



# 2021 Wisconsin Weed Science Research Report

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**Cropping Systems Weed Science**  
UNIVERSITY OF WISCONSIN-MADISON



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

A3646, Pest Management in Wisconsin Field Crops  
Available at: <https://learningstore.uwex.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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We sincerely thank the following companies and organizations who have generously supported our research program in 2021 through financial and/or material donations (listed in alphabetical order):

ADAMA  
Adjuvants Unlimited  
AMVAC  
BASF  
Bayer CropScience  
Belchim Crop Protection  
CHS Agronomy  
Corteva Agriscience  
FMC  
Helm Agro  
Stoller USA  
Summit Agro  
Syngenta  
United Soybean Board  
UPL  
Valent  
Wisconsin Soybean Marketing Board

We would also like to give a special thanks to all the organizations and individuals who provided valuable technical assistance with many aspects of the research projects presented herein.

Michael Bertram – Arlington Ag Research Station Superintendent  
Douglas Wiedenbeck – Lancaster Ag Research Station Superintendent  
Arlington and Lancaster Ag Research Station personnel  
University of Wisconsin faculty and staff  
Agricultural Research of Wisconsin, LLC  
Dan and Mark O'Brien – O'Brien Hybrids  
Alan Sweeny and Scott Fleming for technical assistance at Rock Co Farm

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**Project Goal:** Gain exposure to Bayer and Valent corn herbicide product offerings to support potential recommendations.

#### Site Description:

|                       |                       |                        |                   |
|-----------------------|-----------------------|------------------------|-------------------|
| <b>Location:</b>      | Janesville, WI        | <b>Crop:</b>           | Corn              |
| <b>Field #:</b>       | 4                     | <b>Hybrid:</b>         | DKC54-38 RIB      |
| <b>Soil type:</b>     | Plano silt loam       | <b>Planting Date:</b>  | 4/26              |
| <b>% OM:</b>          | 3.3                   | <b>Emergence Date:</b> | 5/11              |
| <b>pH:</b>            | 6.7                   | <b>Population:</b>     | 35,000 seeds/acre |
| <b>Fertilization:</b> | 180 lbs N/acre        | <b>Depth:</b>          | 2.25 in           |
| <b>Previous crop:</b> | Soybean               | <b>Row spacing:</b>    | 30 in             |
| <b>Tillage:</b>       | conventional          | <b>Plot Size:</b>      | 10 x 30 ft        |
| <b>Weed species:</b>  | giant ragweed (AMBTR) |                        |                   |

#### Herbicide Application Information:

|                                      |            |            |            |
|--------------------------------------|------------|------------|------------|
| <b>Date:</b>                         | 4/27       | 5/21       | 5/26       |
| <b>Treatment:</b>                    | PRE (A)    | EPOST (B)  | POST (C)   |
| <b>Air Temp (°F):</b>                | 88         | 75         | 73         |
| <b>2" Soil Temp (°F):</b>            | 72         | 64         | 68         |
| <b>Soil moisture [surface]:</b>      | dry        | moist      | moist      |
| <b>RH %:</b>                         | 36         | 67         | 58         |
| <b>Cloud cover %</b>                 | 35         | 80         | 0          |
| <b>Wind speed (mph)/direction</b>    | 3-7/NNE    | 3-8/SSE    | 5-11/WNW   |
| <b>Rainfall (in) 1 wk after APP:</b> | 1.2"       | 0.88"      | 0.5"       |
| <b>GPA:</b>                          | 15         | 15         | 15         |
| <b>PSI:</b>                          | 34         | 35         | 34         |
| <b>Nozzle:</b>                       | TTI 110015 | TTI 110015 | TTI 110015 |
| <b>Nozzle spacing (in):</b>          | 20         | 20         | 20         |
| <b>Boom Height (in):</b>             | 20         | 23         | 23         |

#### Crop and weed information at application:

|                      |                 |      |                      |                     |
|----------------------|-----------------|------|----------------------|---------------------|
|                      | <b>Date:</b>    | 4/27 | 5/21                 | 5/26                |
| <b>Corn</b>          | <b>Height:</b>  | -    | 2.5-3.5"             | 8-10"               |
|                      | <b>Stage:</b>   | -    | V2                   | V3/V4               |
| <b>Giant ragweed</b> | <b>Height:</b>  | -    | 0.5-4"               | 0.5-4"              |
|                      | <b>Density:</b> | -    | 31-74 m <sup>2</sup> | 3-16 m <sup>2</sup> |

| Trt # | Treatment                   | Formulation  | SOA Group | Rate        | App Timing | App Code |
|-------|-----------------------------|--------------|-----------|-------------|------------|----------|
| 1     | Corvus<br>atrazine          | 2.63 lb/gal  | 2, 27     | 5.6 fl oz/a | A          | PRE      |
|       |                             | 4 lb/gal     | 5         | 2 pt/a      | A          | PRE      |
| 2     | Corvus<br>Harness XTRA 5.6L | 2.63 lb/gal  | 2, 27     | 4.5 fl oz/a | A          | PRE      |
|       |                             | 5.6 lb/gal   | 5, 15     | 1.5 qt/a    | A          | PRE      |
| 3     | Harness MAX<br>atrazine     | 3.85 lb/gal  | 15, 27    | 2 qt/a      | A          | PRE      |
|       |                             | 4 lb/gal     | 5         | 2 pt/a      | A          | PRE      |
| 4     | Harness                     | 7 lb/gal     | 15        | 2 pt/a      | A          | PRE      |
|       | Laudis                      | 3.5 lb/gal   | 27        | 3 fl oz/a   | C          | POST     |
|       | Roundup PowerMAX II         | 4.5 lbae/gal | 9         | 32 fl oz/a  | C          | POST     |
|       | atrazine                    | 4 lb/gal     | 5         | 1 pt/a      | C          | POST     |
|       | AMS (liquid)                |              |           | 2.5% v/v    | C          | POST     |
| 5     | Balance Flexx               | 2 lb/gal     | 27        | 4 fl oz/a   | A          | PRE      |
|       | atrazine                    | 4 lb/gal     | 5         | 2 pt/a      | A          | PRE      |
|       | Diflexx                     | 4 lbae/gal   | 4         | 6 fl oz/a   | C          | POST     |
|       | Laudis                      | 3.5 lb/gal   | 27        | 3 fl oz/a   | C          | POST     |
|       | Roundup PowerMAX II         | 4.5 lbae/gal | 9         | 32 fl oz/a  | C          | POST     |
|       | AMS (liquid)                |              |           | 2.5% v/v    | C          | POST     |
| 6     | TripleFlex II               | 4.25 lb/gal  | 2, 4, 15  | 1 qt/a      | A          | PRE      |
|       | Diflexx DUO                 | 2.13 lb/gal  | 4, 27     | 24 fl oz/a  | C          | POST     |
|       | Roundup PowerMAX II         | 4 lb/gal     | 9         | 32 fl oz/a  | C          | POST     |
|       | Destiny HC                  | 4.5 lbae/gal |           | 1% v/v      | C          | POST     |
|       | Class Act Ridion            |              |           | 1% v/v      | C          | POST     |
| 7     | Harness Xtra 5.6L           | 5.6 lb/gal   | 5, 15     | 1.5 qt/a    | A          | PRE      |
|       | Capreno                     | 3.45 lb/gal  | 2, 27     | 3 fl oz/a   | C          | POST     |
|       | Roundup PowerMAX II         | 4.5 lbae/gal | 9         | 32 fl oz/a  | C          | POST     |
|       | AMS (liquid)                |              |           | 2.5% v/v    | C          | POST     |
| 8     | Harness MAX                 | 3.85 lb/gal  | 15, 27    | 2 qt/a      | A          | PRE      |
|       | atrazine                    | 4 lb/gal     | 5         | 2 pt/a      | A          | PRE      |
|       | Capreno                     | 3.45 lb/gal  | 2, 27     | 3 fl oz/a   | C          | POST     |
|       | Roundup PowerMAX II         | 4.5 lbae/gal | 9         | 32 fl oz/a  | C          | POST     |
|       | AMS (liquid)                |              |           | 2.5% v/v    | C          | POST     |
| 9     | Balance Flexx               | 2 lb/gal     | 27        | 4 fl oz/a   | A          | PRE      |
|       | atrazine                    | 4 lb/gal     | 5         | 2 pt/a      | A          | PRE      |
|       | Diflexx DUO                 | 2.13 lb/gal  | 4, 27     | 24 fl oz/a  | C          | POST     |
|       | Roundup PowerMAX II         | 4.5 lbae/gal | 9         | 32 fl oz/a  | C          | POST     |
|       | Destiny HC                  |              |           | 1% v/v      | C          | POST     |
|       | Class Act Ridion            |              |           | 1% v/v      | C          | POST     |
| 10    | Harness MAX                 | 3.85 lb/gal  | 15, 27    | 1.5 qt/a    | B          | EPOST    |
|       | Roundup PowerMAX II         | 4.5 lbae/gal | 9         | 32 fl oz/a  | B          | EPOST    |
|       | atrazine                    | 4 lb/gal     | 5         | 1 pt/a      | B          | EPOST    |
|       | AMS (liquid)                |              |           | 2.5% v/v    | B          | EPOST    |

| Trt # | Treatment           | Formulation  | SOA Group | Rate       | App Timing | App Code |
|-------|---------------------|--------------|-----------|------------|------------|----------|
| 11    | <b>Maverick*</b>    | 2.04 lb/gal  | 4, 15, 27 | 1 qt/a     | A          | PRE      |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 32 fl oz/a | C          | POST     |
|       | AMS (liquid)        |              |           | 2.5% v/v   | C          | POST     |
| 12    | <b>Maverick*</b>    | 2.04 lb/gal  | 4, 15, 27 | 1 qt/a     | A          | PRE      |
|       | atrazine            | 4 lb/gal     | 5         | 1.5 pt     | A          | PRE      |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 32 fl oz/a | C          | POST     |
|       | AMS (liquid)        |              |           | 2.5% v/v   | C          | POST     |

**Adjuvants:** AMS = AMSOL; Destiny HC = high surfactant oil concentrate (HSOC); Class Act Ridion = non-AMS water conditioner + NIS

\***Maverick** is a new corn herbicide premix from Valent. Maverick is a suspension concentrate that contains 0.523 lb clopyralid, 0.825 lb mesotrione, and 0.690 lb of pyroxasulfone per gallon. Maverick is not yet registered for use at the time of publication of this report.

#### Trial Summary:

This trial evaluated the weed control and crop safety of various corn herbicide programs from the Bayer and Valent portfolios. There was no significant injury from any of the herbicide programs evaluated.

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 1). Most of the PRE herbicides evaluated provided good control (80-92%) 24 days after application. In general, the PRE treatments containing mesotrione (group 27) had longer and more consistent residual control of giant ragweed control than treatments without. None of the herbicide programs evaluated provided >90% control at corn harvest. Giant ragweed control was especially poor (<40%) for all the 1-pass PRE and EPOST herbicide programs. The 2-pass programs on average performed better relative to the 1-pass systems with some treatments averaging over 70% control. 1-pass PRE or EPOST herbicide programs are not recommended in fields with heavy population densities of giant ragweed and/or biotypes with the prolonged emergence pattern similar to this location.

Corn yield was significantly impacted by herbicide program,  $p < 0.001$  (Table 1). Averaged across all treatments, yield of the 2-pass PRE *fb* POST programs = 202 bu/acre, EPOST = 109 bu/acre and PRE = 56 bu/acre. The untreated check yield = 16 bu/acre.

Plot photos from throughout the growing season are available at [Bayer and Valent Corn Herbicide Programs](#) published on [wiscweeds.info](#).

**Table 1.** Giant ragweed control ratings and corn grain yield for trial #21-ROK-CN02 at Janesville, WI.<sup>a</sup>

| Trt #                                              | Herbicide (rate acre <sup>-1</sup> )                                                                                                                | Giant Ragweed Visual Control (%) |              |                  |                  |                  | Yield <sup>b</sup><br>bu acre <sup>-1</sup> |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------|------------------|------------------|------------------|---------------------------------------------|
|                                                    |                                                                                                                                                     | 5/21                             | 5/26         | 6/8              | 6/23             | 11/2             |                                             |
| 13                                                 | Untreated Check                                                                                                                                     | 0                                | 0            | 0                | 0                | 0                | 16 g                                        |
| <b>One-Pass – PRE (4/27)</b>                       |                                                                                                                                                     |                                  |              |                  |                  |                  |                                             |
| 1                                                  | Corvus (5.6 oz) + atrazine (2 pt)                                                                                                                   | 75                               | 70           | 58               | 35               | 22               | 29 fg                                       |
| 2                                                  | Corvus (4.5 oz) + Harness XTRA 5.6L (1.5 qt)                                                                                                        | 81                               | 82           | 67               | 41               | 22               | 56 ef                                       |
| 3                                                  | Harness MAX (2 qt) + atrazine (2 pt)                                                                                                                | 86                               | 85           | 76               | 55               | 29               | 81 de                                       |
| <b>One-Pass – EPOST (5/21)</b>                     |                                                                                                                                                     |                                  |              |                  |                  |                  |                                             |
| 10                                                 | Harness MAX (1.5 qt) + Roundup PMII (32 oz) + atrazine (1 pt) + AMS                                                                                 | NA                               | 94           | 84               | 68               | 38               | 110 d                                       |
| <b>Two-Pass – PRE (4/27) <i>fb</i> POST (5/26)</b> |                                                                                                                                                     | <b>POST APP</b>                  |              |                  |                  |                  |                                             |
| 4                                                  | Harness (2 pt) <i>fb</i><br>Laudis (3 oz) + Roundup PMII (32 oz) + atrazine (1 pt) + AMS                                                            | 68                               | 61           | 94               | 79               | 61               | 175 c                                       |
| 5                                                  | Balance Flexx (4 oz) + atrazine (2 pt) <i>fb</i><br>Diflexx (6 oz) + Laudis (3 oz) + Roundup PMII (32 oz) + AMS                                     | 80                               | 69           | 97               | 88               | 80               | 223 ab                                      |
| 6                                                  | TripleFlex II (1 qt) <i>fb</i><br>Diflexx DUO (24 oz) + Roundup PMII (32 oz) +<br>Destiny HC (1% v/v) + Class Act Ridion (1% v/v)                   | 76                               | 69           | 97               | 88               | 85               | 237 a                                       |
| 7                                                  | Harness Xtra 5.6L (1.5 qt) <i>fb</i><br>Capreno (3 fl oz) + Roundup PMII (32 oz) + AMS                                                              | 81                               | 74           | 96               | 85               | 72               | 187 bc                                      |
| 8                                                  | Harness MAX (2 qt) + atrazine (2 pt) <i>fb</i><br>Capreno (3 fl oz) + Roundup PMII (32 oz) + AMS                                                    | 92                               | 87           | 95               | 82               | 65               | 183 c                                       |
| 9                                                  | Balance Flexx (4 oz) + atrazine (2 pt) <i>fb</i><br>Diflexx DUO (24 oz) + Roundup PMII (32 oz) +<br>Destiny HC (1% v/v) + Class Act Ridion (1% v/v) | 65                               | 43           | 95               | 85               | 75               | 211 abc                                     |
| 11                                                 | Maverick (1 qt) <i>fb</i><br>Roundup PMII (32 oz) + AMS                                                                                             | 84                               | 84           | 93               | 81               | 66               | 205 abc                                     |
| 12                                                 | Maverick (1 qt) + atrazine (1.5 pt) <i>fb</i><br>Roundup PMII (32 oz) + AMS                                                                         | 91                               | 91           | 93               | 83               | 68               | 200 bc                                      |
| <b>LSD (<math>\alpha=0.10</math>)</b>              |                                                                                                                                                     | <b>14</b>                        | <b>18</b>    | <b>11</b>        | <b>14</b>        | <b>15</b>        | <b>36</b>                                   |
| <b>p value</b>                                     |                                                                                                                                                     | <b>0.04</b>                      | <b>0.002</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b>                            |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Yield values with the same letter are not significantly different.

**Project Goal:** Compare Shieldex applied POST to industry standards for weed control and crop safety.

#### Site Description:

|                       |                                           |                        |                   |
|-----------------------|-------------------------------------------|------------------------|-------------------|
| <b>Location:</b>      | Janesville, WI                            | <b>Crop:</b>           | Corn              |
| <b>Field #:</b>       | 8                                         | <b>Hybrid:</b>         | DKC 54-38 RIB     |
| <b>Soil type:</b>     | Plano silt loam                           | <b>Planting Date:</b>  | 5/24              |
| <b>% OM:</b>          | 3.3                                       | <b>Emergence Date:</b> | 6/2               |
| <b>pH:</b>            | 6.4                                       | <b>Population:</b>     | 35,000 seeds/acre |
| <b>Fertilization:</b> | 180 lbs N/acre                            | <b>Depth:</b>          | 2 in              |
| <b>Previous crop:</b> | Soybean                                   | <b>Row spacing:</b>    | 30 in             |
| <b>Tillage:</b>       | conventional                              | <b>Plot Size:</b>      | 10 x 30 ft        |
| <b>Weed species:</b>  | giant ragweed (AMBTR), velvetleaf (ABUTH) |                        |                   |

#### Herbicide Application Information:

|                                      |            |           |
|--------------------------------------|------------|-----------|
| <b>Date:</b>                         | 5/24       | 6/15      |
| <b>Treatment:</b>                    | PRE (A)    | POST (B)  |
| <b>Air Temp (°F):</b>                | 88         | 73        |
| <b>2" Soil Temp (°F):</b>            | 78         | 67        |
| <b>Soil moisture [surface]:</b>      | dry        | very dry  |
| <b>RH %:</b>                         | 56         | 58        |
| <b>Cloud cover %</b>                 | 80         | 50        |
| <b>Wind speed (mph)/direction</b>    | 1-8/SW     | 1-5/NNE   |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.64"      | 1.75"     |
| <b>GPA:</b>                          | 15         | 15        |
| <b>PSI:</b>                          | 34         | 34        |
| <b>Nozzle:</b>                       | TTI 110015 | TT 110015 |
| <b>Nozzle spacing (in):</b>          | 20         | 20        |
| <b>Boom Height (in):</b>             | 20         | 25        |

#### Crop and weed information at application:

|                      |                 |      |                       |
|----------------------|-----------------|------|-----------------------|
|                      | <b>Date:</b>    | 5/24 | 6/15                  |
| <b>Corn</b>          | <b>Height:</b>  | -    | 8-9"                  |
|                      | <b>Stage:</b>   | -    | V4                    |
| <b>giant ragweed</b> | <b>Height:</b>  | -    | 1-5"                  |
|                      | <b>Density:</b> | -    | 1-43/m <sup>2</sup>   |
| <b>velvetleaf</b>    | <b>Height:</b>  | -    | 1-3"                  |
|                      | <b>Density:</b> | -    | 0.2-16/m <sup>2</sup> |

| Trt # | Treatment            | Formulation  | SOA Group | Rate         | App Timing | App Code |
|-------|----------------------|--------------|-----------|--------------|------------|----------|
| 1     | Bicep Lite II Magnum | 6 lb/gal     | 5, 15     | 1.5 qt/a     | PRE        | A        |
| 2     | Bicep Lite II Magnum | 6 lb/gal     | 5, 15     | 1.5 qt/a     | PRE        | A        |
|       | Shieldex             | 3.33 lb/gal  | 27        | 1 fl oz/a    | POST       | B        |
|       | AAtrex               | 4 lb/gal     | 5         | 1 pt/a       | POST       | B        |
|       | COC                  |              |           | 1% v/v       | POST       | B        |
|       | AMS (liquid)         |              |           | 2.5% v/v     | POST       | B        |
| 3     | Bicep Lite II Magnum | 6 lb/gal     | 5, 15     | 1.5 qt/a     | PRE        | A        |
|       | Impact               | 2.8 lb/gal   | 27        | 0.75 fl oz/a | POST       | B        |
|       | AAtrex               | 4 lb/gal     | 5         | 1 pt/a       | POST       | B        |
|       | COC                  |              |           | 1% v/v       | POST       | B        |
|       | AMS (liquid)         |              |           | 2.5% v/v     | POST       | B        |
| 4     | Bicep Lite II Magnum | 6 lb/gal     | 5, 15     | 1.5 qt/a     | PRE        | A        |
|       | Laudis               | 3.5 lb/gal   | 27        | 3 fl oz/a    | POST       | B        |
|       | AAtrex               | 4 lb/gal     | 5         | 1 pt/a       | POST       | B        |
|       | COC                  |              |           | 1% v/v       | POST       | B        |
|       | AMS (liquid)         |              |           | 2.5% v/v     | POST       | B        |
| 5     | Bicep Lite II Magnum | 6 lb/gal     | 5, 15     | 1.5 qt/a     | PRE        | A        |
|       | Shieldex             | 3.33 lb/gal  | 27        | 1 fl oz/a    | POST       | B        |
|       | AAtrex               | 4 lb/gal     | 5         | 1 pt/a       | POST       | B        |
|       | Roundup PowerMax II  | 4.5 lbae/gal | 9         | 30 fl oz/a   | POST       | B        |
|       | AMS (liquid)         |              |           | 2.5% v/v     | POST       | B        |
| 6     | Bicep Lite II Magnum | 6 lb/gal     | 5, 15     | 1.5 qt/a     | PRE        | A        |
|       | Shieldex             | 3.33 lb/gal  | 27        | 1 fl oz/a    | POST       | B        |
|       | AAtrex               | 4 lb/gal     | 15        | 1 pt/a       | POST       | B        |
|       | Liberty              | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | COC                  |              |           | 1% v/v       | POST       | B        |
|       | AMS (liquid)         |              |           | 2.5% v/v     | POST       | B        |

**Adjuvants:** AMS = AMSOL; COC = Crop Oil

**Trial Summary:**

This trial compared the efficacy and crop safety of Shieldex plus atrazine tank mix applied POST to industry standards.

None of the POST herbicide treatments caused significant corn injury (data not shown). All treatments had <6% corn leaf necrosis 14 days after application and were statistically similar. There was no visible corn injury 30 days after the POST application.

Post-emergence giant ragweed and velvetleaf control was similar amongst the herbicide programs evaluated (Table 2). All POST treatments were effective at controlling emerged giant ragweed; however, a few giant ragweed seedlings emerged after the POST application and control 14 days after application was 86-94%. Shieldex, Impact, Laudis and the low rate of atrazine used have little residual activity on giant ragweed. Shieldex and Laudis treatments had slightly greater giant ragweed control than Impact 30 days after application.

Giant ragweed visual control ratings from this trial should not be compared to trials conducted in other fields at the Rock County Farm in Janesville, WI. Giant ragweed density in this field (field #8) is much lower than other fields containing corn herbicide trials in 2021. This trial was also planted almost a month later (5/24) than other trials (4/26).

Corn grain yield was similar amongst all POST herbicide programs (Table 2). Averaged across all POST programs corn, yield was 249 bu/acre compared to only 77 bu/acre for the 1-pass PRE Bicep Lite II Magnum treatment.

