 18, 32, 36, 44
Metricor DF	metribuzin	59, 65, 69, 73
Moccasin	*S*-metolachlor	69
Moccasin II Plus	*S*-metolachlor	11
Moccasin MTZ	*S*-metolachlor + metribuzin	69
Perpetuo	flumiclorac + pyroxasulfone	50, 67
Prefix	S-metolachlor + fomesafen	51, 59, 65, 69
Preview 2.1SC	sulfentrazone + metribuzin	69
Princep 4FL	simazine	10, 43
Priority MA	mesotrine + metolachlor + atrazine	36
Pursuit	imazethapyr	51, 65
Resicore	clopyralid + acetochlor + mesotrione	36
Resicore XL	clopyralid + acetochlor + mesotrione	2, 6, 10, 15, 18, 22, 32, 39
Reviton	tiafenacil	51
Revulin Q	nicosulfuron + mesotrione	43
Roundup PowerMAX II	glyphosate (potassium salt)	18
Roundup PowerMAX 3	glyphosate (potassium salt)	6, 10, 15, 25, 30, 32, 39, 50, 58, 65, 67
Select Max	clethodim	67
Sharpen	saflufenacil	22
Sonic	sulfentrazone + cloransulam	55, 67
Status	dicamba (sodium salt) + diflufenzopyr	7, 10, 15, 25, 30, 32, 39, 43
Stinger	clopyralid	22
Storen	mesotrione + *S*-metolachlore + pyroxasulfone + bicyclopyrone	30, 32, 39
Surestart II	acetochlor + clopyralid + flumetsulam	36, 43
Surpass NXT	acetochlor	6, 10, 22, 44
Surtain*	saflufenacil + pyroxasulfone	22, 25
Tendovo	*S*-metolachlor + metribuzin + cloransulam	51, 55, 58, 65, 69
Trivolt SC	isoxaflutole + flufenacet + thiencarbazone	15, 25, 32
Verdict	saflufenacil + dimethenamid-P	6, 10, 43
Warrant	acetochlor	47
Warrant Ultra	acetochlor + fomesafen	47
XtendiMax	dicamba (DGA salt) with VaporGrip® Technology	47
Zidua SC	pyroxasulfone	10, 22, 25, 43, 68
Zidua PRO	pyroxasulfone + saflufenzcil + imazethapyr	55, 59, 65, 68, 73
Zone Elite	sulfentrazone + metolachlor	51

*Pending approval for use in Wisconsin as of January 2024.

Index of Trial Sponsors

Company	Trial Number (s)*
ADAMA	CN13
Albaugh	CN12, BG01, BG02
AMVAC	CN09, SB12, SB25
BASF	CN02, CN03, CN06, CN07, SB05, SB06, SB07, SB10, SB11
Bayer Crop Science	CN01, SB01, SB02
CHS Agronomy	BG07, BG08, BG09, BG10, BG11
Corteva Agriscience	CN02, CN03, SB03, SB10
Exacto	CN14, SB23, SB24
FMC	CN02, CN03, SB04, SB10, SB13, WT01
Helm Agro	SB04, SC01
Sipcam Agro	CN08
SummitAgro	CN02
Syngenta	CN02, CN03, CN10, CN11, CN15, SB04, SB08, SB09, SB10
United Soybean Board	USB01, USB02, USB03, USB04
UPL	CN03, SB10
Valent	CN04, CN05, SB04, SB10
Wisconsin Weed Science	CN02, CN03, CN17, SB04, SB10

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