Plot photos from throughout the growing season are available at [Shieldex Weed Control and Crop Safety](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 2.** Weed control ratings and corn grain yield for trial #21-ROK-CN03 at Janesville, WI.<sup>a</sup>

| Trt #   Herbicide (rate acre <sup>-1</sup> ) |                                                                                                                      | Giant Ragweed (%) |       |       | Velvetleaf (%) |       | Yield <sup>b</sup>    |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------|-------|-------|----------------|-------|-----------------------|
|                                              |                                                                                                                      | 6/29              | 7/15  | 11/3  | 6/29           | 7/15  | bu acre <sup>-1</sup> |
| One-Pass – PRE (5/24)                        |                                                                                                                      |                   |       |       |                |       |                       |
| 1                                            | Bicep Lite II Magnum (1.5 qt)                                                                                        | 0                 | 0     | 0     | 0              | 0     | 77 b                  |
| Two-Pass – PRE (5/24) fb POST (6/15)         |                                                                                                                      |                   |       |       |                |       |                       |
| 2                                            | Bicep Lite II Magnum (1.5 qt) fb<br>Shieldex (1 oz) + AAtrex (1 pt) + COC 1% v/v + AMS 2.5% v/v                      | 91                | 89    | 98    | 80             | 75    | 253 a                 |
| 3                                            | Bicep Lite II Magnum (1.5 qt) fb<br>Impact (0.75 oz) + AAtrex (1 pt) + COC 1% v/v + AMS 2.5% v/v                     | 86                | 84    | 95    | 83             | 79    | 248 a                 |
| 4                                            | Bicep Lite II Magnum (1.5 qt) fb<br>Laudis (3 oz) + AAtrex (1 pt) + COC 1% v/v + AMS 2.5% v/v                        | 89                | 87    | 97    | 97             | 90    | 245 a                 |
| 5                                            | Bicep Lite II Magnum (1.5 qt) fb<br>Shieldex (1 oz) + AAtrex (1 pt) + Roundup PMII (30 oz) +<br>AMS 2.5% v/v         | 94                | 87    | 98    | 92             | 82    | 252 a                 |
| 6                                            | Bicep Lite II Magnum (1.5 qt) fb<br>Shieldex (1 oz) + AAtrex (1 pt) + Liberty (32 oz) + COC 1% v/v +<br>AMS 2.5% v/v | 87                | 84    | 96    | 85             | 77    | 249 a                 |
| LSD (α=0.10)                                 |                                                                                                                      | ns                | 3     | ns    | ns             | ns    | 19                    |
| p value                                      |                                                                                                                      | 0.261             | 0.032 | 0.649 | 0.287          | 0.226 | <0.001                |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Yield values with the same letter are not significantly different.

**Project Goal:** Compare single and split applications of Restraint applied PRE and POST to industry standards for weed control and crop safety.

#### Site Description:

|                       |                                           |                        |                   |
|-----------------------|-------------------------------------------|------------------------|-------------------|
| <b>Location:</b>      | Janesville, WI                            | <b>Crop:</b>           | Corn              |
| <b>Field #:</b>       | 8                                         | <b>Hybrid:</b>         | DKC 54-38 RIB     |
| <b>Soil type:</b>     | Plano silt loam                           | <b>Planting Date:</b>  | 5/24              |
| <b>% OM:</b>          | 3.3                                       | <b>Emergence Date:</b> | 6/2               |
| <b>pH:</b>            | 6.4                                       | <b>Population:</b>     | 35,000 seeds/acre |
| <b>Fertilization:</b> | 180 lbs N/acre                            | <b>Depth:</b>          | 2 in              |
| <b>Previous crop:</b> | Soybean                                   | <b>Row spacing:</b>    | 30 in             |
| <b>Tillage:</b>       | conventional                              | <b>Plot Size:</b>      | 10 x 30 ft        |
| <b>Weed species:</b>  | giant ragweed (AMBTR), velvetleaf (ABUTH) |                        |                   |

#### Herbicide Application Information:

|                                      |            |           |
|--------------------------------------|------------|-----------|
| <b>Date:</b>                         | 5/24       | 6/15      |
| <b>Treatment:</b>                    | PRE (A)    | POST (B)  |
| <b>Air Temp (°F):</b>                | 88         | 73        |
| <b>2" Soil Temp (°F):</b>            | 78         | 67        |
| <b>Soil moisture [surface]:</b>      | dry        | very dry  |
| <b>RH %:</b>                         | 56         | 58        |
| <b>Cloud cover %</b>                 | 80         | 50        |
| <b>Wind speed (mph)/direction</b>    | 1-8/SW     | 1-5/NNE   |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.64"      | 1.75"     |
| <b>GPA:</b>                          | 15         | 15        |
| <b>PSI:</b>                          | 34         | 34        |
| <b>Nozzle:</b>                       | TTI 110015 | TT 110015 |
| <b>Nozzle spacing (in):</b>          | 20         | 20        |
| <b>Boom Height (in):</b>             | 20         | 25        |

#### Crop and weed information at application:

|                      |                 |      |                       |
|----------------------|-----------------|------|-----------------------|
|                      | <b>Date:</b>    | 5/24 | 6/15                  |
| <b>Corn</b>          | <b>Height:</b>  | -    | 8-9"                  |
|                      | <b>Stage:</b>   | -    | V4                    |
| <b>giant ragweed</b> | <b>Height:</b>  | -    | 1-5"                  |
|                      | <b>Density:</b> | -    | 1-43/m <sup>2</sup>   |
| <b>velvetleaf</b>    | <b>Height:</b>  | -    | 1-3"                  |
|                      | <b>Density:</b> | -    | 0.2-16/m <sup>2</sup> |

| Trt # | Treatment       | Formulation | SOA Group | Rate       | App Timing | App Code |
|-------|-----------------|-------------|-----------|------------|------------|----------|
| 1     | Untreated Check |             |           |            |            |          |
| 2     | Restraint       | 6.5 lb/gal  | 15, 27    | 36 fl oz/a | PRE        | A        |
|       | AAtrex          | 4 lb/gal    | 5         | 2 pt/a     | PRE        | A        |
|       | Shieldex        | 3.33 lb/gal | 27        | 1 fl oz/a  | POST       | B        |
|       | AAtrex          | 4 lb/gal    | 5         | 1 pt/a     | POST       | B        |
|       | COC             |             |           | 1% v/v     | POST       | B        |
| 3     | Restraint       | 6.5 lb/gal  | 15, 27    | 18 fl oz/a | PRE        | A        |
|       | AAtrex          | 4 lb/gal    | 5         | 2 pt/a     | PRE        | A        |
|       | Restraint       | 6.5 lb/gal  | 15, 27    | 18 fl oz/a | POST       | B        |
|       | AAtrex          | 4 lb/gal    | 5         | 1 pt/a     | POST       | B        |
|       | COC             |             |           | 1% v/v     | POST       | B        |
| 4     | Resicore        | 3.29 lb/gal | 4, 15, 27 | 40 fl oz/a | PRE        | A        |
|       | AAtrex          | 4 lb/gal    | 5         | 2 pt/a     | PRE        | A        |
|       | Restraint       | 6.5 lb/gal  | 15, 27    | 30 fl oz/a | POST       | B        |
|       | AAtrex          | 4 lb/gal    | 5         | 1 pt/a     | POST       | B        |
|       | COC             |             |           | 1% v/v     | POST       | B        |
| 5     | Resicore        | 3.29 lb/gal | 4, 15, 27 | 40 fl oz/a | PRE        | A        |
|       | AAtrex          | 4 lb/gal    | 5         | 2 pt/a     | PRE        | A        |
|       | Resicore        | 3.29 lb/gal | 4, 15, 27 | 40 fl oz/a | POST       | B        |
|       | AAtrex          | 4 lb/gal    | 5         | 1 pt/a     | POST       | B        |
|       | COC             |             |           | 1% v/v     | POST       | B        |

**Adjuvants:** COC = Crop Oil

**Trial Summary:**

This trial compared single and split applications of Restraint applied PRE and POST to an industry standard for weed control and crop safety. Restraint is a newer herbicide offering from Summit Agro containing a premix of tolypralate (0.094 lbs gal<sup>-1</sup>; group 14) and acetochlor (6.404 lbs gal<sup>-1</sup>; group 15).

All the POST herbicide treatments showed visible corn injury (leaf necrosis) 8 and 14 days after application (Table 3). POST applications of Restraint and Resicore had greater corn injury than Shieldex. Restraint at 30 fl oz had slightly more injury than Restraint at 18 fl oz. Corn growth and development was not significantly impacted as there was no visible corn injury 30 days after the POST application (data not shown).

PRE and POST giant ragweed and velvetleaf control was impacted by herbicide program (Table 3). 40 fl oz Resicore + 2 pt AAtrex had greater PRE residual control of both species than either rate of Restraint 15 days after application. The active ingredients in Restraint (acetochlor, tolypralate) don't have great activity on giant ragweed and will only suppress velvetleaf. Giant ragweed and velvetleaf control was similar for all treatments 14 days after the POST application although POST treatments following the PRE application of Resicore had better control up to 30 days after application.

Giant ragweed visual control ratings from this trial should not be compared to trials conducted in other fields at the Rock County Farm in Janesville, WI. Giant ragweed density in this field (field #8) is much lower than other fields containing corn herbicide trials in 2021. This trial was also planted almost a month later (5/24) than other trials (4/26).

Corn grain yield was very similar amongst all herbicide programs (Table 3). Averaged across all POST programs corn yield was 248 bu/acre compared to only 79 bu/acre for the untreated check.

Plot photos from throughout the growing season are available at [Restraint Weed Control and Crop Safety](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 3.** Corn injury, weed control ratings, and corn grain yield for trial #21-ROK-CN04 at Janesville, WI.<sup>a</sup>

| Trt #                                              | Herbicide (rate acre <sup>-1</sup> )                                                           | Crop Injury (%) <sup>c</sup> |              | Giant Ragweed (%) |              |              |              | Velvetleaf (%)  |              |              | Yield <sup>b</sup><br>bu acre <sup>-1</sup> |
|----------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------|--------------|-------------------|--------------|--------------|--------------|-----------------|--------------|--------------|---------------------------------------------|
|                                                    |                                                                                                | 6/23                         | 6/29         | 6/8               | 6/29         | 7/15         | 11/3         | 6/8             | 6/29         | 7/15         |                                             |
| 1                                                  | Untreated Check                                                                                | 0                            | 0            | 0                 | 0            | 0            | 0            | 0               | 0            | 0            | 79 b                                        |
| <b>Two-Pass – PRE (5/24) <i>fb</i> POST (6/15)</b> |                                                                                                |                              |              | <b>POST APP</b>   |              |              |              | <b>POST APP</b> |              |              |                                             |
| 2                                                  | Restraint (36 oz) + AAtrex (2 pt) <i>fb</i><br>Shieldex (1 oz) + AAtrex (1 pt) + COC 1% v/v    | 5                            | 5            | 49                | 88           | 87           | 96           | 37              | 88           | 84           | 250 a                                       |
| 3                                                  | Restraint (18 oz) + A Atrex (2 pt) <i>fb</i><br>Restraint (18 oz) + AAtrex (1 pt) + COC 1% v/v | 11                           | 11           | 39                | 86           | 86           | 96           | 55              | 95           | 89           | 247 a                                       |
| 4                                                  | Resicore (40 oz) + AAtrex (2 pt) <i>fb</i><br>Restraint (30 oz) + AAtrex (1 pt) + COC 1% v/v   | 13                           | 11           | 65                | 92           | 91           | 98           | 75              | 99           | 99           | 246 a                                       |
| 5                                                  | Resicore (40 oz) + AAtrex (2 pt) <i>fb</i><br>Resicore (40 oz) + AAtrex (1 pt) + COC 1% v/v    | 10                           | 8            | 66                | 96           | 96           | 99           | 72              | 100          | 100          | 250 a                                       |
| <b>LSD (<math>\alpha=0.10</math>)</b>              |                                                                                                | <b>2</b>                     | <b>4</b>     | <b>10</b>         | <b>7</b>     | <b>4</b>     | <b>2</b>     | <b>17</b>       | <b>ns</b>    | <b>5</b>     | <b>29</b>                                   |
| <b>p value</b>                                     |                                                                                                | <b>&lt;0.001</b>             | <b>0.063</b> | <b>0.002</b>      | <b>0.084</b> | <b>0.005</b> | <b>0.052</b> | <b>0.014</b>    | <b>0.304</b> | <b>0.003</b> | <b>&lt;0.001</b>                            |

<sup>a</sup> Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup> Yield values with the same letter are not significantly different.<sup>c</sup> Crop injury symptoms included leaf necrosis and chlorosis.

**Project Goal:** Evaluate early postemergence and sequential split applications of Maverick, a new corn herbicide premix from Valent.

\*Maverick is a suspension concentrate that contains 0.523 lb clopyralid, 0.825 lb mesotrione, and 0.690 lb of pyroxasulfone per gallon. Maverick is not yet registered for use at the time of publication of this report.

#### Site Description:

|                       |                       |                        |                   |
|-----------------------|-----------------------|------------------------|-------------------|
| <b>Location:</b>      | Janesville, WI        | <b>Crop:</b>           | Corn              |
| <b>Field #:</b>       | 4                     | <b>Hybrid:</b>         | DKC54-38 RIB      |
| <b>Soil type:</b>     | Plano silt loam       | <b>Planting Date:</b>  | 4/26              |
| <b>% OM:</b>          | 3.3                   | <b>Emergence Date:</b> | 5/11              |
| <b>pH:</b>            | 6.7                   | <b>Population:</b>     | 35,000 seeds/acre |
| <b>Fertilization:</b> | 180 lbs N/acre        | <b>Depth:</b>          | 2.25 in           |
| <b>Previous crop:</b> | Soybean               | <b>Row spacing:</b>    | 30 in             |
| <b>Tillage:</b>       | conventional          | <b>Plot Size:</b>      | 10 x 30 ft        |
| <b>Weed species:</b>  | giant ragweed (AMBTR) |                        |                   |

#### Herbicide Application Information:

|                                      |            |            |            |
|--------------------------------------|------------|------------|------------|
| <b>Date:</b>                         | 4/27       | 5/21       | 6/8        |
| <b>Treatment:</b>                    | PRE (A)    | EPOST (B)  | POST (C)   |
| <b>Air Temp (°F):</b>                | 88         | 75         | 78         |
| <b>2" Soil Temp (°F):</b>            | 72         | 64         | 76         |
| <b>Soil moisture [surface]:</b>      | dry        | moist      | very dry   |
| <b>RH %:</b>                         | 36         | 67         | 69         |
| <b>Cloud cover %</b>                 | 35         | 80         | 90         |
| <b>Wind speed (mph)/direction</b>    | 3-7/NNE    | 3-8/SSE    | 0-0.5/S    |
| <b>Rainfall (in) 1 wk after APP:</b> | 1.2"       | 0.88"      | 0.05"      |
| <b>GPA:</b>                          | 15         | 15         | 15         |
| <b>PSI:</b>                          | 34         | 34         | 34         |
| <b>Nozzle:</b>                       | TTI 110015 | TTI 110015 | TTI 110015 |
| <b>Nozzle spacing (in):</b>          | 20         | 20         | 20         |
| <b>Boom Height (in):</b>             | 20         | 23         | 23         |

#### Crop and weed information at application:

|                      |                 |      |                        |                      |
|----------------------|-----------------|------|------------------------|----------------------|
|                      | <b>Date:</b>    | 4/27 | 5/21                   | 6/8                  |
| <b>Corn</b>          | <b>Height:</b>  | -    | 2.5-3.5"               | 8-12"                |
|                      | <b>Stage:</b>   | -    | V2                     | V5/V6                |
| <b>Giant ragweed</b> | <b>Height:</b>  | -    | 0.5-3"                 | 1-13" avg=5"         |
|                      | <b>Density:</b> | -    | 118-112 m <sup>2</sup> | 38-68 m <sup>2</sup> |

| 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   | EPOST      | B        |
|       | Roundup PowerMAX II | 4.5 lb ae/gal | 9         | 32 fl oz/a | EPOST      | B        |
|       | NIS                 |               |           | 0.25% v/v  | EPOST      | B        |
|       | AMS                 |               |           | 3 lb/a     | EPOST      | B        |
| 3     | Halex GT            | 4.39 lb/gal   | 9, 15, 27 | 4 pt/a     | EPOST      | B        |
|       | NIS                 |               |           | 0.25% v/v  | EPOST      | B        |
|       | AMS                 |               |           | 3 lb/a     | EPOST      | B        |
| 4     | Armezon PRO         | 5.35 lb/gal   | 15, 27    | 24 fl oz/a | EPOST      | B        |
|       | Roundup PowerMAX II | 4.5 lb ae/gal | 9         | 32 fl oz/a | EPOST      | B        |
|       | NIS                 |               |           | 0.25% v/v  | EPOST      | B        |
|       | AMS                 |               |           | 3 lb/a     | EPOST      | B        |
| 5     | Resicore            | 3.29 lb/gal   | 4, 15, 27 | 44 fl oz/a | EPOST      | B        |
|       | Roundup PowerMAX II | 4.5 lb ae/gal | 9         | 32 fl oz/a | EPOST      | B        |
|       | NIS                 |               |           | 0.25% v/v  | EPOST      | B        |
|       | AMS                 |               |           | 3 lb/a     | EPOST      | B        |
| 6     | <b>Maverick*</b>    | 2.04 lb/gal   | 4, 15, 27 | 14 fl oz/a | EPOST      | B        |
|       | Roundup PowerMAX II | 4.5 lb ae/gal | 9         | 32 fl oz/a | EPOST      | B        |
|       | NIS                 |               |           | 0.25% v/v  | EPOST      | B        |
|       | AMS                 |               |           | 3 lb/a     | EPOST      | B        |
| 7     | <b>Maverick*</b>    | 2.04 lb/gal   | 4, 15, 27 | 14 fl oz/a | EPOST      | B        |
|       | AAtrex              | 4 lb/gal      | 5         | 1.5 pt/a   | EPOST      | B        |
|       | Roundup PowerMAX II | 4.5 lb ae/gal | 9         | 32 fl oz/a | EPOST      | B        |
|       | NIS                 |               |           | 0.25% v/v  | EPOST      | B        |
|       | AMS                 |               |           | 3 lb/a     | EPOST      | B        |
| 8     | 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   | EPOST      | B        |
|       | Roundup PowerMAX II | 4.5 lb ae/gal | 9         | 32 fl oz/a | EPOST      | B        |
|       | NIS                 |               |           | 0.25% v/v  | EPOST      | B        |
|       | AMS                 |               |           | 3 lb/a     | EPOST      | B        |
| 9     | <b>Maverick*</b>    | 2.04 lb/gal   | 4, 15, 27 | 18 fl oz/a | PRE        | A        |
|       | <b>Maverick*</b>    | 2.04 lb/gal   | 4, 15, 27 | 14 fl oz/a | EPOST      | B        |
|       | Roundup PowerMAX II | 4.5 lb ae/gal | 9         | 32 fl oz/a | EPOST      | B        |
|       | NIS                 |               |           | 0.25% v/v  | EPOST      | B        |
|       | AMS                 |               |           | 3 lb/a     | EPOST      | B        |
| 10    | <b>Maverick*</b>    | 2.04 lb/gal   | 4, 15, 27 | 18 fl oz   | PRE        | A        |
|       | AAtrex              | 4 lb/gal      | 5         | 1 pt/a     | PRE        | A        |
|       | <b>Maverick*</b>    | 2.04 lb/gal   | 4, 15, 27 | 14 fl oz/a | EPOST      | B        |
|       | AAtrex              | 4 lb/gal      | 5         | 1 pt/a     | EPOST      | B        |
|       | Roundup PowerMAX II | 4.5 lb ae/gal | 9         | 32 fl oz/a | EPOST      | B        |
|       | NIS                 |               |           | 0.25% v/v  | EPOST      | B        |
|       | AMS                 |               |           | 3 lb/a     | EPOST      | B        |

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

**Trial Summary:**

This trial compared the weed control and crop safety of early postemergence and sequential split applications of Maverick to industry standards.

Minor (<5%) corn leaf necrosis was observed 5 days after the early POST applications (Table 4). Corn growth and development was not significantly impacted as there was no visible injury 17 days after application.

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. Giant ragweed visual weed control was impacted by herbicide program at all rating timings (Table 4). The PRE herbicides provided fair residual control (76-82%) 24 days after application. Acuron provided slightly better residual control (73%) 41 days after the PRE application than Maverick (61%) or Maverick + atrazine (60%). All EPOST treatments effectively controlled giant ragweed plants that were emerged at herbicide application. However, none of the EPOST treatments provided acceptable levels of giant ragweed for the duration of the growing season as control for most treatments was <80% at all the later rating dates. Several flushes of giant ragweed emerged after application. All the 1-pass EPOST herbicide programs provided similar levels of giant ragweed control throughout the growing season with exception of Maverick + atrazine + glyphosate which always had greater control. All the 2-pass PRE followed by POST herbicide programs provided excellent (>96%) control after the POST application had been made. Making the POST application 18 days later than the EPOST application allowed most of the giant ragweed to emerge and be controlled by the herbicide's burndown activity. A 1-pass EPOST herbicide program is not recommended in fields with heavy population densities of giant ragweed and/or biotypes with the prolonged emergence pattern similar to this location.

Corn yield was significantly impacted by herbicide program,  $p < 0.001$  (Table 4). Averaged across all treatments, yield of the 2-pass PRE *fb* POST programs = 218 bu/acre and EPOST = 68 bu/acre. The untreated check yield only yielded 11 bu/acre indicating the very heavy giant ragweed density in this trial.

Plot photos from throughout the growing season are available at [POST and Sequential Weed Control with Maverick](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 4.** Corn injury, giant ragweed visual control, and corn grain yield for trial #21-ROK-CN06 at Janesville, WI.<sup>a</sup>

| Trt #                                      | Herbicide (rate acre <sup>-1</sup> )                                                                                                                   | Crop Injury <sup>c</sup> (%) |           | Giant Ragweed Control (%) |              |                  |                  | Yield <sup>b</sup><br>bu acre <sup>-1</sup> |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------|---------------------------|--------------|------------------|------------------|---------------------------------------------|
|                                            |                                                                                                                                                        | 5/26                         | 6/7       | 5/26                      | 6/7          | 6/18             | 11/2             |                                             |
| 1                                          | Untreated Check                                                                                                                                        | 0                            | 0         | 0                         | 0            | 0                | 0                | 11 d                                        |
| <b>One-Pass – EPOST (5/21)</b>             |                                                                                                                                                        |                              |           |                           |              |                  |                  |                                             |
| 2                                          | Acuron (1.5 qt) + Roundup PM II (32 oz) + NIS 0.25% v/v + AMS                                                                                          | 2.3                          | 0         | 85                        | 76           | 53               | 16               | 56 c                                        |
| 3                                          | Halex GT (4 pt) + NIS 0.25% v/v + AMS                                                                                                                  | 3.3                          | 0         | 86                        | 78           | 55               | 19               | 53 c                                        |
| 4                                          | Armezon PRO (24 oz) + Roundup PM II (32 oz) + NIS 0.25% v/v + AMS                                                                                      | 1.3                          | 0         | 91                        | 79           | 57               | 25               | 66 c                                        |
| 5                                          | Resicore (44 oz) + Roundup PM II (32 oz) + NIS 0.25% v/v + AMS                                                                                         | 4.3                          | 0         | 90                        | 79           | 56               | 20               | 68 c                                        |
| 6                                          | Maverick <sup>d</sup> (14 oz) + Roundup PM II (32 oz) + NIS 0.25% v/v + AMS                                                                            | 3.5                          | 0         | 90                        | 78           | 58               | 19               | 64 c                                        |
| 7                                          | Maverick <sup>d</sup> (14 oz) + AAtrex (1.5 pt) + Roundup PM II (32 oz) + NIS 0.25% v/v + AMS                                                          | 2.5                          | 0         | 95                        | 85           | 73               | 34               | 101 b                                       |
| <b>Two-Pass – PRE (4/27) fb POST (6/8)</b> |                                                                                                                                                        |                              |           | <b>POST APP</b>           |              |                  |                  |                                             |
| 8                                          | Acuron (1.5 qt) <b>fb</b><br>Acuron (1.5 qt) + Roundup PM II (32 oz) + NIS 0.25% v/v + AMS                                                             | 0                            | 0         | 82                        | 73           | 99               | 100              | 221 a                                       |
| 9                                          | Maverick <sup>d</sup> (18 oz) <b>fb</b><br>Maverick <sup>d</sup> (14 oz) + Roundup PM II (32 oz) + NIS 0.25% v/v + AMS                                 | 0                            | 0         | 77                        | 61           | 97               | 98               | 209 a                                       |
| 10                                         | Maverick <sup>d</sup> (18 oz) + AAtrex (1 pt) <b>fb</b><br>Maverick <sup>d</sup> (14 oz) + AAtrex (1 pt) + Roundup PM II (32 oz) + NIS 0.25% v/v + AMS | 0                            | 0         | 76                        | 60           | 99               | 99               | 224 a                                       |
| <b>LSD (<math>\alpha=0.10</math>)</b>      |                                                                                                                                                        | <b>0.6</b>                   | <b>ns</b> | <b>5</b>                  | <b>10</b>    | <b>10</b>        | <b>14</b>        | <b>26</b>                                   |
| <b>p value</b>                             |                                                                                                                                                        | <b>&lt;0.001</b>             | <b>ns</b> | <b>&lt;0.001</b>          | <b>0.003</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b>                            |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Yield values with the same letter are not significantly different.<sup>c</sup>Visual corn injury rated was leaf necrosis.<sup>d</sup>Maverick is a suspension concentrate that contains 0.523 lb clopyralid, 0.825 lb mesotrione, and 0.690 lb of pyroxasulfone per gallon. Maverick is not yet registered for use at the time of publication of this report.

**Project Goal:** Compare the efficacy and crop safety of early POST applications of Armezon PRO, Empyros, Impact Core, and Katagon.

#### Site Description:

|                       |                                                                                                                   |                        |                   |
|-----------------------|-------------------------------------------------------------------------------------------------------------------|------------------------|-------------------|
| <b>Location:</b>      | Janesville, WI                                                                                                    | <b>Crop:</b>           | Corn              |
| <b>Field #:</b>       | 8                                                                                                                 | <b>Hybrid:</b>         | DKC 54-38 RIB     |
| <b>Soil type:</b>     | Plano silt loam                                                                                                   | <b>Planting Date:</b>  | 5/24              |
| <b>% OM:</b>          | 3.3                                                                                                               | <b>Emergence Date:</b> | 6/2               |
| <b>pH:</b>            | 6.4                                                                                                               | <b>Population:</b>     | 35,000 seeds/acre |
| <b>Fertilization:</b> | 180 lbs N/acre                                                                                                    | <b>Depth:</b>          | 2 in              |
| <b>Previous crop:</b> | Soybean                                                                                                           | <b>Row spacing:</b>    | 30 in             |
| <b>Tillage:</b>       | conventional                                                                                                      | <b>Plot Size:</b>      | 10 x 30 ft        |
| <b>Weed species:</b>  | giant ragweed, velvetleaf, redroot pigweed, smooth pigweed, waterhemp, giant foxtail, fall panicum, barnyardgrass |                        |                   |

#### Herbicide Application Information:

|                                      |            |           |
|--------------------------------------|------------|-----------|
| <b>Date:</b>                         | 5/24       | 6/11      |
| <b>Treatment:</b>                    | PRE (A)    | EPOST (B) |
| <b>Air Temp (°F):</b>                | 88         | 80        |
| <b>2" Soil Temp (°F):</b>            | 78         | -         |
| <b>Soil moisture [surface]:</b>      | dry        | very dry  |
| <b>RH %:</b>                         | 56         | 67        |
| <b>Cloud cover %</b>                 | 80         | 0         |
| <b>Wind speed (mph)/direction</b>    | 1-8/SW     | 2-5       |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.64"      | 1.5"      |
| <b>GPA:</b>                          | 15         | 15        |
| <b>PSI:</b>                          | 34         | 34        |
| <b>Nozzle:</b>                       | TTI 110015 | TT 110015 |
| <b>Nozzle spacing (in):</b>          | 20         | 20        |
| <b>Boom Height (in):</b>             | 20         | 25        |

#### Crop and weed information at application:

|                       |                 |      |                       |
|-----------------------|-----------------|------|-----------------------|
|                       | <b>Date:</b>    | 5/24 | 6/11                  |
| <b>Corn</b>           | <b>Height:</b>  | -    | 5-7"                  |
|                       | <b>Stage:</b>   | -    | V3                    |
| <b>giant ragweed</b>  | <b>Height:</b>  | -    | 1-4"                  |
|                       | <b>Density:</b> | -    | 1-43/m <sup>2</sup>   |
| <b>velvetleaf</b>     | <b>Height:</b>  | -    | 1-3"                  |
|                       | <b>Density:</b> | -    | 0.2-16/m <sup>2</sup> |
| <b>pigweed sp.</b>    | <b>Height:</b>  | -    | 0.5-1"                |
|                       | <b>Density:</b> | -    | 0.5-4/m <sup>2</sup>  |
| <b>annual grasses</b> | <b>Height:</b>  | -    | 1-4"                  |
|                       | <b>Density:</b> | -    | -                     |

| Trt # | Treatment       | Formulation | SOA Group | Rate         | App Timing | App Code |
|-------|-----------------|-------------|-----------|--------------|------------|----------|
| 1     | Untreated Check |             |           |              |            |          |
| 2     | Empyros         | 3.82 lb/gal | 15, 27    | 32 fl oz/a   | B          | EPOST    |
|       | atrazine        | 4 lb/gal    | 5         | 1 pt/a       | B          | EPOST    |
|       | Zaar (MSO)      |             |           | 1 pt/a       | B          | EPOST    |
| 3     | Armezon PRO     | 5.35 lb/gal | 15, 27    | 16 fl oz/a   | B          | EPOST    |
|       | atrazine        | 4 lb/gal    | 5         | 1 pt/a       | B          | EPOST    |
|       | Zaar (MSO)      |             |           | 1 pt/a       | B          | EPOST    |
| 4     | Empyros         | 3.82 lb/gal | 15, 27    | 48 fl oz/a   | B          | EPOST    |
|       | atrazine        | 4 lb/gal    | 5         | 1.5 pt/a     | B          | EPOST    |
|       | Zaar (MSO)      |             |           | 1 pt/a       | B          | EPOST    |
| 5     | Armezon PRO     | 5.35 lb/gal | 15, 27    | 24 fl oz/a   | B          | EPOST    |
|       | atrazine        | 4 lb/gal    | 5         | 1.5 pt/a     | B          | EPOST    |
|       | Zaar (MSO)      |             |           | 1 pt/a       | B          | EPOST    |
| 6     | Empyros         | 3.82 lb/gal | 15, 27    | 64 fl oz/a   | B          | EPOST    |
|       | atrazine        | 4 lb/gal    | 5         | 2 pt/a       | B          | EPOST    |
|       | Zaar (MSO)      |             |           | 1 pt/a       | B          | EPOST    |
| 7     | Armezon PRO     | 5.35 lb/gal | 15, 27    | 32 fl oz/a   | B          | EPOST    |
|       | atrazine        | 4 lb/gal    | 5         | 2 pt/a       | B          | EPOST    |
|       | Zaar (MSO)      |             |           | 1 pt/a       | B          | EPOST    |
| 8     | Armezon PRO     | 5.35 lb/gal | 15, 27    | 20 fl oz/a   | B          | EPOST    |
|       | atrazine        | 4 lb/gal    | 5         | 1 pt/a       | B          | EPOST    |
|       | Zaar (MSO)      |             |           | 1 pt/a       | B          | EPOST    |
| 9     | Impact Core     | 7.5 lb/gal  | 15, 27    | 28 fl oz/a   | B          | EPOST    |
|       | atrazine        | 4 lb/gal    | 5         | 1 pt/a       | B          | EPOST    |
|       | Zaar            |             |           | 1 pt/a       | B          | EPOST    |
| 10    | Impact Core     | 7.5 lb/gal  | 15, 27    | 22.5 fl oz/a | B          | EPOST    |
|       | atrazine        | 4 lb/gal    | 5         | 1 pt/a       | B          | EPOST    |
|       | Zaar            |             |           | 1 pt/a       | B          | EPOST    |
| 11    | Fearless*       | 7 lb/gal    | 15        | 14 fl oz/a   | A          | PRE      |
|       | Katagon         | 2 lb/gal    | 2, 27     | 3.2 fl oz/a  | B          | EPOST    |
|       | Destiny HC      |             |           | 1% v/v       | B          | EPOST    |
| 12    | Fearless*       | 7 lb/gal    | 15        | 14 fl oz/a   | A          | PRE      |
|       | Katagon         | 2 lb/gal    | 2, 27     | 3.2 fl oz/a  | B          | EPOST    |
|       | atrazine        | 4 lb/gal    | 5         | 2 pt/a       | B          | EPOST    |
|       | Destiny HC      |             |           | 1% v/v       | B          | EPOST    |

**Adjuvants:** Zaar=MSO + water conditioner; Destiny HC = high surfactant oil concentrate (HSOC)

\*Fearless was applied at ½ the recommended labeled rate to allow weed escapes in order to evaluate the POST efficacy of Katagon.

**Trial Summary:**

This trial compared the efficacy and crop safety of early POST applications of Armezon PRO, Empyros, Impact Core, and Katagon. Empyros and Katagon are premixes that both contain the relatively new HPPD active ingredient tolpyralate.

All POST herbicide treatments showed visible corn injury 7 days after application (Table 6). Empyros at all rates showed significant corn bleaching and leaf necrosis. Armezon PRO and Impact Core had similar levels of corn leaf necrosis. The Katagon and Katagon + atrazine treatments had leaf bleaching and minor leaf necrosis with the later showing greater injury. Only the Empyros treatments showed any significant injury later in the growing season. At 26 DAT, plots sprayed with Empyros at all rates were stunted 3-5% relative to the untreated check. All other treatments had minimal corn stunting. Applications were made in a very hot and dry period of early June, thus corn injury observed in this trial may be higher than normal.

Large seeded broadleaf control (giant ragweed; velvetleaf) was similar across all treatments (Table 5). Initial control 7 days after application was excellent >90%; however, control fell below 90% for most treatments later in the season due to seedling emergence after application. Pigweed sp. control was excellent for most herbicide programs at all rating dates (Table 5). Only Empyros at the lowest rate (32 fl oz) fell below 90%. Annual grass control varied among treatments (Table 5). Empyros and Katagon both had good initial control of grass weeds. Armezon PRO and Impact Core had very poor control of emerged grass weeds. Annual grass species included a mixture of giant foxtail, fall panicum, and barnyardgrass. Grass pressure was generally low and inconsistent across the trial area.

Giant ragweed visual control ratings from this trial should not be compared to trials conducted in other fields at the Rock County Farm in Janesville, WI. Giant ragweed density in this field (field #8) is much lower than in other fields containing corn herbicide trials in 2021. This trial was also planted almost a month later (5/24) than other trials (4/26).

Corn grain yield differed amongst herbicide programs (Table 6); however, yield was good (>230 bu acre<sup>-1</sup>) for all herbicide treatments. Averaged across all use rates and atrazine rates, yield of each herbicide in order of highest to lowest was Armezon PRO (254) > Katagon (247) > Impact Core (242) > Empyros (239). Yield of the untreated check was 54 bu acre<sup>-1</sup>.

Plot photos from throughout the growing season are available at [Weed Control and Crop Safety with EPOST Herbicide Applications](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 5.** Weed control visual ratings for trial #21-ROK-CN08 at Janesville, WI.<sup>a</sup>

| Trt #                                       | Herbicide (rate acre <sup>-1</sup> )                                          | Giant Ragweed (%) |              |              | Velvetleaf (%) |              |              | Pigweed <sup>b</sup> (%) |             |              | Annual Grasses <sup>c</sup> (%) |                  |              |
|---------------------------------------------|-------------------------------------------------------------------------------|-------------------|--------------|--------------|----------------|--------------|--------------|--------------------------|-------------|--------------|---------------------------------|------------------|--------------|
|                                             |                                                                               | 6/18              | 7/7          | 7/28         | 6/18           | 7/7          | 7/28         | 6/18                     | 7/7         | 7/28         | 6/18                            | 7/7              | 7/28         |
| 1                                           | Untreated Check                                                               | 0                 | 0            | 0            | 0              | 0            | 0            | 0                        | 0           | 0            | 0                               | 0                | 0            |
| <b>One-Pass – EPOST (6/11)</b>              |                                                                               |                   |              |              |                |              |              |                          |             |              |                                 |                  |              |
| 2                                           | Empyros (32 oz) + atrazine (1 pt) + Zaar (1 pt)                               | 99                | 89           | 79           | 100            | 84           | 70           | 100                      | 95          | 84           | 100                             | 94               | 89           |
| 3                                           | Armezon PRO (16 oz) + atrazine (1 pt) + Zaar (1pt)                            | 98                | 92           | 83           | 100            | 91           | 79           | 100                      | 97          | 93           | 45                              | 73               | 71           |
| 4                                           | Empyros (48 ox) + atrazine (1.5 pt) + Zaar (1pt)                              | 99                | 89           | 81           | 100            | 85           | 76           | 100                      | 98          | 93           | 100                             | 94               | 83           |
| 5                                           | Armezon PRO (24 oz) + atrazine (1.5 pt) + Zaar (1pt)                          | 98                | 90           | 83           | 100            | 89           | 79           | 100                      | 97          | 94           | 70                              | 79               | 79           |
| 6                                           | Empyros (64 ox) + atrazine (2 pt) + Zaar (1pt)                                | 99                | 88           | 80           | 100            | 91           | 80           | 100                      | 99          | 96           | 100                             | 97               | 92           |
| 7                                           | Armezon PRO (32 oz) + atrazine (2 pt) + Zaar (1 pt)                           | 99                | 95           | 88           | 100            | 95           | 85           | 100                      | 100         | 97           | 88                              | 85               | 86           |
| 8                                           | Armezon PRO (20 oz) + atrazine (1 pt) + Zaar (1 pt)                           | 99                | 91           | 90           | 100            | 88           | 79           | 100                      | 98          | 90           | 59                              | 70               | 71           |
| 9                                           | Impact Core (28 oz) + atrazine (1 pt) + Zaar (1 pt)                           | 98                | 91           | 83           | 100            | 90           | 76           | 100                      | 100         | 99           | 49                              | 65               | 69           |
| 10                                          | Impact Core (22.5 oz) + atrazine (1 pt) + Zaar (1 pt)                         | 98                | 89           | 84           | 100            | 92           | 80           | 100                      | 99          | 97           | 41                              | 66               | 63           |
| <b>Two-Pass – PRE (5/24) fb POST (6/11)</b> |                                                                               |                   |              |              |                |              |              |                          |             |              |                                 |                  |              |
| 11                                          | Fearless (14 oz) fb<br>Katagon (3.2 oz) + Destiny HC 1% v/v                   | 93                | 90           | 85           | 100            | 90           | 79           | 100                      | 99          | 94           | 80                              | 90               | 83           |
| 12                                          | Fearless (14 oz) fb<br>Katagon (3.2 oz) + atrazine (2 pt) + Destiny HC 1% v/v | 99                | 87           | 81           | 100            | 93           | 82           | 100                      | 99          | 97           | 99                              | 96               | 90           |
| <b>LSD (<math>\alpha=0.10</math>)</b>       |                                                                               | <b>2</b>          | <b>ns</b>    | <b>ns</b>    | <b>ns</b>      | <b>ns</b>    | <b>ns</b>    | <b>ns</b>                | <b>ns</b>   | <b>7</b>     | <b>28</b>                       | <b>13</b>        | <b>13</b>    |
| <b>p value</b>                              |                                                                               | <b>&lt;0.001</b>  | <b>0.579</b> | <b>0.103</b> | <b>0.465</b>   | <b>0.107</b> | <b>0.218</b> | <b>1.00</b>              | <b>0.24</b> | <b>0.068</b> | <b>0.001</b>                    | <b>&lt;0.001</b> | <b>0.006</b> |

<sup>a</sup> Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup> Pigweed species included a mixture of redroot and smooth pigweed (~50%) and common waterhemp (~50%).<sup>c</sup> Annual grass species included a mixture of giant foxtail, fall panicum, and barnyardgrass. Grass pressure was generally low and inconsistent across the trial area.

**Table 6.** Corn injury ratings and grain yield for trial #21-ROK-CN08 at Janesville, WI

| Trt #                                              | Herbicide (rate acre <sup>-1</sup> )                                                 | Crop Injury (%)   |                  | Yield <sup>c</sup><br>(bu acre <sup>-1</sup> ) |
|----------------------------------------------------|--------------------------------------------------------------------------------------|-------------------|------------------|------------------------------------------------|
|                                                    |                                                                                      | 6/18 <sup>a</sup> | 7/7 <sup>b</sup> |                                                |
| 1                                                  | Untreated Check                                                                      | 0.0               | 0.0              | 54 e                                           |
| <b>One-Pass – EPOST (6/11)</b>                     |                                                                                      |                   |                  |                                                |
| 2                                                  | Empyros (32 oz) + atrazine (1 pt) + Zaar (1 pt)                                      | 11.5              | 3.5              | 235 d                                          |
| 3                                                  | Armezon PRO (16 oz) + atrazine (1 pt) + Zaar (1pt)                                   | 6.5               | 0.0              | 250 abc                                        |
| 4                                                  | Empyros (48 oz) + atrazine (1.5 pt) + Zaar (1pt)                                     | 11.3              | 4.8              | 243 a-d                                        |
| 5                                                  | Armezon PRO (24 oz) + atrazine (1.5 pt) + Zaar (1pt)                                 | 8.0               | 0.5              | 256 ab                                         |
| 6                                                  | Empyros (64 oz) + atrazine (2 pt) + Zaar (1pt)                                       | 12.1              | 4.5              | 239 cd                                         |
| 7                                                  | Armezon PRO (32 oz) + atrazine (2 pt) + Zaar (1 pt)                                  | 8.0               | 0.8              | 252 abc                                        |
| 8                                                  | Armezon PRO (20 oz) + atrazine (1 pt) + Zaar (1 pt)                                  | 7.8               | 0.5              | 257 a                                          |
| 9                                                  | Impact Core (28 oz) + atrazine (1 pt) + Zaar (1 pt)                                  | 8.5               | 1.5              | 242 bcd                                        |
| 10                                                 | Impact Core (22.5 oz) + atrazine (1 pt) + Zaar (1 pt)                                | 8.3               | 1.0              | 243 a-d                                        |
| <b>Two-Pass – PRE (5/24) <i>fb</i> POST (6/11)</b> |                                                                                      |                   |                  |                                                |
| 11                                                 | Fearless (14 oz) <i>fb</i><br>Katagon (3.2 oz) + Destiny HC 1% v/v                   | 2.5               | 0.5              | 253 abc                                        |
| 12                                                 | Fearless (14 oz) <i>fb</i><br>Katagon (3.2 oz) + atrazine (2 pt) + Destiny HC 1% v/v | 7.0               | 2.5              | 242 bcd                                        |
| <b>LSD (<math>\alpha=0.10</math>)</b>              |                                                                                      | <b>1.2</b>        | <b>1.2</b>       | <b>14</b>                                      |
| <b>p value</b>                                     |                                                                                      | <b>&lt;0.001</b>  | <b>&lt;0.001</b> | <b>&lt;0.001</b>                               |

<sup>a</sup>Crop injury symptoms at 6/18 rating included leaf necrosis and leaf bleaching. Empyros treatments had both bleaching and necrosis; Armezon PRO and Impact Core had necrosis; Katagon had bleaching and minor necrosis.

<sup>b</sup>Crop injury was rated for corn stunting at the 7/7 rating.

<sup>c</sup>Yield values with the same letter are not significantly different.

**Project Goal:** Evaluate the residual control of troublesome weeds with single and multiple SOA herbicide products commonly used in corn production systems in Wisconsin.

#### Site Description:

|  | <b>Trial #:</b>                                | <b>21-ROK-CN11</b> | <b>21-LAN-CN11</b> |
|--|------------------------------------------------|--------------------|--------------------|
|  | <b>Location:</b>                               | Janesville, WI     | Lancaster, WI      |
|  | <b>Field #:</b>                                | 3                  | SIDS-SW            |
|  | <b>Soil Type:</b>                              | Plano silt loam    | Fayette silt loam  |
|  | <b>Soil Texture % sand/silt/clay:</b>          | 8/66/26            | -                  |
|  | <b>% OM:</b>                                   | 3.3                | 2.5                |
|  | <b>pH:</b>                                     | 6.7                | 7.2                |
|  | <b>Fertilization:</b>                          | 180 lb N/acre      | 115 lb N/acre      |
|  | <b>Previous Crop:</b>                          | soybean            | soybean            |
|  | <b>Tillage:</b>                                | conventional       | conventional       |
|  | <b>Hybrid:</b>                                 | NK 9653-5222EZ     | B97T04SXE          |
|  | <b>Planting Date:</b>                          | 4/26               | 4/28               |
|  | <b>Emergence Date:</b>                         | 5/11               | 5/11               |
|  | <b>Seeding Rate (seeds acre<sup>-1</sup>):</b> | 35,000             | 32,500             |
|  | <b>Depth:</b>                                  | 2.25 in            | 1.75 in            |
|  | <b>Row Spacing:</b>                            | 30 in              | 30 in              |
|  | <b>Plot Size:</b>                              | 10 x 30 ft         | 10 x 30 ft         |

#### Herbicide Application Information:

|  |                                       |            |            |
|--|---------------------------------------|------------|------------|
|  | <b>Date:</b>                          | 4/27       | 4/29       |
|  | <b>Treatment:</b>                     | PRE (A)    | PRE (A)    |
|  | <b>Air Temp (°F):</b>                 | 88         | 66         |
|  | <b>2" Soil Temp (°F):</b>             | 72         | 64         |
|  | <b>Soil moisture [surface]:</b>       | dry        | dry        |
|  | <b>RH %:</b>                          | 36         | 30         |
|  | <b>Cloud cover %:</b>                 | 35         | 5          |
|  | <b>Wind speed (mph)/direction:</b>    | 3-7/NNE    | 11/NNE     |
|  | <b>Rainfall (in) 1 wk after APP:</b>  | 1.20       | 1.25       |
|  | <b>Rainfall (in) 2 wks after APP:</b> | 1.55       | 1.26       |
|  | <b>GPA:</b>                           | 15         | 15         |
|  | <b>PSI:</b>                           | 34         | 35         |
|  | <b>Nozzle:</b>                        | TTI 110015 | TTI 110015 |

| Trt # | Treatment            | Formulation | SOA Group | Rate        | App Timing | App Code |
|-------|----------------------|-------------|-----------|-------------|------------|----------|
| 1     | Untreated Check      |             |           |             |            |          |
| 2     | Diflexx              | 4 lb ae/gal | 4         | 16 fl oz/a  | PRE        | A        |
| 3     | AAtrex               | 4 lb/gal    | 5         | 2 pt/a      | PRE        | A        |
| 4     | Princep 4FL          | 4 lb/gal    | 5         | 2 qt/a      | PRE        | A        |
| 5     | Harness              | 7 lb/gal    | 15        | 2 pt/a      | PRE        | A        |
| 6     | Dual II Magnum       | 7.64 lb/gal | 15        | 1.67 pt/a   | PRE        | A        |
| 7     | Balance Flexx        | 2 lb/gal    | 27        | 4.5 fl oz/a | PRE        | A        |
| 8     | Callisto             | 4 lb/gal    | 27        | 5 fl oz/a   | PRE        | A        |
| 9     | Harness Max          | 3.85 lb/gal | 15, 27    | 2 qt/a      | PRE        | A        |
| 10    | Corvus               | 2.63 lb/gal | 2, 27     | 5.6 fl oz/a | PRE        | A        |
| 11    | Bicep Lite II Magnum | 6 lb/gal    | 5, 15     | 1.75 qt/a   | PRE        | A        |
| 12    | Harness Xtra         | 6 lb/gal    | 5, 15     | 2 qt/a      | PRE        | A        |
| 13    | Verdict              | 5.57 lb/gal | 14, 15    | 15 fl oz/a  | PRE        | A        |
| 14    | Hornet WDG           | 78.5% w/w   | 2, 4      | 4 oz/a      | PRE        | A        |
| 15    | Acuron Flexi         | 3.26 lb/gal | 15, 27    | 2 qt/a      | PRE        | A        |
| 16    | Acuron               | 3.44 lb/gal | 5, 15, 27 | 2.5 qt/a    | PRE        | A        |
| 17    | Surestart II         | 4.25 lb/gal | 2, 4, 15  | 2.5 pt/a    | PRE        | A        |
| 18    | Resicore             | 3.29 lb/gal | 4, 15, 27 | 2.5 qt/a    | PRE        | A        |
| 19    | <b>Maverick*</b>     | 2.04 lb/gal | 4, 15, 27 | 1 qt/a      | PRE        | A        |

\***Maverick** is a suspension concentrate that contains 0.523 lb clopyralid, 0.825 lb mesotrione, and 0.690 lb of pyroxasulfone per gallon. Maverick is not yet registered for use at the time of publication of this report.

#### Rate equivalents of herbicide premixes at rates used in trial.

| Herbicide Premix     | Rate        | Rate Equivalents (rate acre <sup>-1</sup> )                                           |
|----------------------|-------------|---------------------------------------------------------------------------------------|
| Harness Max          | 2 qt/a      | 2 pt Harness + 5.3 fl oz Callisto                                                     |
| Corvus               | 5.6 fl oz/a | 5.3 fl oz Balance Flexx + 0.525 oz ai thienencarbazone                                |
| Bicep Lite II Magnum | 1.75 qt/a   | 1.53 pt Dual II Magnum + 2.34 pt AAtrex 4L                                            |
| Harness Xtra         | 2 qt/a      | 2.46 pt Harness + 1.7 pt AAtrex 4L                                                    |
| Verdict              | 15 fl oz/a  | 3 fl oz Sharpen + 12.5 fl oz Outlook                                                  |
| Hornet WDG           | 4 oz/a      | 0.93 oz Python + 5.3 fl oz Stinger                                                    |
| Acuron Flexi         | 2 qt/a      | 1.5 pt Dual II Magnum + 5.1 fl oz Callisto + 0.64 oz bicyclopyrone                    |
| Acuron               | 2.5 qt/a    | 1.4 pt Dual II Magnum + 4.8 fl oz Callisto + 1.25 pt AAtrex 4L + 0.6 oz bicyclopyrone |
| Surestart II         | 2.5 pt/a    | 1.34 pt Harness + 3.8 fl oz Stinger + 0.75 oz Python                                  |
| Resicore             | 2.5 qt/a    | 2 pt Harness + 6 fl oz Callisto + 5.1 fl oz Stinger                                   |
| Maverick             | 1 qt/a      | 5.3 fl oz Zidua SC + 6.6 fl oz Callisto + 5.6 fl oz Stinger                           |

**Trial Summary:**

This study was a joint effort between the [UW-Madison Nutrient and Pest Management Program](#) (NPM; Dan Smith) and the WiscWeed team. The purpose of this study was to evaluate and demonstrate the efficacy of multiple PRE-emergence corn herbicides on difficult to control weed species like giant ragweed and waterhemp. Treatments consisted of PRE-emergence corn herbicides containing one, two and three different active ingredients and/or sites of action. Since we wanted to evaluate the residual activity of the PRE-emergence herbicide treatments throughout the season, no POST-emergence herbicides were sprayed to the research plots. Our intent was not to promote one product versus another, instead, demonstrate the value of using an effective PRE-emergence herbicide program.

The trial was conducted at two locations in southern Wisconsin: Rock County Farm near Janesville, WI and Lancaster Agricultural Research Station near Lancaster, WI. Giant ragweed was the predominant species at the Janesville location and the population consists of a biotype with a prolonged emergence pattern as emergence typically starts in mid- to late-April and continues well into June. Waterhemp and common lambsquarters were the predominant species at the Lancaster location.

While these results should be taken with a grain of salt (only one year of data), they clearly indicate the value of PRE-emergence herbicides and the residual programs that don't work so well. This study will be replicated at both locations in 2022.

**Key Take Home Points from 2021 Data:**

- Several of the PRE-emergence corn herbicides evaluated provided adequate levels of giant ragweed control (>70%) 23 days after application (Table 7).
- Giant ragweed control was poor for most herbicides at 42 days after application (Table 7).
  - Demonstrates that a 1-pass herbicide program is not recommended for giant ragweed control
- Treatments containing mesotrione (Callisto) had longer residual control of giant ragweed than most other herbicides. Verdict also provided similar levels of control as mesotrione containing products.
- Herbicides with 2 or more active ingredients/sites of action generally improved residual control of giant ragweed.
- All herbicides provided excellent control of common lambsquarters 21 DAT (Table 7).
- Most of the herbicides evaluated provide excellent control (>90%) of waterhemp, even at 41 days after application (Table 7).

Plot photos from throughout the growing season are available at [Evaluation of Corn PRE-Emergence Herbicides](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 7.** Weed control visual ratings (%) for trials #21-ROK-CN11 at Brooklyn, WI and #21-LAN-CN11 at Lancaster, WI

| Trt #                                 | Herbicide (rate acre <sup>-1</sup> ) | Janesville, WI     |                  | Lancaster, WI      |                    |                  |
|---------------------------------------|--------------------------------------|--------------------|------------------|--------------------|--------------------|------------------|
|                                       |                                      | AMBTR <sup>b</sup> |                  | AMATA <sup>b</sup> | CHEAL <sup>b</sup> |                  |
|                                       |                                      | 23 DAT             | 42 DAT           | 41 DAT             | 21 DAT             | 41 DAT           |
| 1                                     | Untreated Check                      | 0                  | 0                | 0                  | 0                  | 0                |
| <b>One-Pass PRE</b>                   |                                      |                    |                  |                    |                    |                  |
| 2                                     | Diflexx (16 fl oz)                   | 79                 | 48               | 44                 | 100                | 65               |
| 3                                     | AAtrex (2 pt)                        | 13                 | 20               | 49                 | 100                | 98               |
| 4                                     | Princep 4FL (2 qt)                   | 9                  | 22               | 60                 | 100                | 98               |
| 5                                     | Harness (2 pt)                       | 60                 | 39               | 100                | 100                | 77               |
| 6                                     | Dual II Magnum (1.67 pt)             | 6                  | 14               | 93                 | 100                | 65               |
| 7                                     | Balance Flexx (4.5 fl oz)            | 33                 | 26               | 92                 | 100                | 91               |
| 8                                     | Callisto (5 fl oz)                   | 57                 | 66               | 100                | 100                | 96               |
| 9                                     | Harness Max (2 qt)                   | 72                 | 56               | 100                | 100                | 100              |
| 10                                    | Corvus (5.6 fl oz)                   | 59                 | 58               | 89                 | 100                | 93               |
| 11                                    | Bicep Lite II Magnum (1.75 qt)       | 18                 | 26               | 95                 | 100                | 99               |
| 12                                    | Harness Xtra (2 qt)                  | 68                 | 51               | 100                | 100                | 99               |
| 13                                    | Verdict (15 fl oz)                   | 80                 | 72               | 94                 | 100                | 80               |
| 14                                    | Hornet WDG (4 oz)                    | 80                 | 53               | 57                 | 99                 | 98               |
| 15                                    | Acuron Flexi (2 qt)                  | 78                 | 78               | 98                 | 100                | 98               |
| 16                                    | Acuron (2.5 qt)                      | 82                 | 78               | 100                | 100                | 100              |
| 17                                    | Surestart II (2.5 pt)                | 81                 | 36               | 98                 | 100                | 93               |
| 18                                    | Resicore (2.5 qt)                    | 87                 | 72               | 100                | 100                | 100              |
| 19                                    | Maverick <sup>c</sup> (1 qt)         | 79                 | 68               | 100                | 100                | 100              |
| <b>LSD (<math>\alpha=0.10</math>)</b> |                                      | <b>12</b>          | <b>23</b>        | <b>17</b>          | <b>ns</b>          | <b>8</b>         |
| <b>p value</b>                        |                                      | <b>&lt;0.001</b>   | <b>&lt;0.001</b> | <b>&lt;0.001</b>   | <b>0.159</b>       | <b>&lt;0.001</b> |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

<sup>b</sup>AMBTR, giant ragweed; AMATA, common waterhemp; CHEAL, common lambsquarters

<sup>c</sup>Maverick is a suspension concentrate that contains 0.523 lb clopyralid, 0.825 lb mesotrione, and 0.690 lb of pyroxasulfone per gallon. Maverick is not yet registered for use at the time of publication of this report.

**Project Goal:** Evaluate differences in weed control and crop safety among 2-pass programs containing Acuron GT and other competitor programs.

#### Site Description:

|                       |                       |                        |                   |
|-----------------------|-----------------------|------------------------|-------------------|
| <b>Location:</b>      | Janesville, WI        | <b>Crop:</b>           | Corn              |
| <b>Field #:</b>       | 3                     | <b>Hybrid:</b>         | NK9653-5222 EZ    |
| <b>Soil type:</b>     | Plano silt loam       | <b>Planting Date:</b>  | 4/26              |
| <b>% OM:</b>          | 3.3                   | <b>Emergence Date:</b> | 5/11              |
| <b>pH:</b>            | 6.9                   | <b>Population:</b>     | 35,000 seeds/acre |
| <b>Fertilization:</b> | 180 lbs N/acre        | <b>Depth:</b>          | 2.25 in           |
| <b>Previous crop:</b> | Soybean               | <b>Row spacing:</b>    | 30 in             |
| <b>Tillage:</b>       | conventional          | <b>Plot Size:</b>      | 10 x 30 ft        |
| <b>Weed species:</b>  | giant ragweed (AMBTR) |                        |                   |

#### Herbicide Application Information:

|                                      |            |            |
|--------------------------------------|------------|------------|
| <b>Date:</b>                         | 4/27       | 5/26       |
| <b>Treatment:</b>                    | PRE (A)    | POST (B)   |
| <b>Air Temp (°F):</b>                | 88         | 73         |
| <b>2" Soil Temp (°F):</b>            | 72         | 68         |
| <b>Soil moisture [surface]:</b>      | dry        | moist      |
| <b>RH %:</b>                         | 36         | 58         |
| <b>Cloud cover %</b>                 | 35         | 0          |
| <b>Wind speed (mph)/direction</b>    | 3-7/NNE    | 5-11       |
| <b>Rainfall (in) 1 wk after APP:</b> | 1.2"       | 0.5"       |
| <b>GPA:</b>                          | 15         | 15         |
| <b>PSI:</b>                          | 34         | 34         |
| <b>Nozzle:</b>                       | TTI 110015 | TTI 110015 |
| <b>Nozzle spacing (in):</b>          | 20         | 20         |
| <b>Boom Height (in):</b>             | 20         | 23         |

#### Crop and weed information at application:

|                      |                 |      |                      |
|----------------------|-----------------|------|----------------------|
|                      | <b>Date:</b>    | 4/27 | 5/26                 |
| <b>Corn</b>          | <b>Height:</b>  | -    | 8-10"                |
|                      | <b>Stage:</b>   | -    | V3/V4                |
| <b>Giant ragweed</b> | <b>Height:</b>  | -    | 0.5-4"               |
|                      | <b>Density:</b> | -    | 56-72/m <sup>2</sup> |

| Trt # | Treatment            | Formulation  | SOA Group | Rate         | App Timing | App Code |
|-------|----------------------|--------------|-----------|--------------|------------|----------|
| 1     | Untreated Check      |              |           |              |            |          |
| 2     | Bicep Lite II Magnum | 6 lb/gal     | 5, 15     | 1 qt/a       | A          | PRE      |
|       | Acuron GT            | 4.3 lb/gal   | 9, 15, 27 | 3.75 pt/a    | B          | POST     |
|       | NIS                  |              |           | 0.25% v/v    | B          | POST     |
|       | AMS                  |              |           | 2.5 qt/a     | B          | POST     |
| 3     | Lumax EZ             | 3.67 lb/gal  | 5, 15, 27 | 1.5 qt/a     | A          | PRE      |
|       | Acuron GT            | 4.3 lb/gal   | 9, 15, 27 | 3.75 pt/a    | B          | POST     |
|       | NIS                  |              |           | 0.25% v/v    | B          | POST     |
|       | AMS                  |              |           | 2.5 qt/a     | B          | POST     |
| 4     | SureStart II         | 4.25 lb/gal  | 2, 4, 15  | 1.75 pt      | A          | PRE      |
|       | Acuron GT            | 4.3 lb/gal   | 9, 15, 27 | 3.75 pt/a    | B          | POST     |
|       | NIS                  |              |           | 0.25% v/v    | B          | POST     |
|       | AMS                  |              |           | 2.5 qt/a     | B          | POST     |
| 5     | Harness              | 7 lb/gal     | 15        | 1.5 pt/a     | A          | PRE      |
|       | Acuron GT            | 4.3 lb/gal   | 9, 15, 27 | 3.75 pt/a    | B          | POST     |
|       | NIS                  |              |           | 0.25% v/v    | B          | POST     |
|       | AMS                  |              |           | 2.5 qt/a     | B          | POST     |
| 6     | Verdict              | 5.57 lb/gal  | 14, 15    | 14 fl oz/a   | A          | PRE      |
|       | Acuron GT            | 4.3 lb/gal   | 9, 15, 27 | 3.75 pt/a    | B          | POST     |
|       | NIS                  |              |           | 0.25% v/v    | B          | POST     |
|       | AMS                  |              |           | 2.5 qt/a     | B          | POST     |
| 7     | Surestart II         | 4.25 lb/gal  | 2, 4, 15  | 1.75 pt/a    | A          | PRE      |
|       | Resicore             | 3.29 lb/gal  | 4, 15, 27 | 1.25 qt/a    | B          | POST     |
|       | Roundup PowerMAX II  | 4.5 lbae/gal | 9         | 26.6 fl oz/a | B          | POST     |
|       | AMS                  |              |           | 2.5 qt/a     | B          | POST     |
| 8     | Harness              | 7 lb/gal     | 15        | 1.5 pt/a     | A          | PRE      |
|       | Laudis               | 3.5 lb/gal   | 27        | 3 fl oz/a    | B          | POST     |
|       | Roundup PowerMAX II  | 4.5 lbae/gal | 9         | 26.6 fl oz/a | B          | POST     |
|       | Superb HC            |              |           | 0.5% v/v     | B          | POST     |
|       | AMS                  |              |           | 2.5 qt/a     | B          | POST     |
| 9     | Verdict              | 5.57 lb/gal  | 2, 4, 15  | 10 fl oz/a   | A          | PRE      |
|       | Armezon PRO          | 5.35 lb/gal  | 15, 27    | 18 fl oz/a   | B          | POST     |
|       | Roundup PowerMAX II  | 4.5 lbae/gal | 9         | 26.6 fl oz/a | B          | POST     |
|       | AMS                  |              |           | 2.5 qt/a     | B          | POST     |
| 10    | Acuron Flexi XR      | 3.13 lb/gal  | 15, 27    | 3 qt/a       | A          | PRE      |
| 11    | Acuron XR            | 3.54 lb/gal  | 5, 15, 27 | 3 qt/a       | A          | PRE      |
| 12    | Harness Max          | 3.85 lb/gal  | 15, 27    | 75 fl oz/a   | A          | PRE      |
| 13    | Acuron               | 3.44 lb/gal  | 5, 15, 27 | 3 qt/a       | A          | PRE      |
| 14    | Harness Max          | 3.85 lb/gal  | 15, 27    | 37.5 fl oz/a | A          | PRE      |
|       | Harness Max          | 3.85 lb/gal  | 15, 27    | 37.5 fl oz/a | B          | POST     |
|       | Roundup PowerMAX II  | 4.5 lbae/gal | 9         | 26.6 fl oz/a | B          | POST     |
|       | AMS                  |              |           | 2.5% v/v     | B          | POST     |
| 15    | Acuron               | 3.44 lb/gal  | 5, 15, 27 | 1.5 qt/a     | A          | PRE      |
|       | Acuron               | 3.44 lb/gal  | 5, 15, 27 | 1.5 qt/a     | B          | POST     |
|       | Roundup PowerMAX II  | 4.5 lbae/gal | 9         | 26.5 fl oz/a | B          | POST     |
|       | AMS                  |              |           | 2.5% v/v     | B          | POST     |

**Adjuvants:** AMS = Amsol (liquid AMS); NIS = Prefer 90; Superb HC = high surfactant oil concentrate (HSOC)

**Trial Summary:**

This trial evaluated differences in weed control and crop safety among 2-pass programs containing Acuron GT and other competitor programs. **Acuron GT** is a new premix for corn containing bicyclopyrone (27), mesotrione (27), s-metolachlor (15), and glyphosate (9). Acuron GT does NOT contain atrazine. Acuron GT will have a similar utility as Halex GT. **Acuron XR** and **Acuron Flexi XR** are new formulations of Acuron and Acuron Flexi that contain higher concentrations of S-metolachlor and mesotrione. Both products are not yet registered for use as of 2021.

There was not any significant corn injury from the PRE herbicides (data not shown). All POST herbicide treatments had some leaf necrosis (burn) at 7 and 28 days after application (Table 8).

Giant ragweed was the predominant species and density in this trial was extremely high. 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 8). Most of the PRE herbicides evaluated were effective at suppressing giant ragweed growth prior to the POST application. The higher rate of Verdict, Acuron, Acuron XR, and Acuron Flexi XR provided the best early season residual control (79-88%). Harness MAX, Lumax EZ, SureStart II, and the lower rates of Acuron and Verdict did suppress early season giant ragweed growth (~61-74% control). All POST herbicide programs were effective at controlling giant ragweed plants emerged at application (data not shown); however, by 29 days after application no program provided >81% control. Several giant ragweed seedlings emerged after the POST application and were not controlled by the herbicides. End-of-season control was poor for all two-pass herbicide programs (28-62%). End-of-season control for the one-pass PRE only programs was 11-33%. The extremely high giant ragweed density in this trial would have required a 3-pass herbicide program to achieve acceptable levels of control. It is reasonable to expect that several of these programs would perform much better in a more typical field setting with lower weed infestation levels.

Corn yield was significantly impacted by herbicide program,  $p < 0.001$  (Table 8). Yield was poor across all herbicide programs. The untreated check only yielded 3 bu/acre, indicating the very high giant ragweed density and competition in this trial. Averaged across all treatments, yield of the 2-pass PRE *fb* POST programs = 135 bu/acre and PRE only = 70 bu/acre. Among the 2-pass programs, yields were generally higher in treatments that had greater PRE residual control early in the season.

Plot photos from throughout the growing season are available at [Evaluation of Acuron GT in a Two-Pass System](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 8.** Corn injury, weed control ratings, and corn grain yield for trial #21-ROK-CN13 at Janesville, WI.

| Trt #                                       | Herbicide (rate acre <sup>-1</sup> )                                                         | Crop Injury (%) <sup>c</sup> |                  | Giant Ragweed <sup>a</sup> (%) |                  |                  |                  | Yield <sup>b</sup><br>bu acre <sup>-1</sup> |
|---------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------|------------------|--------------------------------|------------------|------------------|------------------|---------------------------------------------|
|                                             |                                                                                              | 6/2                          | 6/23             | 5/26                           | 6/23             | 7/20             | 11/3             |                                             |
| 1                                           | Untreated Check                                                                              | 0                            | 0                | 0                              | 0                | 0                | 0                | 3 i                                         |
| <b>One-Pass – PRE (4/27)</b>                |                                                                                              |                              |                  |                                |                  |                  |                  |                                             |
| 10                                          | Acuron Flexi XR (3 qt)                                                                       | 0.3                          | 0.3              | 80                             | 53               | 16               | 28               | 81 g                                        |
| 11                                          | Acuron XR (3 qt)                                                                             | 0                            | 0                | 87                             | 60               | 22               | 33               | 81 g                                        |
| 12                                          | Harness Max (75 fl oz)                                                                       | 0                            | 0                | 71                             | 25               | 11               | 11               | 28 h                                        |
| 13                                          | Acuron (3 qt)                                                                                | 0.3                          | 1.5              | 88                             | 60               | 21               | 26               | 88 fg                                       |
| <b>Two-Pass – PRE (4/27) fb POST (5/36)</b> |                                                                                              |                              |                  | <b>POST APP</b>                |                  |                  |                  |                                             |
| 2                                           | Bicep Lite II Magnum (1 qt) <b>fb</b><br>Acuron GT (3.75 pt) + NIS 0.25% v/v + AMS (2.5 qt)  | 5.3                          | 6.0              | 11                             | 75               | 44               | 47               | 135 bcd                                     |
| 3                                           | Lumax EZ (1.5 qt) <b>fb</b><br>Acuron GT (3.75 pt) + NIS 0.25% v/v + AMS (2.5 qt)            | 4.8                          | 6.0              | 67                             | 81               | 49               | 62               | 161 a                                       |
| 4                                           | Surestart II (1.75 pt) <b>fb</b><br>Acuron GT (3.75 pt) + NIS 0.25% v/v + AMS (2.5 qt)       | 5.8                          | 5.5              | 64                             | 70               | 38               | 38               | 123 de                                      |
| 5                                           | Harness (1.5 pt) <b>fb</b><br>Acuron GT (3.75 pt) + NIS 0.25% v/v + AMS (2.5 qt)             | 5.3                          | 5.8              | 29                             | 74               | 41               | 48               | 134 bcd                                     |
| 6                                           | Verdict (14 fl oz) <b>fb</b><br>Acuron GT (3.75 pt) + NIS 0.25% v/v + AMS (2.5 qt)           | 6.0                          | 5.8              | 79                             | 81               | 52               | 53               | 146 abc                                     |
| 7                                           | Surestart II (1.75 pt) <b>fb</b><br>Resicore (1.25 qt) + Roundup PM (26.6 oz) + AMS (2.5 qt) | 5.8                          | 5.5              | 74                             | 80               | 52               | 55               | 149 ab                                      |
| 8                                           | Harness (1.5 pt) <b>fb</b><br>Laudis (3 oz)+Roundup PM (26.6 oz)+Superb HC 0.5% v/v          | 4.0                          | 4.3              | 24                             | 65               | 28               | 28               | 107 ef                                      |
| 9                                           | Verdict (10 fl oz) <b>fb</b><br>Armezon PRO(18 oz)+Roundup PM(26.6 oz)+AMS(2.5 qt)           | 7.3                          | 4.8              | 61                             | 79               | 45               | 37               | 124 de                                      |
| 14                                          | Harness Max (37.5 oz) <b>fb</b><br>Harness Max(37.5 oz)+Roundup PM(26.6 oz)+AMS 2.5% v/v     | 5.3                          | 6.0              | 64                             | 76               | 43               | 38               | 127 cd                                      |
| 15                                          | Acuron (1.5 qt) <b>fb</b><br>Acuron (1.5 qt) + Roundup PM (26.6 oz) + AMS 2.5% v/v           | 6.8                          | 6.0              | 68                             | 80               | 46               | 53               | 148 ab                                      |
| <b>LSD (<math>\alpha=0.10</math>)</b>       |                                                                                              | <b>1.1</b>                   | <b>1.1</b>       | <b>12</b>                      | <b>6</b>         | <b>9</b>         | <b>10</b>        | <b>19</b>                                   |
| <b>p value</b>                              |                                                                                              | <b>&lt;0.001</b>             | <b>&lt;0.001</b> | <b>&lt;0.001</b>               | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b>                            |

<sup>a</sup> Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup> Yield values with the same letter are not significantly different.<sup>c</sup> Crop injury symptoms included leaf necrosis.

**Project Goal:** Evaluate Reviton for control of weeds in a burndown management situation.

#### Site Description:

|                       |                                                                                         |                        |                   |
|-----------------------|-----------------------------------------------------------------------------------------|------------------------|-------------------|
| <b>Location:</b>      | Arlington, WI                                                                           | <b>Crop:</b>           | Corn              |
| <b>Field #:</b>       | 452                                                                                     | <b>Hybrid:</b>         | B97T04SXE         |
| <b>Soil type:</b>     | Plano silt loam                                                                         | <b>Planting Date:</b>  | 5/21              |
| <b>% OM:</b>          | 3.2                                                                                     | <b>Emergence Date:</b> | 5/31              |
| <b>pH:</b>            | 6.7                                                                                     | <b>Population:</b>     | 36,000 seeds/acre |
| <b>Fertilization:</b> | 225 lbs urea/acre<br>100 lbs AMS/acre                                                   | <b>Depth:</b>          | 2 in              |
| <b>Previous crop:</b> | Soybean                                                                                 | <b>Row spacing:</b>    | 30 in             |
| <b>Tillage:</b>       | no-till                                                                                 | <b>Plot Size:</b>      | 10 x 25 ft        |
| <b>Weed species:</b>  | glyphosate resistant marestail (ERICA); dandelion (TAROF); common lambsquarters (CHEAL) |                        |                   |

#### Herbicide Application Information:

|                                      |              |
|--------------------------------------|--------------|
| <b>Date:</b>                         | 5/12         |
| <b>Treatment:</b>                    | Burndown (A) |
| <b>Air Temp (°F):</b>                | 66           |
| <b>2" Soil Temp (°F):</b>            | 65           |
| <b>Soil moisture [surface]:</b>      | dry          |
| <b>RH %:</b>                         | 20           |
| <b>Cloud cover %</b>                 | 40           |
| <b>Wind speed (mph)/direction</b>    | 0-2          |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.3"         |
| <b>GPA:</b>                          | 15           |
| <b>PSI:</b>                          | 34           |
| <b>Nozzle:</b>                       | TT 110015    |
| <b>Nozzle spacing (in):</b>          | 20           |
| <b>Boom Height (in):</b>             | 23           |

#### Crop and weed information at application:

|                      |                  |                     |
|----------------------|------------------|---------------------|
|                      | <b>Date:</b>     | 5/12                |
| <b>Corn</b>          | <b>Height:</b>   | -                   |
|                      | <b>Stage:</b>    | -                   |
| <b>Marestail</b>     | <b>Height:</b>   | 0.5-2"              |
|                      | <b>Density:</b>  | 2-8/ft <sup>2</sup> |
| <b>Dandelion</b>     | <b>Diameter:</b> | 1-7"                |
|                      | <b>Density:</b>  | 0-2/ft <sup>2</sup> |
| <b>Lambsquarters</b> | <b>Height:</b>   | 1-2"                |
|                      | <b>Density:</b>  | 2-5/ft <sup>2</sup> |

| Trt # | Treatment           | Formulation  | SOA Group | Rate           | App Timing | App Code |
|-------|---------------------|--------------|-----------|----------------|------------|----------|
| 1     | Untreated Check     |              |           |                |            |          |
| 2     | Reviton             | 2.83 lb/gal  | 14        | 2 fl oz/a      | Burndown   | A        |
|       | Destiny HC          |              |           | 0.25% v/v      | Burndown   | A        |
| 3     | Reviton             | 2.83 lb/gal  | 14        | 1 fl oz/a      | Burndown   | A        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 22 fl oz/a     | Burndown   | A        |
|       | Destiny HC          |              |           | 0.25% v/v      | Burndown   | A        |
|       | AMS                 |              |           | 8.5 lb/100 gal | Burndown   | A        |
| 4     | Sharpen             | 2.85 lb/gal  | 14        | 1.5 fl oz/a    | Burndown   | A        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 22 fl oz/a     | Burndown   | A        |
|       | Destiny HC          |              |           | 0.25% v/v      | Burndown   | A        |
|       | AMS                 |              |           | 8.5 lb/100 gal | Burndown   | A        |
| 5     | Reviton             | 2.83 lb/gal  | 14        | 1 fl oz/a      | Burndown   | A        |
|       | Argos               | 4 lb/gal     | 27        | 5 fl oz/a      | Burndown   | A        |
|       | Fearless            | 7 lb/gal     | 15        | 2 pt/a         | Burndown   | A        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 22 fl oz/a     | Burndown   | A        |
|       | Destiny HC          |              |           | 0.25% v/v      | Burndown   | A        |
|       | AMS                 |              |           | 8.5 lb/100 gal | Burndown   | A        |

**Adjuvants:** AMS = BlueAg spray grade ammonium sulfate; Destiny HC = high surfactant oil concentrate (HSOC)

#### Trial Summary:

This trial evaluated Reviton for control of weeds in a burndown management situation before planting corn. Reviton (tiafenacil; group 14) is a relatively new herbicide offering from Helm Agro which can be used as part of a pre-plant burndown before corn, soybean, and wheat. Corn can be planted immediately after application. For this trial, corn was planted 9 days after the burndown application. There was no observable corn injury from any of the herbicide programs (data not shown).

Glyphosate-resistant marestail was the predominant weed species in the trial area. Dandelion and common lambsquarters were also rated for burndown control. Weed control was impacted by burndown herbicide program (Table 9). Initial control was excellent for all treatments across all 3 weed species 5 days after treatment (DAT); however, there was regrowth of previously controlled marestail and dandelion plants. Sharpen + Roundup outperformed Reviton and Reviton + Roundup in marestail control. Reviton + Argos + Roundup was similar to that of Sharpen + Roundup. If horseweed is present, an appropriate tank mix partner should be included with Reviton to achieve adequate control.

Plot photos from throughout the growing season are available at [Reviton Burndown Programs in Corn](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 9.** Weed control ratings for trial #21-ARL-CN15 at Arlington, WI.<sup>a</sup>

| Trt #                                       | Herbicide (rate acre <sup>-1</sup> )                                                                           | Marestail <sup>b</sup> (%) |              |                  | Dandelion (%) |                  |                  | Lambsquarters (%) |                  |                  |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------|--------------|------------------|---------------|------------------|------------------|-------------------|------------------|------------------|
|                                             |                                                                                                                | 5 DAT                      | 14 DAT       | 22 DAT           | 5 DAT         | 14 DAT           | 22 DAT           | 5 DAT             | 14 DAT           | 22 DAT           |
| 1                                           | Untreated Check                                                                                                | 0                          | 0            | 0                | 0             | 0                | 0                | 0                 | 0                | 0                |
| <b>One-Pass – Pre-plant Burndown (5/12)</b> |                                                                                                                |                            |              |                  |               |                  |                  |                   |                  |                  |
| 2                                           | Reviton (2 oz) + Destiny HC 0.25% v/v                                                                          | 99                         | 90           | 77               | 98            | 68               | 40               | 95                | 79               | 61               |
| 3                                           | Reviton (1 oz) + Roundup PM (22 oz) + Destiny HC 0.25% v/v + AMS <sup>c</sup>                                  | 99                         | 87           | 80               | 98            | 93               | 86               | 99                | 100              | 98               |
| 4                                           | Sharpen (1.5 oz) + Roundup PM (22 oz) + Destiny HC 0.25% v/v + AMS <sup>c</sup>                                | 100                        | 99           | 98               | 98            | 96               | 88               | 98                | 99               | 99               |
| 5                                           | Reviton (1 oz) + Argos (5 oz) + Fearless (2 pt) + Roundup PM (22 oz) + Destiny HC 0.25% v/v + AMS <sup>c</sup> | 97                         | 100          | 100              | 97            | 99               | 99               | 97                | 100              | 100              |
| <b>LSD (<math>\alpha=0.10</math>)</b>       |                                                                                                                | <b>1</b>                   | <b>6</b>     | <b>8</b>         | <b>2</b>      | <b>5</b>         | <b>10</b>        | <b>2</b>          | <b>3</b>         | <b>5</b>         |
| <b>p value</b>                              |                                                                                                                | <b>0.017</b>               | <b>0.005</b> | <b>&lt;0.001</b> | <b>0.447</b>  | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>0.032</b>      | <b>&lt;0.001</b> | <b>&lt;0.001</b> |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Marestail population is glyphosate resistant.<sup>c</sup>Spray grade AMS applied at 8.5 lb/100 gal.

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

#### Site Description:

|                       |                                                                   |                        |                   |
|-----------------------|-------------------------------------------------------------------|------------------------|-------------------|
| <b>Location:</b>      | Arlington, WI                                                     | <b>Crop:</b>           | Corn              |
| <b>Field #:</b>       | 453                                                               | <b>Hybrid:</b>         | DKC 54-38RIB      |
| <b>Soil type:</b>     | Plano silt loam                                                   | <b>Planting Date:</b>  | 5/8               |
| <b>% OM:</b>          | 3.8                                                               | <b>Emergence Date:</b> | 5/20              |
| <b>pH:</b>            | 5.9                                                               | <b>Population:</b>     | 34,500 seeds/acre |
| <b>Fertilization:</b> | 149 lbs N/acre                                                    | <b>Depth:</b>          | 2 in              |
| <b>Previous crop:</b> | Soybean                                                           | <b>Row spacing:</b>    | 30 in             |
| <b>Tillage:</b>       | conventional                                                      | <b>Plot Size:</b>      | 10 x 25 ft        |
| <b>Weed species:</b>  | common ragweed (AMBEL); velvetleaf (ABUTH); giant foxtail (SETFA) |                        |                   |

#### Herbicide Application Information:

|                                      |            |            |            |
|--------------------------------------|------------|------------|------------|
| <b>Date:</b>                         | 5/10       | 6/4        | 6/11       |
| <b>Treatment:</b>                    | PRE (A)    | EPOST (B)  | POST (C)   |
| <b>Air Temp (°F):</b>                | 64         | 68         | 79         |
| <b>2" Soil Temp (°F):</b>            | 59         | 66         | 77         |
| <b>Soil moisture [surface]:</b>      | dry        | dry        | very dry   |
| <b>RH %:</b>                         | 28         | 55         | 73         |
| <b>Cloud cover %</b>                 | 60         | 100        | 0          |
| <b>Wind speed (mph)/direction</b>    | 2-9/SW     | 6-10/SW    | 2-5/SE     |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.02"      | 0.20"      | 1.68"      |
| <b>GPA:</b>                          | 15         | 15         | 15         |
| <b>PSI:</b>                          | 35         | 35         | 34         |
| <b>Nozzle:</b>                       | TTI 110015 | TTI 110015 | TTI 110015 |
| <b>Nozzle spacing (in):</b>          | 20         | 20         | 20         |
| <b>Boom Height (in):</b>             | 20         | 22         | 24         |

#### Crop and weed information at application:

|                        |                 |      |                       |                      |
|------------------------|-----------------|------|-----------------------|----------------------|
|                        | <b>Date:</b>    | 5/10 | 6/4                   | 6/11                 |
| <b>Corn</b>            | <b>Height:</b>  | -    | 4 in                  | 10 in                |
|                        | <b>Stage:</b>   | -    | V3                    | V5                   |
| <b>common ragweed</b>  | <b>Height:</b>  | -    | 0.5-2.25 in           | 1-3 in               |
|                        | <b>Density:</b> | -    | 4-80/m <sup>2</sup>   | 0-17/m <sup>2</sup>  |
| <b>velvetleaf</b>      | <b>Height:</b>  | -    | 0.5-1.5 in            | 1-3 in               |
|                        | <b>Density:</b> | -    | 1-13/m <sup>2</sup>   | 0-1/m <sup>2</sup>   |
| <b>giant foxtail</b>   | <b>Height:</b>  | -    | 0.25-2.5 in           | 0.5-6 in             |
|                        | <b>Density:</b> | -    | 19-254/m <sup>2</sup> | 2-320/m <sup>2</sup> |
| <b>woolly cupgrass</b> | <b>Height:</b>  | -    | 0.25-2 in             | 0-5-6 in             |
|                        | <b>Density:</b> | -    | 0-53/m <sup>2</sup>   | 0-40/m <sup>2</sup>  |

| Trt # | Treatment           | Formulation  | SOA Group | Rate           | App Timing | App Code |
|-------|---------------------|--------------|-----------|----------------|------------|----------|
| 1     | Untreated Check     |              |           |                |            |          |
| 2     | Acuron Flexi        | 3.26 lb/gal  | 15, 27    | 2.25 qt/a      | PRE        | A        |
| 4     | Acuron GT           | 4.3 lb/gal   | 9, 15, 27 | 3.75 pt/a      | EPOST      | B        |
|       | NIS                 |              |           | 0.25% v/v      | EPOST      | B        |
|       | AMS                 |              |           | 8.5 lb/100 gal | EPOST      | B        |
| 5     | Acuron Flexi        | 3.26 lb/gal  | 15, 27    | 1.1 qt/a       | PRE        | A        |
|       | Acuron Flexi        | 3.26 lb/gal  | 15, 27    | 1.1 qt/a       | POST       | C        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 32 fl oz/a     | POST       | C        |
|       | AMS                 |              |           | 8.5 lb/100 gal | POST       | C        |
| 6     | Corvus              | 2.63 lb/gal  | 2, 27     | 5.6 fl oz/a    | PRE        | A        |
| 7     | Harness MAX         | 3.85 lb/gal  | 15, 27    | 1.5 qt/a       | EPOST      | B        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 32 fl oz/a     | EPOST      | B        |
|       | AMS                 |              |           | 8.5 lb/100 gal | EPOST      | B        |
| 8     | Harness             | 7 lb/gal     | 15        | 2 pt/a         | PRE        | A        |
|       | Capreno             | 3.45 lb/gal  | 3, 27     | 3 fl oz/a      | POST       | C        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 32 fl oz/a     | POST       | C        |
|       | AMS                 |              |           | 8.5 lb/100 gal | POST       | C        |
| 9     | TripleFlex II       | 4.25 lb/gal  | 2, 4, 15  | 2 pt/a         | PRE        | A        |
|       | Diflex Duo          | 2.13 lb/gal  | 4, 27     | 24 fl oz/a     | POST       | C        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 32 fl oz/a     | POST       | C        |
|       | Destiny HC          |              |           | 1% v/v         | POST       | C        |
|       | Class Act Ridion    |              |           | 1% v/v         | POST       | C        |
| 10    | SureStart II        | 4.25 lb/gal  | 2, 4, 15  | 2 pt/a         | PRE        | A        |
|       | Resicore            | 3.29 lb/gal  | 4, 15, 27 | 1.25 qt/a      | POST       | C        |
|       | Durango DMA         | 4 lbae/gal   | 9         | 32 fl oz/a     | POST       | C        |
|       | AMS                 |              |           | 8.5 lb/100 gal | POST       | C        |
| 11    | Surpass NXT         | 7 lb/gal     | 15        | 2 pt/a         | PRE        | A        |
|       | Resicore            | 3.29 lb/gal  | 4, 15, 27 | 1.25 qt/a      | POST       | C        |
|       | Durango DMA         | 4 lbae/gal   | 9         | 32 fl oz/a     | POST       | C        |
|       | AMS                 |              |           | 8.5 lb/100 gal | POST       | C        |
| 12    | Surpass NXT         | 7 lb/gal     | 15        | 2 pt/a         | PRE        | A        |
|       | Realm Q             | 38.75% w/w   | 2, 27     | 4 oz/a         | POST       | C        |
|       | Stinger             | 3 lbae/gal   | 4         | 4 fl oz/a      | POST       | C        |
|       | Durango DMA         | 4 lbae/gal   | 9         | 32 fl oz/a     | POST       | C        |
|       | AMS                 |              |           | 8.5 lb/100 gal | POST       | C        |
| 13    | Verdict             | 5.57 lb/gal  | 14, 15    | 10 fl oz/a     | PRE        | A        |
|       | Armezon PRO         | 5.35 lb/gal  | 15, 27    | 16 fl oz/a     | POST       | C        |
|       | Roundup PowerMAX    | 4.5 lbae/gal | 9         | 32 fl oz/a     | POST       | C        |
|       | COC                 |              |           | 1% v/v         | POST       | C        |
|       | AMS                 |              |           | 8.5 lb/100 gal | POST       | C        |

| Trt # | Treatment        | Formulation  | SOA Group | Rate           | App Timing | App Code |
|-------|------------------|--------------|-----------|----------------|------------|----------|
| 14    | Verdict          | 5.57 lb/gal  | 14, 15    | 16 fl oz/a     | PRE        | A        |
|       | Status           | 56% w/w      | 4         | 4 oz/a         | POST       | C        |
|       | Roundup PowerMAX | 4.5 lbae/gal | 9         | 32 fl oz/a     | POST       | C        |
|       | COC              |              |           | 1% v/v         | POST       | C        |
|       | AMS              |              |           | 8.5 lb/100 gal | POST       | C        |
| 15    | Verdict          | 5.57 lb/gal  | 14, 15    | 10 fl oz/a     | PRE        | A        |
|       | Callisto         | 4 lb/gal     | 27        | 3 fl oz/a      | POST       | C        |
|       | Zidua SC         | 4.17 lb/gal  | 15        | 3 fl oz/a      | POST       | C        |
|       | Roundup PowerMAX | 4.5 lbae/gal | 9         | 32 fl oz/a     | POST       | C        |
|       | COC              |              |           | 1% v/v         | POST       | C        |
|       | AMS              |              |           | 8.5 lb/100 gal | POST       | C        |
| 16    | 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       | C        |
|       | Roundup PowerMAX | 4.5 lbae/gal | 9         | 32 fl oz/a     | POST       | C        |
|       | COC              |              |           | 1% v/v         | POST       | C        |
|       | AMS              |              |           | 8.5 lb/100 gal | POST       | C        |
| 17    | Restraint        | 6.5 lb/gal   | 15, 27    | 30 fl oz/a     | PRE        | A        |
|       | Princep 4FL      | 4 lb/gal     | 5         | 1 qt/a         | PRE        | A        |
|       | Restraint        | 6.5 lb/gal   | 15, 27    | 18 fl oz/a     | POST       | C        |
|       | COC              |              |           | 1% v/v         | POST       | C        |
|       | AMS              |              |           | 8.5 lb/100 gal | POST       | C        |
| 19    | <b>Maverick*</b> | 2.04 lb/gal  | 4, 15, 27 | 1 qt/a         | PRE        | A        |
|       | Roundup PowerMAX | 4.5 lbae/gal | 9         | 32 fl oz/a     | POST       | C        |
|       | AMS              |              |           | 8.5 lb/100 gal | POST       | C        |
| 20    | Fearless         | 7 lb/gal     | 15        | 2 pt/a         | PRE        | A        |
|       | Katagon          | 2 lb/gal     | 2, 27     | 3.2 fl oz/a    | POST       | C        |
|       | Destiny HC       |              |           | 1% v/v         | POST       | C        |
| 21    | Untreated Check  |              |           |                |            |          |

**Adjuvants:** AMS = BlueAg spray grade ammonium sulfate; COC = Crop Oil; Destiny HC = high surfactant oil concentrate (HSOC); Class Act Ridion = non-AMS water conditioner + NIS; NIS = Prefer 90

**\*Maverick** is a suspension concentrate that contains 0.523 lb clopyralid, 0.825 lb mesotrione, and 0.690 lb of pyroxasulfone per gallon. Maverick is not yet registered for use at the time of publication of this report.

**Trial Summary:**

This trial evaluated 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 purpose of this study was to evaluate corn herbicide performance on weed species other than giant ragweed and waterhemp.

None of the PRE herbicides caused visible corn injury symptoms 22 days after application (data not shown). There was ~5-8% frost damage (necrotic leaf tips and margins) at this time due to temperature dropping below 32° F on the night of May 29th. There was minor leaf necrosis 13 days after EPOST and 6 days after the POST applications in 4 of the treatments: Harness MAX - EPOST (trt 7); Resicore – POST (trt 10); and Callisto + Zidua SC - POST (trt 15) had ~4-5% injury. Restraint + Princep 4FL - POST (trt 17) had slightly greater leaf necrosis at 6%. Further corn growth was not significantly impacted as there were no further injury symptoms present 14 days after the POST application.

Several of the corn herbicide programs provided excellent season long control of both broadleaf (common ragweed, velvetleaf) and grass (giant foxtail, woolly cupgrass) weed species (Table 10). All treatments provided >90% control of common ragweed and velvetleaf at corn harvest. Both of the one-pass PRE only herbicide programs failed to adequately control giant foxtail and woolly cupgrass at corn harvest. 13 out of the 14 PRE followed by POST 2-pass herbicide programs had excellent end-of-season grass control. Both one-pass EPOST treatments had excellent broadleaf control and good-excellent grass control indicating that a one-pass EPOST herbicide program can be effective for season long weed control if timed appropriately and if difficult to control weeds like giant ragweed are not present in a conventional tillage system. A burndown application may be necessary in no-till or reduced tillage systems to start with a clean seedbed.

Corn grain yield differed amongst treatments (Table 10). In general yields amongst the one-pass EPOST and two-pass herbicide programs were statistically similar (average = 221 bu acre<sup>-1</sup>) with only a few exceptions. The PRE only treatments had significantly lower yield (average = 193 bu acre<sup>-1</sup>). Yield of the untreated check averaged 103 bu acre<sup>-1</sup>, a 47% and 53% reduction from the average of the PRE only and the EPOST/PRE fb POST programs respectively.

Plot photos from throughout the growing season are available at [Corn Herbicide Showcase](#) published on [wiscweeds.info](#).

**Table 10.** Weed control visual ratings and corn grain yield for trial #21-ARL-CN16 at Arlington, WI.<sup>a</sup>

| Trt # Herbicide (rate acre <sup>-1</sup> )                                                                                    | C. Ragweed (%)  |                 |                 | Velvetleaf (%) |                 |              | Annual Grass <sup>b</sup> (%) |                 |                 | Yield <sup>c</sup><br>bu acre <sup>-1</sup> |
|-------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|-----------------|----------------|-----------------|--------------|-------------------------------|-----------------|-----------------|---------------------------------------------|
|                                                                                                                               | 6/10            | 6/25            | 10/19           | 6/10           | 6/25            | 10/19        | 6/10                          | 6/25            | 10/19           |                                             |
| 1 Untreated Check                                                                                                             | 0               | 0               | 0               | 0              | 0               | 0            | 0                             | 0               | 0               | 95 e                                        |
| 21 Untreated Check                                                                                                            | 0               | 0               | 0               | 0              | 0               | 0            | 0                             | 0               | 0               | 111 e                                       |
| <b>One-Pass – PRE (5/10)</b>                                                                                                  |                 |                 |                 |                |                 |              |                               |                 |                 |                                             |
| 2 Acuron Flexi (2.25 qt)                                                                                                      | 93              | 79              | 91              | 100            | 99              | 100          | 88                            | 69              | 55              | 187 d                                       |
| 6 Corvus (5.6 oz)                                                                                                             | 98              | 96              | 95              | 100            | 100             | 100          | 92                            | 81              | 81              | 199 cd                                      |
| <b>One-Pass – EPOST (6/4)</b>                                                                                                 |                 |                 |                 |                |                 |              |                               |                 |                 |                                             |
| 4 Acuron GT (3.75 pt) + NIS 0.25% v/v + AMS <sup>d</sup>                                                                      | 100             | 99              | 100             | 100            | 100             | 100          | 100                           | 93              | 89              | 218 a-d                                     |
| 7 Harness MAX (1.5 qt) + Roundup PM (32 oz) + AMS                                                                             | 100             | 97              | 99              | 100            | 99              | 100          | 100                           | 97              | 92              | 221 abc                                     |
| <b>Two-Pass – PRE (5/10) fb POST (6/11)</b>                                                                                   |                 |                 |                 |                |                 |              |                               |                 |                 |                                             |
| 5 Acuron Flexi (1.1 qt) <b>fb</b><br>Acuron Flexi (1.1 qt) + Roundup PM (32 oz) + AMS                                         | 92              | 98              | 100             | 100            | 100             | 100          | 89                            | 99              | 99              | 215 a-d                                     |
| 8 Harness (2 pt) <b>fb</b><br>Capreno (3 oz) + Roundup PM (32 oz) + AMS                                                       | 96              | 100             | 100             | 96             | 100             | 100          | 95                            | 99              | 100             | 199 cd                                      |
| 9 TripleFlex II (2 pt) <b>fb</b><br>Diflexx Duo (24 oz) + Roundup PM (32 oz) +<br>Destiny HC 1% v/v + Class Act Ridion 1% v/v | 93              | 100             | 99              | 100            | 100             | 100          | 93                            | 97              | 96              | 208 bcd                                     |
| 10 SureStart II (2 pt) <b>fb</b><br>Resicore (1.25 qt) + Durango DMA (32 oz) + AMS                                            | 97              | 99              | 100             | 99             | 100             | 100          | 95                            | 100             | 100             | 219 a-d                                     |
| 11 Surpass NXT (2 pt) <b>fb</b><br>Resicore (1.25 qt) + Durango DMA (32 oz) + AMS                                             | 90              | 97              | 100             | 94             | 100             | 100          | 95                            | 100             | 100             | 214 bcd                                     |
| 12 Surpass NXT (2 pt) <b>fb</b><br>Realm Q (4 oz) + Stinger (4 oz) +<br>Durango DMA (32 oz) + AMS                             | 92              | 98              | 100             | 93             | 100             | 100          | 95                            | 99              | 98              | 218 a-d                                     |
| 13 Verdict (10 oz) <b>fb</b><br>Armezon PRO (16 oz) + Roundup PM (32 oz) +<br>COC 1% v/v + AMS                                | 84              | 97              | 99              | 99             | 100             | 100          | 83                            | 95              | 98              | 232 abc                                     |
| 14 Verdict (16 oz) <b>fb</b><br>Status (4 oz) + Roundup PM (32 oz) +<br>COC 1% v/v + AMS                                      | 90              | 99              | 99              | 100            | 100             | 100          | 91                            | 96              | 96              | 229 abc                                     |
| 15 Verdict (10 oz) <b>fb</b><br>Callisto (3 oz) + Zidua SC (3 oz) +<br>Roundup PM (32 oz) + COC 1% v/v + AMS                  | 86              | 97              | 100             | 100            | 100             | 100          | 77                            | 97              | 98              | 223 abc                                     |
| 16 Verdict (10 oz) + Callisto (3 oz) <b>fb</b><br>Armezon PRO (16 oz) + Roundup PM (32 oz) +<br>COC 1% v/v + AMS              | 87              | 99              | 100             | 100            | 100             | 100          | 83                            | 96              | 100             | 230 abc                                     |
| 17 Restraint (30 oz) + Princep 4FL (1 qt) <b>fb</b><br>Restraint (18 oz) + COC 1% v/v + AMS                                   | 80              | 100             | 100             | 95             | 99              | 100          | 50                            | 85              | 82              | 217 a-d                                     |
| 19 Maverick (1 qt) <b>fb</b><br>Roundup PM (32 oz) + AMS                                                                      | 93              | 99              | 100             | 96             | 100             | 100          | 77                            | 98              | 99              | 247 a                                       |
| 20 Fearless (2 pt) <b>fb</b><br>Katagon (3.2 oz) + Destiny HC 1%v/v                                                           | 93              | 97              | 99              | 93             | 96              | 97           | 95                            | 96              | 96              | 232 ab                                      |
| <b>LSD (<math>\alpha=0.10</math>)</b>                                                                                         | <b>7</b>        | <b>4</b>        | <b>3</b>        | <b>5</b>       | <b>1</b>        | <b>1</b>     | <b>9</b>                      | <b>3</b>        | <b>5</b>        | <b>33</b>                                   |
| <b>p value</b>                                                                                                                | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>0.071</b>   | <b>&lt;.001</b> | <b>0.003</b> | <b>&lt;.001</b>               | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>&lt;.001</b>                             |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Annual grass species in the trial area consisted of giant foxtail and woolly cupgrass. Giant foxtail was the predominant species.<sup>c</sup>Yield values with the same letter are not significantly different.<sup>d</sup>Spray grade AMS applied at 8.5 lb/100 gal.

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

| Site Description                              |                                |                       |                       |                    |
|-----------------------------------------------|--------------------------------|-----------------------|-----------------------|--------------------|
|                                               | Trial #:                       | 21-ARL-CN18           | 21-BRO-CN18           |                    |
|                                               | Location:                      | Arlington, WI         | Brooklyn, WI          |                    |
|                                               | Soil Type:                     | Plano silt loam       | Dresden loam          |                    |
| Soil Texture % sand/silt/clay:                |                                | 7 / 70 / 23           | 50 / 39 / 12          |                    |
| % OM:                                         |                                | 3.8                   | 1.2                   |                    |
| pH:                                           |                                | 5.9                   | 7.1                   |                    |
| Fertilization:                                |                                | 148 lb N/acre         | none                  |                    |
| Previous Crop:                                |                                | Soybean               | Corn                  |                    |
| Tillage:                                      |                                | conventional          | conventional          |                    |
| Hybrid :                                      |                                | DKC 54-36             | DKC 54-36             |                    |
| Planting Date:                                |                                | 5/10                  | 5/13                  |                    |
| Emergence Date:                               |                                | 5/20                  | 5/22                  |                    |
| Seeding Rate:                                 |                                | 34,500 seeds/acre     | 32,000 seeds/acre     |                    |
| Depth:                                        |                                | 2 in                  | 2 in                  |                    |
| Row Spacing:                                  |                                | 30 in                 | 30 in                 |                    |
| Plot Size:                                    |                                | 10 x 25 ft            | 10 x 25 ft            |                    |
| Herbicide Application Information             |                                |                       |                       |                    |
|                                               | Trial #:                       | 21-ARL-CN18           | 21-BRO-CN18           |                    |
|                                               | Date:                          | 5/10      6/10        | 5/14      6/10        |                    |
|                                               | Treatment:                     | PRE (A)      POST (B) | PRE (A)      POST (B) |                    |
|                                               | Air Temp (°F):                 | 64      98            | 72      87            |                    |
|                                               | 2" Soil Temp (°F):             | 59      92            | 65      80            |                    |
|                                               | Soil moisture [surface]:       | dry      dry          | dry      very dry     |                    |
|                                               | RH %:                          | 28      46            | 24      65            |                    |
|                                               | Cloud cover %:                 | 60      15            | 10      0             |                    |
|                                               | Wind speed (mph)/direction:    | 2-9/SW      0-5/NE    | 3-7/SE      0-1/W     |                    |
|                                               | Rainfall (in) 1 wk after APP:  | 0.02"      0.42"      | 0.83"      1.22"      |                    |
|                                               | Rainfall (in) 2 wks after APP: | 0.62"      3.22"      | 1.50"      3.22"      |                    |
|                                               | GPA:                           | 15                    | 15                    |                    |
|                                               | PSI:                           | 34                    | 34                    |                    |
|                                               | Nozzle:                        | TTI 110015            | TTI 110015            |                    |
| Crop and Weed Information at POST Application |                                |                       |                       |                    |
|                                               | Corn                           | Height<br>9-12 in     | Stage<br>V5           | Height<br>10-12 in |
|                                               |                                |                       |                       | Stage<br>V5        |
|                                               |                                | Height                | Density               | Height             |
|                                               | Waterhemp                      | -                     | -                     | 0.5-3 in           |
|                                               | Velvetleaf                     | 1-3 in                | 0-1/m²                | 1-3 in             |
|                                               | Common Ragweed                 | 1-3 in                | 0-17/m²               | -                  |
|                                               | Wild-proso Millet              | -                     | -                     | 0.5-4"             |
|                                               | Giant Foxtail                  | 1-6 in                | 2-360/m²              | -                  |

| 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        |
|       | Acuron Flexi    | 3.26 lb/gal | 15, 27    | 1.1 qt/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 4FL     | 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 4FL     | 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    | Harness        | 7 lb/gal    | 15        | 2 pt/a     | PRE        | A        |
|       | Princep 4FL    | 4 lb/gal    | 5         | 1 qt/a     | PRE        | A        |
|       | Shieldex       | 3.3 lb/gal  | 27        | 1 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    | Harness        | 7 lb/gal    | 15        | 2 pt/a     | PRE        | A        |
|       | Princep 4FL    | 4 lb/gal    | 5         | 1 qt/a     | PRE        | A        |
|       | Laudis         | 3.5 lb/gal  | 27        | 3 fl oz/a  | POST       | B        |
|       | Warrant        | 3 lb/gal    | 15        | 48 fl oz/a | POST       | B        |
|       | MSO            |             |           | 1% v/v     | POST       | B        |
|       | AMS            |             |           | 2 lb/a     | POST       | B        |
| 12    | Dual II Magnum | 7.64 lb/gal | 15        | 1.67 pt/a  | PRE        | A        |
|       | Princep 4FL    | 4 lb/gal    | 5         | 1 qt/a     | PRE        | A        |
|       | Callisto       | 4 lb/gal    | 27        | 3 fl 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        |

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

**Trial Summary:**

Trials were established in May 2021 at the Arlington Ag Research Station near Arlington, WI and 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. Atrazine was not included in any treatments as both locations were in atrazine prohibition areas. Corn grain yield data was only collected from the Arlington location.

There was no visible corn injury from any of the PRE herbicides evaluated at either location. At Arlington, there was visible corn stunting (~6-7%) 7 days after the POST application of Capreno (data not shown); however later corn development was not affected as no stunting was evident 14 days after application. At Brooklyn, there was corn "leaning" 8 days following the POST application in all treatments; however, it tended to be worse in treatments containing Status (data not shown). A storm had gone through the night prior to rating. Corn showed no leaning 14 days after application.

Several of the herbicide programs evaluated provided excellent control of broadleaf (waterhemp, common ragweed, velvetleaf) and grass weeds (giant foxtail, wild-proso millet) (Tables 11, 12). The PRE applications of Harness + Princep 4L and Dual II Magnum + Princep 4L did not provide adequate control of velvetleaf at Brooklyn where the velvetleaf population density was much higher than Arlington. The Dual II Magnum + Princep 4L treatment also did not adequately control giant foxtail and the Arlington location. Poor control was likely due to the lack of rain (0.02") 1 week following application as Dual will typically provide excellent grass control if properly activated. Giant foxtail control remained poor in treatment 12 following the POST application as the height and density was too great for Callisto to provide effective POST control.

Corn yield was similar for all treatments except for treatment 12 (Table 11). Giant foxtail control was very poor the entire growing season in this treatment and competition led to yield loss.

**Key Take Home Points from 2021 Data:**

- Glyphosate was not required to achieve excellent season-long control of troublesome weeds.
- Several of the herbicide programs evaluated provided excellent control of broadleaf (waterhemp, common ragweed, velvetleaf) and grass weeds (giant foxtail, wild-proso millet).
- An effective PRE-emergence herbicide is recommended to reduce early-season crop competition and weed density.
- Lower weed density at POST application can improve the efficacy of a POST herbicide program.

A complete report with plot photos from throughout the growing season is available on the [wiscweeds.info](https://wiscweeds.info) blog or as a PDF download at this link [Herbicide Programs for Conventional Corn](#).

**Table 11.** Weed control ratings and corn grain yield for trial #21-ARL-CN18 at the Arlington Ag Research Station near Arlington, WI.<sup>a</sup>

| Trt #                                              | Herbicide (rate acre <sup>-1</sup> )                                                                                         | Common Ragweed   |              |           | Velvetleaf   |                  |           | Giant Foxtail    |                  |                  | Yield <sup>b</sup><br>bu acre <sup>-1</sup> |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------|--------------|-----------|--------------|------------------|-----------|------------------|------------------|------------------|---------------------------------------------|
|                                                    |                                                                                                                              | 6/10             | 6/25         | 10/19     | 6/10         | 6/25             | 10/19     | 6/10             | 6/25             | 10/19            |                                             |
| 1                                                  | Untreated Check                                                                                                              | 0                | 0            | 0         | 0            | 0                | 0         | 0                | 0                | 0                | 158 c                                       |
| <b>Two-Pass – PRE (5/10) <i>fb</i> POST (6/10)</b> |                                                                                                                              |                  |              |           |              |                  |           |                  |                  |                  |                                             |
| 2                                                  | Harness MAX (2 qt) <i>fb</i><br>Capreno (3 oz) + Superb HC 0.5% v/v + AMS (2 lb)                                             | 98               | 100          | 100       | 100          | 100              | 100       | 99               | 95               | 97               | 249 a                                       |
| 3                                                  | Harness MAX (2 qt) <i>fb</i><br>Diflexx Duo (28 oz) + COC 1% v/v + AMS (2 lb)                                                | 98               | 100          | 100       | 99           | 100              | 100       | 99               | 89               | 83               | 242 a                                       |
| 4                                                  | Acuron Flexi (1.1 qt) <i>fb</i><br>Acuron Flexi (1.1 qt) + NIS 0.25% v/v + AMS (2 lb)                                        | 93               | 99           | 100       | 100          | 100              | 100       | 88               | 80               | 72               | 243 a                                       |
| 5                                                  | Verdict (16 oz) <i>fb</i><br>Armezon (1 oz) + Status (5 oz) + MSO 1% v/v + AMS (2 lb)                                        | 98               | 100          | 100       | 100          | 100              | 100       | 95               | 97               | 100              | 249 a                                       |
| 6                                                  | Verdict (10 oz) + Callisto (3 oz) <i>fb</i><br>Armezon PRO (16 fl oz) + MSO 1% v/v + AMS (2 lb)                              | 95               | 99           | 100       | 100          | 100              | 100       | 95               | 95               | 99               | 252 a                                       |
| 7                                                  | Surestart II (2 pt) <i>fb</i><br>Accent Q (0.9 oz) + Status (5 oz) + COC 1% v/v + AMS (2 lb)                                 | 99               | 100          | 100       | 98           | 99               | 99        | 98               | 97               | 99               | 247 a                                       |
| 8                                                  | Harness (2 pt) + Princep 4L (1 qt) <i>fb</i><br>Revulin Q (4 oz) + Status (5 oz) + COC 1% v/v + AMS (2 lb)                   | 98               | 100          | 100       | 98           | 100              | 100       | 99               | 98               | 100              | 247 a                                       |
| 9                                                  | Harness (2 pt) + Princep 4L (1 qt) <i>fb</i><br>Revulin Q (4 oz) + Status (5 oz) + Zidua SC (3 oz) + COC 1% v/v + AMS (2 lb) | 98               | 100          | 100       | 95           | 100              | 100       | 99               | 99               | 98               | 238 a                                       |
| 10                                                 | Harness (2 pt) + Princep 4L (1 qt) <i>fb</i><br>Shieldex (1 oz) + Accent Q (0.9 oz) + COC 1% v/v + AMS (2 lb)                | 98               | 100          | 100       | 94           | 97               | 99        | 99               | 98               | 100              | 248 a                                       |
| 11                                                 | Harness (2 pt) + Princep 4L (1 qt) <i>fb</i><br>Laudis (3 oz) + Warrant (48 oz) + MSO 1% v/v + AMS (2 lb)                    | 99               | 100          | 100       | 96           | 99               | 100       | 97               | 100              | 99               | 252 a                                       |
| 12                                                 | Dual II Magnum (1.67 pt) + Princep 4L (1 qt) <i>fb</i><br>Callisto (3 oz) + Status (5 oz) + COC 1% v/v + AMS (2 lb)          | 88               | 100          | 100       | 90           | 100              | 100       | 59               | 60               | 45               | 219 b                                       |
| <b>LSD (<math>\alpha=0.10</math>)</b>              |                                                                                                                              | <b>3</b>         | <b>1</b>     | <b>ns</b> | <b>4</b>     | <b>1</b>         | <b>ns</b> | <b>7</b>         | <b>2</b>         | <b>6</b>         | <b>15</b>                                   |
| <b>p value</b>                                     |                                                                                                                              | <b>&lt;0.001</b> | <b>0.036</b> | <b>ns</b> | <b>0.003</b> | <b>&lt;0.001</b> | <b>ns</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b>                            |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Yield values with the same letter are not significantly different.

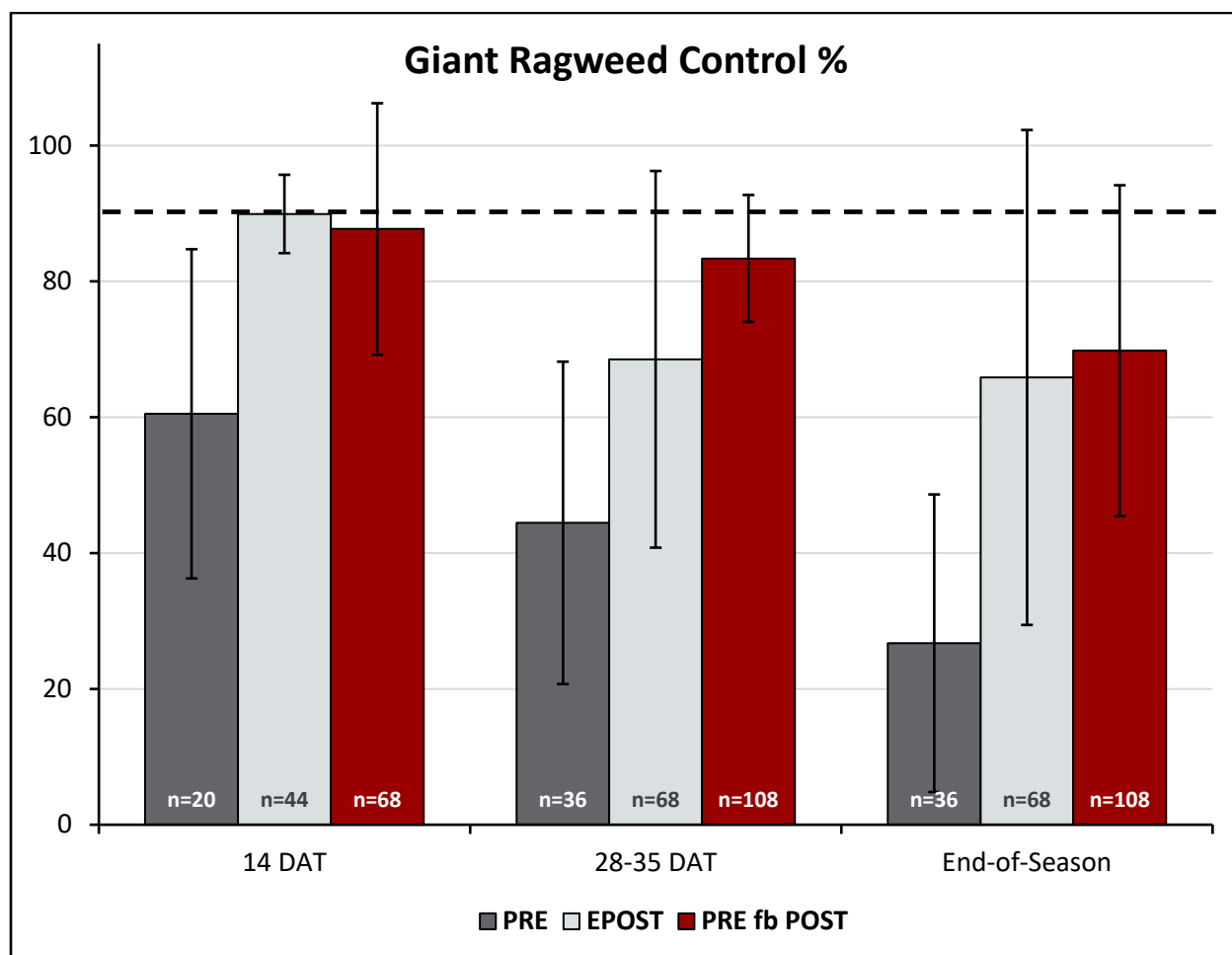
**Table 12.** Weed control ratings for trial #21-BRO-CN18 at Brooklyn, WI.<sup>a</sup>

| Trt #                                              | Herbicide (rate acre <sup>-1</sup> )                                                                                         | Waterhemp        |                  |                  | Velvetleaf       |              |              | Wild-Proso Millet |             |           |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|------------------|------------------|--------------|--------------|-------------------|-------------|-----------|
|                                                    |                                                                                                                              | 6/10             | 6/24             | 7/8              | 6/10             | 6/24         | 7/8          | 6/10              | 6/24        | 7/8       |
| 1                                                  | Untreated Check                                                                                                              | 0                | 0                | 0                | 0                | 0            | 0            | 0                 | 0           | 0         |
| <b>Two-Pass – PRE (5/14) <i>fb</i> POST (6/10)</b> |                                                                                                                              |                  |                  |                  |                  |              |              |                   |             |           |
| 2                                                  | Harness MAX (2 qt) <i>fb</i><br>Capreno (3 oz) + Superb HC 0.5% v/v + AMS (2 lb)                                             | 100              | 99               | 96               | 100              | 100          | 100          | 99                | 99          | 100       |
| 3                                                  | Harness MAX (2 qt) <i>fb</i><br>Diflexx Duo (28 oz) + COC 1% v/v + AMS (2 lb)                                                | 100              | 99               | 97               | 100              | 100          | 98           | 98                | 100         | 98        |
| 4                                                  | Acuron Flexi (1.1 qt) <i>fb</i><br>Acuron Flexi (1.1 qt) + NIS 0.25% v/v + AMS (2 lb)                                        | 92               | 82               | 83               | 100              | 100          | 100          | 95                | 98          | 98        |
| 5                                                  | Verdict (16 oz) <i>fb</i><br>Armezon (1 oz) + Status (5 oz) + MSO 1% v/v + AMS (2 lb)                                        | 95               | 97               | 93               | 100              | 100          | 100          | 97                | 100         | 100       |
| 6                                                  | Verdict (10 oz) + Callisto (3 oz) <i>fb</i><br>Armezon PRO (16 fl oz) + MSO 1% v/v + AMS (2 lb)                              | 98               | 92               | 90               | 100              | 100          | 100          | 93                | 100         | 99        |
| 7                                                  | Surestart II (2 pt) <i>fb</i><br>Accent Q (0.9 oz) + Status (5 oz) + COC 1% v/v + AMS (2 lb)                                 | 95               | 97               | 95               | 92               | 99           | 100          | 91                | 97          | 95        |
| 8                                                  | Harness (2 pt) + Princep 4L (1 qt) <i>fb</i><br>Revolin Q (4 oz) + Status (5 oz) + COC 1% v/v + AMS (2 lb)                   | 99               | 99               | 98               | 46               | 100          | 100          | 97                | 100         | 96        |
| 9                                                  | Harness (2 pt) + Princep 4L (1 qt) <i>fb</i><br>Revolin Q (4 oz) + Status (5 oz) + Zidua SC (3 oz) + COC 1% v/v + AMS (2 lb) | 100              | 100              | 100              | 45               | 100          | 100          | 99                | 99          | 99        |
| 10                                                 | Harness (2 pt) + Princep 4L (1 qt) <i>fb</i><br>Shieldex (1 oz) + Accent Q (0.9 oz) + COC 1% v/v + AMS (2 lb)                | 99               | 95               | 89               | 50               | 99           | 100          | 99                | 100         | 100       |
| 11                                                 | Harness (2 pt) + Princep 4L (1 qt) <i>fb</i><br>Laudis (3 oz) + Warrant (48 oz) + MSO 1% v/v + AMS (2 lb)                    | 97               | 98               | 94               | 46               | 100          | 98           | 97                | 100         | 100       |
| 12                                                 | Dual II Magnum (1.67 pt) + Princep 4L (1 qt) <i>fb</i><br>Callisto (3 oz) + Status (5 oz) + COC 1% v/v + AMS (2 lb)          | 76               | 97               | 90               | 20               | 100          | 100          | 96                | 95          | 96        |
| <b>LSD (<math>\alpha=0.10</math>)</b>              |                                                                                                                              | <b>4</b>         | <b>3</b>         | <b>6</b>         | <b>15</b>        | <b>1</b>     | <b>1</b>     | <b>4</b>          | <b>3</b>    | <b>ns</b> |
| <b>p value</b>                                     |                                                                                                                              | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>0.014</b> | <b>0.017</b> | <b>0.016</b>      | <b>0.07</b> | <b>ns</b> |

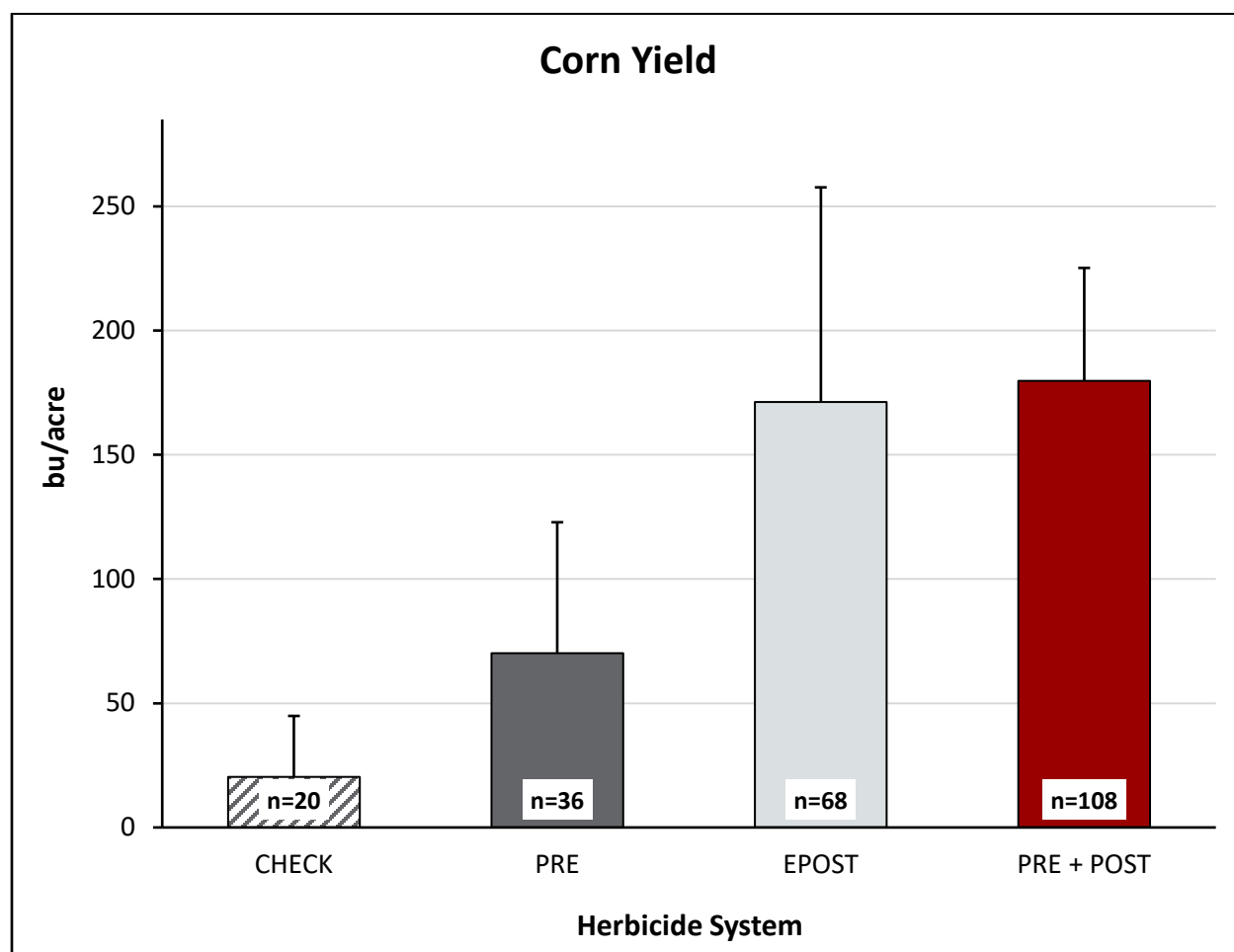
<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

**Multi-Trial Summary:**

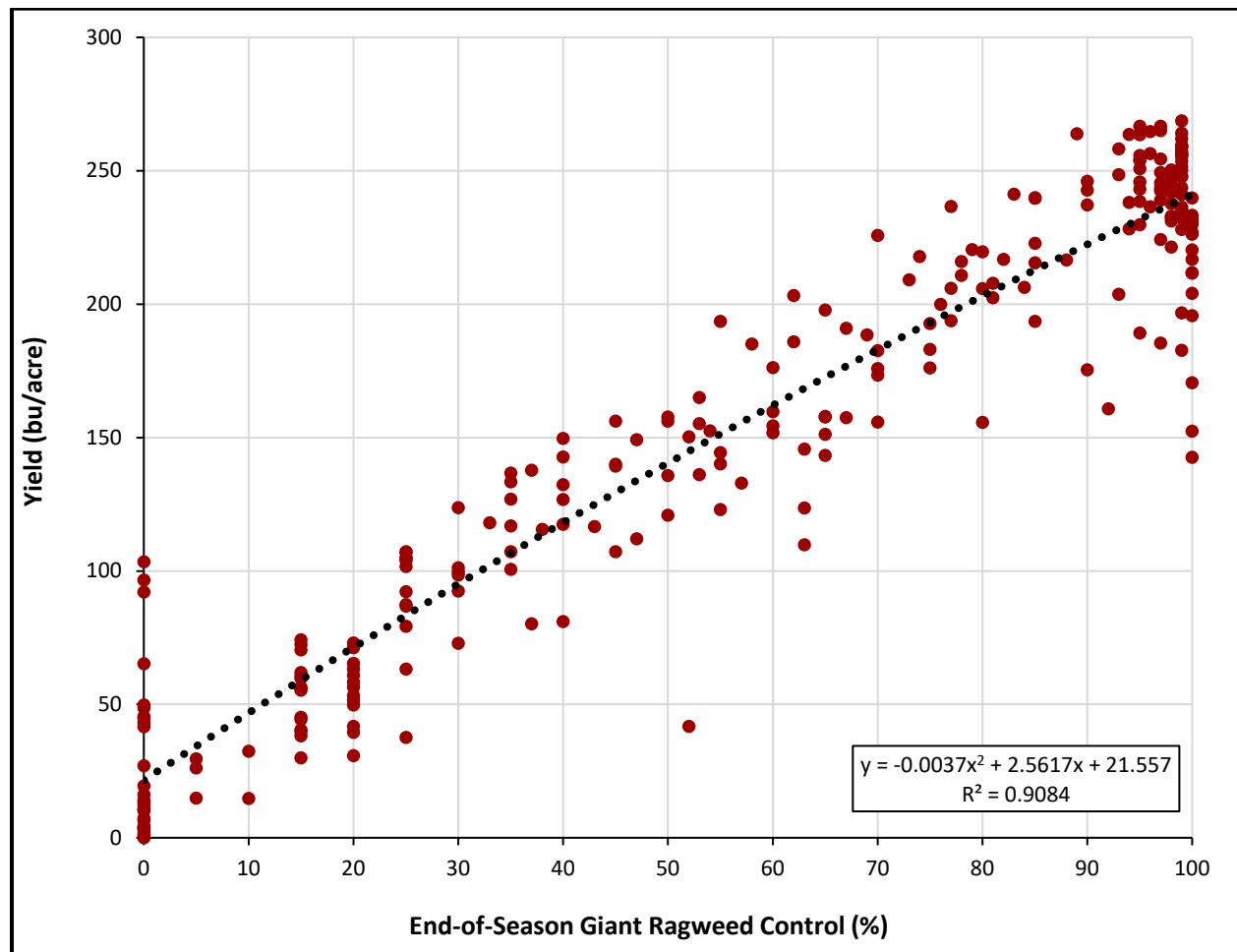
The following figures summarize giant ragweed control from some of the corn herbicide evaluation trials conducted in 2021 at the Rock County Farm in Janesville, WI. Giant ragweed at the Rock County Farm is a biotype with a prolonged emergence pattern as emergence typically starts in mid- to late-April and continues well into June. Treatments were grouped by one of three herbicide systems: 1-pass preemergence (PRE), 1-PASS early-postemergence (EPOST), and 2-pass (PRE *fb* POST). There were varying levels of effectiveness among the herbicides within each system, but by grouping we can get a better sense of what systems perform best on average. To see how certain herbicides or herbicide tank mixes perform see individual trial data presented in this report.



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



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



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

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

#### Site Description:

|                       |                                                                                                 |                        |                    |
|-----------------------|-------------------------------------------------------------------------------------------------|------------------------|--------------------|
| <b>Location:</b>      | Arlington, WI                                                                                   | <b>Crop:</b>           | Soybean            |
| <b>Field #:</b>       | 362                                                                                             | <b>Variety:</b>        | AG20XF1            |
| <b>Soil type:</b>     | Plano silt loam                                                                                 | <b>Planting Date:</b>  | 5/12               |
| <b>% OM:</b>          | 3.8                                                                                             | <b>Emergence Date:</b> | 5/20               |
| <b>pH:</b>            | 6.6                                                                                             | <b>Population:</b>     | 140,000 seeds/acre |
| <b>Fertilization:</b> | -                                                                                               | <b>Depth:</b>          | 1.5 in             |
| <b>Previous crop:</b> | Corn                                                                                            | <b>Row spacing:</b>    | 30 in              |
| <b>Tillage:</b>       | conventional                                                                                    | <b>Plot Size:</b>      | 10 x 30 ft         |
| <b>Weed species:</b>  | common ragweed (AMBEL); velvetleaf (ABUTH); common lambsquarters (CHEAL); giant foxtail (SETFA) |                        |                    |

#### Herbicide Application Information:

|                                      |            |
|--------------------------------------|------------|
| <b>Date:</b>                         | 5/12       |
| <b>Treatment:</b>                    | PRE (A)    |
| <b>Air Temp (°F):</b>                | 70         |
| <b>2" Soil Temp (°F):</b>            | 65         |
| <b>Soil moisture [surface]:</b>      | dry        |
| <b>RH %:</b>                         | 24         |
| <b>Cloud cover %</b>                 | 40         |
| <b>Wind speed (mph)/direction</b>    | 2-6/ESE    |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.30"      |
| <b>GPA:</b>                          | 15         |
| <b>PSI:</b>                          | 30         |
| <b>Nozzle:</b>                       | TTI 110015 |
| <b>Nozzle spacing (in):</b>          | 20         |
| <b>Boom Height (in):</b>             | 20         |

| Trt # | Treatment          | Formulation   | SOA Group | Rate       | App Timing | App Code |
|-------|--------------------|---------------|-----------|------------|------------|----------|
| 1     | Untreated Check    |               |           |            |            |          |
| 2     | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal      | 5         | 8 fl oz/a  | PRE        | A        |
| 3     | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | PRE        | A        |
| 4     | Warrant Ultra      | 3.45 lb/gal   | 14, 15    | 50 fl oz/a | PRE        | A        |
| 5     | Fierce EZ          | 3.04 lb/gal   | 14, 15    | 6 fl oz/a  | PRE        | A        |
| 6     | Valor EZ           | 4 lb/gal      | 14        | 2 fl oz/a  | PRE        | A        |
| 7     | Authority MTZ      | 45% w/w       | 5, 14     | 10 oz/a    | PRE        | A        |
| 8     | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 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        |
| 9     | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 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        |
| 10    | 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        |
| 11    | Fierce EZ          | 3.04 lb/gal   | 14, 15    | 6 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        |
| 12    | Valor EZ           | 4 lb/gal      | 14        | 2 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        |
| 13    | Authority MTZ      | 45% w/w       | 5, 14     | 10 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.

**\*MON301668** is an experimental formulation of encapsulated acetochlor similar to Warrant herbicide with a higher active ingredient load per gallon of formulated product.

**Trial Summary:**

This trial evaluated the potential benefit of adding XtendiMax to the tank with traditional PRE herbicides. There was visible soybean injury (stunting) from all treatments containing flumioxazin 15 and 22 days after application (Table 13). Fierce EZ (flumioxazin + pyroxasulfone) had greater % stunting than Valor EX (flumioxazin). The addition of XtendiMax to Fierce EZ slightly increased soybean stunting relative to Fierce EZ alone.

The addition of XtendiMax to the tank with traditional PRE herbicides greatly improved large seeded broadleaf (common ragweed, velvetleaf) control of most treatments (Table 13). Averaged across all treatments, common ragweed control of PRE herbicides with XtendiMax was 99% vs 82% without XtendiMax 22 days after application. Similarly, velvetleaf control was 92% with vs 74% without 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. Results from this trial further supports this as only 0.30 inches of rainfall was received within one week of application. When paired with traditional PRE herbicides, there may be some added benefit of weed control in the interim between application and activating precipitation in dry springs.

Plot photos from throughout the growing season are available at [XtendiMax Paired Soil Residual Herbicide Programs](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 13.** Crop injury and weed control visual ratings for trial #21-ARL-SB01 at Arlington, WI.<sup>ab</sup>

| Trt # Herbicide (rate acre <sup>-1</sup> )                         | Injury <sup>c</sup> (%) |                  | AMBEL (%)        |                  | ABUTH (%)    |                  | CHEAL (%)    |                  | SETFA (%)    |              |
|--------------------------------------------------------------------|-------------------------|------------------|------------------|------------------|--------------|------------------|--------------|------------------|--------------|--------------|
|                                                                    | 15 DAT                  | 22 DAT           | 22 DAT           | 36 DAT           | 22 DAT       | 36 DAT           | 22 DAT       | 36 DAT           | 22 DAT       | 36 DAT       |
| 1 Untreated Check                                                  | 0                       | 0                | 0                | 0                | 0            | 0                | 0            | 0                | 0            | 0            |
| <b>One-Pass – PRE (5/12)</b>                                       |                         |                  |                  |                  |              |                  |              |                  |              |              |
| 2 MON 301668 (30 fl oz) + Mauler (8 fl oz)                         | 0.0                     | 0.0              | 94               | 81               | 79           | 61               | 98           | 95               | 100          | 98           |
| 8 MON 301668 (30 fl oz) + Mauler (8 fl oz) + XtendiMax (22 fl oz)* | 0.0                     | 0.0              | 99               | 97               | 88           | 90               | 100          | 100              | 100          | 96           |
| 3 MON 301668 (30 fl oz)                                            | 0.0                     | 0.0              | 83               | 59               | 71           | 34               | 96           | 73               | 99           | 99           |
| 9 MON 301668 (30 fl oz) + XtendiMax (22 fl oz)*                    | 0.0                     | 0.3              | 99               | 96               | 89           | 89               | 100          | 99               | 99           | 93           |
| 4 Warrant Ultra (50 fl oz)                                         | 0.0                     | 0.0              | 94               | 85               | 70           | 44               | 95           | 89               | 100          | 83           |
| 10 Warrant Ultra (50 fl oz) + XtendiMax (22 fl oz)*                | 0.0                     | 0.0              | 99               | 98               | 89           | 92               | 100          | 98               | 100          | 95           |
| 5 Fierce EZ (6 fl oz)                                              | 5.8                     | 9.8              | 81               | 73               | 98           | 97               | 99           | 97               | 98           | 88           |
| 11 Fierce EZ (6 fl oz) + XtendiMax (22 fl oz)*                     | 7.3                     | 12.0             | 99               | 96               | 100          | 100              | 100          | 99               | 100          | 96           |
| 6 Valor EZ (2 fl oz)                                               | 2.8                     | 5.8              | 77               | 53               | 83           | 83               | 99           | 92               | 93           | 62           |
| 12 Valor EZ (2 fl oz) + XtendiMax (22 fl oz)*                      | 2.8                     | 7.3              | 99               | 97               | 97           | 99               | 100          | 99               | 98           | 94           |
| 7 Authority MTZ (10 oz)                                            | 0.5                     | 0.3              | 62               | 31               | 44           | 46               | 96           | 87               | 68           | 47           |
| 13 Authority MTZ (10 oz) + XtendiMax (22 fl oz)*                   | 0.0                     | 0.0              | 99               | 97               | 89           | 93               | 100          | 100              | 95           | 88           |
| <b>LSD (<math>\alpha=0.10</math>)</b>                              | <b>0.9</b>              | <b>1.8</b>       | <b>13</b>        | <b>17</b>        | <b>22</b>    | <b>17</b>        | <b>3</b>     | <b>4</b>         | <b>13</b>    | <b>22</b>    |
| <b>p value</b>                                                     | <b>&lt;0.001</b>        | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>0.011</b> | <b>&lt;0.001</b> | <b>0.011</b> | <b>&lt;0.001</b> | <b>.0011</b> | <b>0.007</b> |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>AMBEL, common ragweed; ABUTH, velvetleaf; CHEAL, common lambsquarters; SETFA, giant foxtail.<sup>c</sup>Crop injury rated as % stunting relative to the untreated check.

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

**Project Goal:** Evaluate weed control and crop safety of MON 301668 vs key competitor herbicides.

**MON301668** is an experimental formulation of encapsulated acetochlor similar to Warrant herbicide with a higher active ingredient load per gallon of formulated product.

#### Site Description:

|                       |                                                                             |                        |                    |
|-----------------------|-----------------------------------------------------------------------------|------------------------|--------------------|
| <b>Location:</b>      | Arlington, WI                                                               | <b>Crop:</b>           | Soybean            |
| <b>Field #:</b>       | 454                                                                         | <b>Variety:</b>        | AG20XF1            |
| <b>Soil type:</b>     | Plano silt loam                                                             | <b>Planting Date:</b>  | 5/17               |
| <b>% OM:</b>          | 3.5                                                                         | <b>Emergence Date:</b> | -                  |
| <b>pH:</b>            | 6.7                                                                         | <b>Population:</b>     | 140,000 seeds/acre |
| <b>Fertilization:</b> | -                                                                           | <b>Depth:</b>          | 1.5 in             |
| <b>Previous crop:</b> | Corn                                                                        | <b>Row spacing:</b>    | 30 in              |
| <b>Tillage:</b>       | conventional                                                                | <b>Plot Size:</b>      | 10 x 25 ft         |
| <b>Weed species:</b>  | common ragweed (AMBEL); common lambsquarters (CHEAL); giant foxtail (SETFA) |                        |                    |

#### Herbicide Application Information:

|                                      |            |
|--------------------------------------|------------|
| <b>Date:</b>                         | 5/17       |
| <b>Treatment:</b>                    | PRE (A)    |
| <b>Air Temp (°F):</b>                | 77         |
| <b>2" Soil Temp (°F):</b>            | 73         |
| <b>Soil moisture [surface]:</b>      | very dry   |
| <b>RH %:</b>                         | 36         |
| <b>Cloud cover %</b>                 | 15         |
| <b>Wind speed (mph)/direction</b>    | 5-12/SE    |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.60"      |
| <b>GPA:</b>                          | 15         |
| <b>PSI:</b>                          | 34         |
| <b>Nozzle:</b>                       | TTI 110015 |
| <b>Nozzle spacing (in):</b>          | 20         |
| <b>Boom Height (in):</b>             | 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        |
|       | XtendiMax          | 2.89 lbae/gal | 4         | 22 fl oz/a | PRE        | A        |
|       | VaporGrip Xtra     |               |           | 20 fl oz/a | PRE        | A        |
| 3     | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 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        |
| 4     | Zidua              | 85% w/w       | 15        | 2 oz/a     | PRE        | A        |
|       | XtendiMax          | 2.89 lbae/gal | 4         | 22 fl oz/a | PRE        | A        |
|       | VaporGrip Xtra     |               |           | 20 fl oz/a | PRE        | A        |
| 5     | Outlook            | 6 lb/gal      | 15        | 14 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     | Dual II Magnum     | 7.64 lb/gal   | 15        | 1 pt/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            | 3 lb/gal      | 15        | 48 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal      | 5         | 8 fl oz/a  | PRE        | A        |
| 8     | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal      | 5         | 8 fl oz/a  | PRE        | A        |
| 9     | Zidua              | 85% w/w       | 15        | 2 oz/a     | PRE        | A        |
|       | Mauler             | 4 lb/gal      | 5         | 8 fl oz/a  | PRE        | A        |
| 10    | Outlook            | 6 lb/gal      | 15        | 14 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal      | 5         | 8 fl oz/a  | PRE        | A        |
| 11    | Dual II Magnum     | 7.64 lb/gal   | 15        | 1 pt/a     | PRE        | A        |
|       | Mauler             | 4 lb/gal      | 5         | 8 fl oz/a  | PRE        | A        |
| 12    | 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        |
| 13    | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 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        |
| 14    | Zidua              | 85% w/w       | 15        | 2 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        |

**Adjuvants:** VaporGrip Xtra = volatility reducing agent.

**\*MON301668** is an experimental formulation of encapsulated acetochlor similar to Warrant herbicide with a higher active ingredient load per gallon of formulated product.

| Trt # | Treatment      | Formulation   | SOA Group | Rate       | App Timing | App Code |
|-------|----------------|---------------|-----------|------------|------------|----------|
| 15    | Outlook        | 6 lb/gal      | 15        | 14 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        |
| 16    | Dual II Magnum | 7.64 lb/gal   | 15        | 1 pt/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        |

**Adjuvants:** VaporGrip Xtra = volatility reducing agent.

### Trial Summary:

This trial evaluated the weed control and crop safety of MON 301668 in various tank mixes against key competitor group 15 herbicides and commercial Warrant. There was no visible soybean injury attributable to any of the herbicide treatments 15 and 23 days after application (data not shown).

Weed control of MON 301668 was similar to that of commercial Warrant and other competitor group 15 herbicides (Table 14). The addition of XtendiMax to the tank improved common ragweed control relative to a group 15 + Mauler tank mix. This is similar to what was observed in trial [#21-ARL-SB01](#). XtendiMax herbicide has been shown to provide a short period of residual control of broadleaf weeds in dry springs with very little required moisture for activation. Results from this trial further supports this as only 0.60 inches of rainfall was received within one week of application. Giant foxtail control was not significantly different among any of the treatments.

Plot photos from throughout the growing season are available at [MON 301668 Residual Weed Control and Crop Safety](#) published on [wiscweeds.info](#).

**Table 14.** Weed control visual ratings for trial #21-ARL-SB03 at Arlington, WI.<sup>ab</sup>

| Trt # Herbicide (rate acre <sup>-1</sup> )                          | AMBEL (%)        |                  | CHEAL (%)        |                  | SETFA (%)    |              |
|---------------------------------------------------------------------|------------------|------------------|------------------|------------------|--------------|--------------|
|                                                                     | 23 DAT           | 36 DAT           | 23 DAT           | 36 DAT           | 23 DAT       | 36 DAT       |
| 1 Untreated Check                                                   | 0                | 0                | 0                | 0                | 0            | 0            |
| <b>One-Pass – PRE (5/12)</b>                                        |                  |                  |                  |                  |              |              |
| 2 Warrant (48 fl oz) + XtendiMax (22 fl oz)*                        | 98               | 96               | 93               | 93               | 99           | 100          |
| 7 Warrant (48 fl oz) + Mauler (8 fl oz)                             | 89               | 80               | 92               | 92               | 94           | 91           |
| 12 Warrant (48 fl oz) + Mauler (8 fl oz) + XtendiMax (22 fl oz)*    | 98               | 96               | 95               | 92               | 100          | 98           |
| 3 MON 301668 (30 fl oz) + XtendiMax (22 fl oz)*                     | 100              | 96               | 98               | 97               | 100          | 98           |
| 8 MON 301668 (30 fl oz) + Mauler (8 fl oz)                          | 88               | 81               | 97               | 93               | 99           | 95           |
| 13 MON 301668 (30 fl oz) + Mauler (8 fl oz) + XtendiMax (22 fl oz)* | 100              | 99               | 97               | 94               | 100          | 98           |
| 4 Zidua (2 oz) + XtendiMax (22 fl oz)*                              | 100              | 99               | 95               | 96               | 100          | 99           |
| 9 Zidua (2 oz) + Mauler (8 fl oz)                                   | 84               | 65               | 94               | 93               | 96           | 93           |
| 14 Zidua (2 oz) + Mauler (8 fl oz) + XtendiMax (22 fl oz)*          | 100              | 97               | 96               | 94               | 100          | 99           |
| 5 Outlook (14 fl oz) + XtendiMax (22 fl oz)*                        | 99               | 98               | 97               | 97               | 100          | 98           |
| 10 Outlook (14 fl oz) + Mauler (8 fl oz)                            | 86               | 72               | 97               | 90               | 96           | 93           |
| 15 Outlook (14 fl oz) + Mauler (8 fl oz) + XtendiMax (22 fl oz)*    | 99               | 98               | 97               | 95               | 99           | 98           |
| 6 Dual II Magnum (1 pt) + XtendiMax (22 fl oz)*                     | 99               | 98               | 93               | 93               | 99           | 99           |
| 11 Dual II Magnum (1 pt) + Mauler (8 fl oz)                         | 84               | 59               | 93               | 89               | 96           | 93           |
| 16 Dual II Magnum (1 pt) + Mauler (8 fl oz) + XtendiMax (22 fl oz)* | 99               | 98               | 98               | 95               | 100          | 97           |
| <b>LSD (<math>\alpha=0.10</math>)</b>                               | <b>4</b>         | <b>18</b>        | <b>2</b>         | <b>3</b>         | <b>ns</b>    | <b>ns</b>    |
| <b>p value</b>                                                      | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>0.175</b> | <b>0.128</b> |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

<sup>b</sup>AMBEL, common ragweed; CHEAL, common lambsquarters; SETFA, giant foxtail.

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

**Project Goal:** Evaluate multiple herbicide programs to provide recommendations for XtendFlex soybean weed management.

#### Site Description:

|                       |                                                                                                   |                        |                    |
|-----------------------|---------------------------------------------------------------------------------------------------|------------------------|--------------------|
| <b>Location:</b>      | Brooklyn, WI                                                                                      | <b>Crop:</b>           | XtendFlex soybean  |
| <b>Field #:</b>       | OB-1                                                                                              | <b>Variety:</b>        | AG20XF1            |
| <b>Soil type:</b>     | Kegonsa silt loam                                                                                 | <b>Planting Date:</b>  | 5/25               |
| <b>% OM:</b>          | 2                                                                                                 | <b>Emergence Date:</b> | 6/2                |
| <b>pH:</b>            | 7.1                                                                                               | <b>Population:</b>     | 140,000 seeds/acre |
| <b>Fertilization:</b> | -                                                                                                 | <b>Depth:</b>          | 1.25 in            |
| <b>Previous crop:</b> | Seed Corn                                                                                         | <b>Row spacing:</b>    | 30 in              |
| <b>Tillage:</b>       | conventional                                                                                      | <b>Plot Size:</b>      | 10 x 30 ft         |
| <b>Weed species:</b>  | gly-R waterhemp (AMATA); velvetleaf (ABUTH); common lambsquarters; (CHEAL); venice mallow (HIBTR) |                        |                    |

#### Herbicide Application Information:

|                                      |            |           |
|--------------------------------------|------------|-----------|
| <b>Date:</b>                         | 5/26       | 6/22      |
| <b>Treatment:</b>                    | PRE (A)    | POST (B)  |
| <b>Air Temp (°F):</b>                | 73         | 65        |
| <b>2" Soil Temp (°F):</b>            | 69         | 51        |
| <b>Soil moisture [surface]:</b>      | dry        | damp      |
| <b>RH %:</b>                         | 58         | 51        |
| <b>Cloud cover %</b>                 | 55         | 10        |
| <b>Wind speed (mph)/direction</b>    | 6-12/NW    | 3-10/W    |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.61"      | 3.21"     |
| <b>GPA:</b>                          | 15         | 15        |
| <b>PSI:</b>                          | 34         | 34        |
| <b>Nozzle:</b>                       | TTI 110015 | TT*/TTI** |
| <b>Nozzle spacing (in):</b>          | 20         | 20        |
| <b>Boom Height (in):</b>             | 20         | 24        |

\*Used TT 110015 nozzles for all treatments without XtendiMax.

\*\*Used TTI 110015 nozzles for all treatments with XtendiMax.

#### Crop and weed information at application:

|                      |              |      |                     |
|----------------------|--------------|------|---------------------|
|                      | <b>Date:</b> | 5/26 | 6/22                |
| <b>Soybean</b>       | Height:      | -    | -                   |
|                      | Stage:       | -    | V3                  |
| <b>waterhemp</b>     | Height:      | -    | 0.5-5"              |
|                      | Density:     | -    | 0-36/m <sup>2</sup> |
| <b>velvetleaf</b>    | Height:      | -    | 1-4"                |
|                      | Density:     | -    | 0-4/m <sup>2</sup>  |
| <b>lambsquarters</b> | Height:      | -    | 1-3"                |
|                      | Density:     | -    | 0-4/m <sup>2</sup>  |
| <b>venice mallow</b> | Height:      | -    | 0.5-2"              |
|                      | Density:     | -    | 0-36/m <sup>2</sup> |

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

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

| Trt # | Treatment          | Formulation  | SOA Group | Rate       | App Timing | App Code |
|-------|--------------------|--------------|-----------|------------|------------|----------|
| 1     | Check              |              |           |            |            |          |
| 2     | XtendiMax          | 2.9 lbae/gal | 4         | 22 fl oz/a | PRE        | A        |
|       | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal     | 5         | 8 fl oz/a  | PRE        | A        |
|       | VaporGrip Xtra     |              |           | 20 fl oz/a | PRE        | A        |
|       | XtendiMax          | 2.9 lbae/gal | 4         | 22 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal | 9         | 30 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | POST       | B        |
|       | VaporGrip Xtra     |              |           | 20 fl oz/a | POST       | B        |
|       | Intact             |              |           | 0.5% v/v   | POST       | B        |
|       | Class Act Ridion   |              |           | 1% v/v     | POST       | B        |
| 3     | XtendiMax          | 2.9 lbae/gal | 4         | 22 fl oz/a | PRE        | A        |
|       | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal     | 5         | 8 fl oz/a  | PRE        | A        |
|       | VaporGrip Xtra     |              |           | 20 fl oz/a | PRE        | A        |
|       | Liberty            | 2.34 lb/gal  | 10        | 32 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal | 9         | 30 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | POST       | B        |
|       | AMS                |              |           | 2.5% v/v   | POST       | B        |
| 4     | XtendiMax          | 2.9 lbae/gal | 4         | 22 fl oz/a | PRE        | A        |
|       | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal     | 5         | 8 fl oz/a  | PRE        | A        |
|       | VaporGrip Xtra     |              |           | 20 fl oz/a | PRE        | A        |
|       | Liberty            | 2.34 lb/gal  | 10        | 32 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal | 9         | 30 fl oz/a | POST       | B        |
|       | AMS                |              |           | 2.5% v/v   | POST       | B        |
| 5     | XtendiMax          | 2.9 lbae/gal | 4         | 22 fl oz/a | PRE        | A        |
|       | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal     | 5         | 8 fl oz/a  | PRE        | A        |
|       | VaporGrip Xtra     |              |           | 20 fl oz/a | PRE        | A        |
|       | Liberty            | 2.34 lb/gal  | 10        | 32 fl oz/a | POST       | B        |
|       | Select Max         | 0.97 lb/gal  | 1         | 12 fl oz/a | POST       | B        |
|       | AMS                |              |           | 2.5% v/v   | POST       | B        |
| 6     | XtendiMax          | 2.9 lbae/gal | 4         | 22 fl oz/a | PRE        | A        |
|       | Fierce WDG         | 76% w/w      | 14, 15    | 3 oz/a     | PRE        | A        |
|       | VaporGrip Xtra     |              |           | 20 fl oz/a | PRE        | A        |
|       | Liberty            | 2.34 lb/gal  | 10        | 32 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal | 9         | 30 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | POST       | B        |
|       | AMS                |              |           | 2.5% v/v   | POST       | B        |

| Trt # | Treatment          | Formulation   | SOA Group | Rate       | App Timing | App Code |
|-------|--------------------|---------------|-----------|------------|------------|----------|
| 7     | XtendiMax          | 2.9 lbae/gal  | 4         | 22 fl oz/a | PRE        | A        |
|       | Fierce WDG         | 76% w/w       | 14, 15    | 3 oz/a     | PRE        | A        |
|       | VaporGrip Xtra     |               |           | 20 fl oz/a | PRE        | A        |
|       | XtendiMax          | 2.9 lbae/gal  | 4         | 22 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal  | 9         | 30 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | POST       | B        |
|       | Vapor Grip Xtra    |               |           | 20 fl oz/a | POST       | B        |
|       | Intact             |               |           | 0.5% v/v   | POST       | B        |
|       | Class Act Ridion   |               |           | 1% v/v     | POST       | B        |
| 8     | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal      | 5         | 8 fl oz/a  | PRE        | A        |
|       | XtendiMax          | 2.9 lbae/gal  | 4         | 22 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal  | 9         | 30 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | POST       | B        |
|       | Vapor Grip Xtra    |               |           | 20 fl oz/a | POST       | B        |
|       | Intact             |               |           | 0.5% v/v   | POST       | B        |
|       | Class Act Ridion   |               |           | 1% v/v     | POST       | B        |
|       |                    |               |           |            |            |          |
| 9     | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal      | 5         | 8 fl oz/a  | PRE        | A        |
|       | Liberty            | 2.34 lbae/gal | 10        | 32 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal  | 9         | 30 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | POST       | B        |
|       | AMS                |               |           | 2.5% v/v   | POST       | B        |
|       |                    |               |           |            |            |          |
| 10    | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal      | 5         | 8 fl oz/a  | PRE        | A        |
|       | Liberty            | 2.34 lb/gal   | 10        | 32 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal  | 9         | 30 fl oz/a | POST       | B        |
|       | AMS                |               |           | 2.5% v/v   | POST       | B        |
|       |                    |               |           |            |            |          |
| 11    | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal      | 5         | 8 fl oz/a  | PRE        | A        |
|       | Liberty            | 2.34 lb/gal   | 10        | 32 fl oz/a | POST       | B        |
|       | Select Max         | 0.97 lb/gal   | 1         | 12 fl oz/a | POST       | B        |
|       | AMS                |               |           | 2.5% v/v   | POST       | B        |
|       |                    |               |           |            |            |          |
| 12**  | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal      | 5         | 8 fl oz/a  | PRE        | A        |
|       | Liberty            | 2.34 lb/gal   | 10        | 32 fl oz/a | POST       | B        |
|       | Xtendimax          | 2.9 lbae/gal  | 4         | 22 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | POST       | B        |
|       | Vapor Grip Xtra    |               |           | 20 fl oz/a | POST       | B        |
|       | Intact             |               |           | 0.5% v/v   | POST       | B        |
|       | Class Act Ridion   |               |           | 1% v/v     | POST       | B        |
|       |                    |               |           |            |            |          |

| Trt # | Treatment          | Formulation  | SOA Group | Rate       | App Timing | App Code |
|-------|--------------------|--------------|-----------|------------|------------|----------|
| 13**  | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal     | 5         | 8 fl oz/a  | PRE        | A        |
|       | Liberty            | 2.34 lb/gal  | 10        | 32 fl oz/a | POST       | B        |
|       | Xtendimax          | 2.9 lbae/gal | 4         | 22 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal | 9         | 30 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | POST       | B        |
|       | Vapor Grip Xtra    |              |           | 20 fl oz/a | POST       | B        |
|       | Intact             |              |           | 0.5% v/v   | POST       | B        |
|       | Class Act Ridion   |              |           | 1% v/v     | POST       | B        |
| 14    | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | PRE        | A        |
|       | Mauler             | 4 lb/gal     | 5         | 8 fl oz/a  | PRE        | A        |
|       | Warrant Ultra      | 3.45 lb/gal  | 14, 15    | 48 fl oz/a | POST       | B        |
|       | Liberty            | 2.34 lb/gal  | 10        | 32 fl oz/a | POST       | B        |
|       | AMS                |              |           | 2.5% v/v   | POST       | B        |
|       |                    |              |           |            |            |          |
| 15    | XtendiMax          | 2.9 lbae/gal | 4         | 22 fl oz/a | PRE        | A        |
|       | Warrant Ultra      | 3.45 lb/gal  | 14, 15    | 48 fl oz/a | PRE        | A        |
|       | VaporGrip Xtra     |              |           | 20 fl oz/a | PRE        | A        |
|       | XtendiMax          | 2.9 lbae/gal | 4         | 22 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal | 9         | 30 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | POST       | B        |
|       | Vapor Grip Xtra    |              |           | 20 fl oz/a | POST       | B        |
|       | Intact             |              |           | 0.5% v/v   | POST       | B        |
|       | Class Act Ridion   |              |           | 1% v/v     | POST       | B        |
| 16    | XtendiMax          | 2.9 lbae/gal | 4         | 22 fl oz/a | PRE        | A        |
|       | Warrant Ultra      | 3.45 lb/gal  | 14, 15    | 48 fl oz/a | PRE        | A        |
|       | VaporGrip Xtra     |              |           | 20 fl oz/a | PRE        | A        |
|       | Liberty            | 2.34 lb/gal  | 10        | 32 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal | 9         | 30 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal  | 15        | 30 fl oz/a | POST       | B        |
|       | AMS                |              |           | 2.5% v/v   | POST       | B        |
|       |                    |              |           |            |            |          |

**Adjuvants:** AMS = Amsol (liquid AMS); Intact = DRA; Class Act Ridion = non-AMS water conditioner + NIS; VaporGrip Xtra = volatility reducing agent (VRA)

**\*MON301668** is an experimental formulation of encapsulated acetochlor similar to Warrant herbicide with a higher active ingredient load per gallon of formulated product.

**\*\*Treatments 12 and 13** are not an approved tank mixture due to restrictions on the XtendiMax label. Do not tank mix Liberty with XtendiMax.

**Trial Summary:**

This trial evaluated multiple 2-pass herbicide programs to provide recommendations for weed management in XtendFlex soybeans. There was no observable soybean injury from the PRE herbicides (data not shown). There was visible soybean injury 16 days after the POST application (Table 15). Injury symptoms included leaf necrosis (burn) and leaf crinkling. Warrant Ultra had the greatest % injury. Tank mixes with Liberty + MON 301668 also generally showed greater injury than other POST herbicide treatments.

The trial was conducted in a field infested with a population of glyphosate-resistant waterhemp. All treatments provided excellent season long waterhemp control (Table 15). Waterhemp control from the PRE herbicides at the time of POST application was good to excellent ~87-96%. The addition of XtendiMax to the tank at the PRE application resulted in slightly better control of waterhemp and other broadleaf species (velvetleaf, common lambsquarters, venice mallow) in the trial area. All POST herbicide programs provided excellent waterhemp control.

Yield was very similar among herbicide programs (Table 15). Yield across all herbicide treatments = 62 bu acre<sup>-1</sup>, while the untreated check was 33 bu acre<sup>-1</sup>.

Plot photos from throughout the growing season are available at [XtendFlex Soybean Herbicide Programs](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 15.** Soybean injury, weed control ratings, and soybean yield for trial #21-BRO-SB04 at Brooklyn, WI.<sup>a</sup>

| Trt #                                              | Herbicide (rate acre <sup>-1</sup> )                                                                                                            | Injury <sup>c</sup> (%) | Waterhemp (%) |       |       | Overall <sup>d</sup> (%) |       |       | Yield <sup>b</sup><br>bu acre <sup>-1</sup> |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-------|-------|--------------------------|-------|-------|---------------------------------------------|
|                                                    |                                                                                                                                                 | 7/8                     | 6/22          | 7/8   | 9/21  | 6/22                     | 7/8   | 9/21  |                                             |
| 1                                                  | Untreated Check                                                                                                                                 | 0                       | 0             | 0     | 0     | 0                        | 0     | 0     | 33 c                                        |
| <b>Two-Pass – PRE (5/26) <i>fb</i> POST (6/22)</b> |                                                                                                                                                 |                         |               |       |       |                          |       |       |                                             |
| 2                                                  | XtendiMax (22 oz) + MON 301668 (30 oz) + Mauler (8 oz)* <i>fb</i><br>XtendiMax (22 oz) + Roundup PM 3 (30 oz) + MON 301668 (30 oz)**            | 8.8                     | 95            | 99    | 99    | 94                       | 100   | 99    | 61 b                                        |
| 3                                                  | XtendiMax (22 oz) + MON 301668 (30 oz) + Mauler (8 oz)* <i>fb</i><br>Liberty (32 oz) + Roundup PM 3 (30 oz) + MON 301668 (30 oz) + AMS 2.5% v/v | 16.3                    | 93            | 100   | 98    | 92                       | 99    | 98    | 60 b                                        |
| 4                                                  | XtendiMax (22 oz) + MON 301668 (30 oz) + Mauler (8 oz)* <i>fb</i><br>Liberty (32 oz) + Roundup PM 3 (30 oz) + AMS 2.5% v/v                      | 6.3                     | 93            | 99    | 100   | 92                       | 100   | 100   | 63 ab                                       |
| 5                                                  | XtendiMax (22 oz) + MON 301668 (30 oz) + Mauler (8 oz)* <i>fb</i><br>Liberty (32 oz) + Select Max (12 oz) + AMS 2.5% v/v                        | 5.0                     | 92            | 99    | 99    | 91                       | 99    | 99    | 62 b                                        |
| 6                                                  | XtendiMax (22 oz) + Fierce WDG (3 oz) <i>fb</i><br>Liberty (32 oz) + Roundup PM 3 (30 oz) + MON 301668 (30 oz) + AMS 2.5% v/v                   | 15.0                    | 95            | 100   | 100   | 94                       | 100   | 100   | 61 b                                        |
| 7                                                  | XtendiMax (22 oz) + Fierce WDG (3 oz) <i>fb</i><br>XtendiMax (22 oz) + Roundup PM 3 (30 oz) + MON 301668 (30 oz)**                              | 13.8                    | 96            | 100   | 100   | 96                       | 100   | 100   | 61 b                                        |
| 8                                                  | MON 301668 (30 oz) + Mauler (8 oz) <i>fb</i><br>XtendiMax (22 oz) + Roundup PM 3 (30 oz) + MON 301668 (30 oz)**                                 | 11.3                    | 92            | 99    | 100   | 87                       | 100   | 100   | 64 ab                                       |
| 9                                                  | MON 301668 (30 oz) + Mauler (8 oz) <i>fb</i><br>Liberty (32 oz) + Roundup PM 3 (30 oz) + MON 301668 (30 oz) + AMS 2.5% v/v                      | 15.0                    | 90            | 99    | 100   | 90                       | 98    | 100   | 60 b                                        |
| 10                                                 | MON 301668 (30 oz) + Mauler (8 oz) <i>fb</i><br>Liberty (32 oz) + Roundup PM 3 (30 oz) + AMS 2.5% v/v                                           | 5.0                     | 89            | 99    | 100   | 86                       | 100   | 100   | 62 ab                                       |
| 11                                                 | MON 301668 (30 oz) + Mauler (8 oz) <i>fb</i><br>Liberty (32 oz) + Select Max (12 oz) + AMS 2.5% v/v                                             | 5.0                     | 89            | 99    | 100   | 87                       | 98    | 99    | 63 ab                                       |
| 12                                                 | MON 301668 (30 oz) + Mauler (8 oz) <i>fb</i><br>Liberty (32 oz) + XtendiMax (22 oz) + MON 301668 (30 oz)**                                      | 10.0                    | 90            | 99    | 100   | 85                       | 99    | 99    | 63 ab                                       |
| 13                                                 | MON 301668 (30 oz) + Mauler (8 oz) <i>fb</i><br>Liberty (32 oz)+XtendiMax (22 oz)+Roundup PM 3 (30 oz)+MON 301668 (30 oz)**                     | 8.8                     | 87            | 98    | 100   | 85                       | 99    | 100   | 65 ab                                       |
| 14                                                 | MON 301668 (30 oz) + Mauler (8 oz) <i>fb</i><br>Warrant Ultra (48 oz) + Liberty (32 oz) + AMS 2.5% v/v                                          | 20.0                    | 91            | 100   | 100   | 86                       | 98    | 98    | 61 b                                        |
| 15                                                 | XtendiMax (22 oz) + Warrant Ultra (48 oz)* <i>fb</i><br>XtendiMax (22 oz) + Roundup PM 3 (30 oz) + MON 301668 (30 oz)**                         | 7.5                     | 92            | 100   | 100   | 91                       | 100   | 100   | 62 ab                                       |
| 16                                                 | XtendiMax (22 oz) + Warrant Ultra (48 oz)* <i>fb</i><br>Liberty (32 oz) + Roundup PM 3 (30 oz) + MON 301668 (30 oz) + AMS 2.5% v/v              | 11.3                    | 88            | 100   | 100   | 91                       | 100   | 100   | 68 a                                        |
| LSD ( $\alpha=0.10$ )                              |                                                                                                                                                 | 3.0                     | 3             | ns    | ns    | 4                        | ns    | ns    | 6                                           |
| p value                                            |                                                                                                                                                 | <0.001                  | 0.004         | 0.883 | 0.326 | <0.001                   | 0.510 | 0.567 | <0.001                                      |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Yield values with the same letter are not significantly different.<sup>c</sup>Crop injury symptoms included leaf necrosis (burn) and leaf crinkling.<sup>d</sup>Overall weed control included all species in the trial area: waterhemp, velvetleaf, common lambsquarters, and venice mallow.

\*All PRE applications of XtendiMax included 20 fl oz/a VaporGrip Xtra, a volatility reducing agent.

\*\*All POST applications of XtendiMax included VaporGrip Xtra at 20 fl oz, Class Act Ridion 1% v/v, and Intact 0.5% v/v.

**Project Goal:** Evaluate the efficacy and crop safety of Authority brand herbicides and similar competitor PRE herbicides in Enlist soybeans.

#### Site Description:

|                       |                                                                                                                                              |                        |                    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------|
| <b>Location:</b>      | Brooklyn, WI                                                                                                                                 | <b>Crop:</b>           | Enlist soybean     |
| <b>Field #:</b>       | OB-3                                                                                                                                         | <b>Variety:</b>        | P20T64E            |
| <b>Soil type:</b>     | Dresden loam                                                                                                                                 | <b>Planting Date:</b>  | 5/13               |
| <b>% OM:</b>          | 1.2                                                                                                                                          | <b>Emergence Date:</b> | 5/22               |
| <b>pH:</b>            | 7.1                                                                                                                                          | <b>Population:</b>     | 140,000 seeds/acre |
| <b>Fertilization:</b> | -                                                                                                                                            | <b>Depth:</b>          | 1.5                |
| <b>Previous crop:</b> | Seed Corn                                                                                                                                    | <b>Row spacing:</b>    | 30 in              |
| <b>Tillage:</b>       | Conventional                                                                                                                                 | <b>Plot Size:</b>      | 10 x 25 ft         |
| <b>Weed species:</b>  | glyphosate-resistant waterhemp (AMATA); velvetleaf (ABUTH); common lambsquarters (CHEAL); wild-proso millet (PANMI); woolly cupgrass (ERBVI) |                        |                    |

#### Herbicide Application Information:

|                                      |            |           |
|--------------------------------------|------------|-----------|
| <b>Date:</b>                         | 5/14       | 6/15      |
| <b>Treatment:</b>                    | PRE (A)    | POST (B)  |
| <b>Air Temp (°F):</b>                | 72         | 79        |
| <b>2" Soil Temp (°F):</b>            | 71         | 80        |
| <b>Soil moisture [surface]:</b>      | dry        | very dry  |
| <b>RH %:</b>                         | 33         | 49        |
| <b>Cloud cover %</b>                 | 12         | 40        |
| <b>Wind speed (mph)/direction</b>    | 2-10/W     | 2-5/NNE   |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.83"      | 2.01"     |
| <b>GPA:</b>                          | 15         | 15        |
| <b>PSI:</b>                          | 34         | 34        |
| <b>Nozzle:</b>                       | TTI 110015 | TT 110015 |
| <b>Nozzle spacing (in):</b>          | 20         | 20        |
| <b>Boom Height (in):</b>             | 20         | 25        |

#### Crop and weed information at application:

|                       |              |      |                      |
|-----------------------|--------------|------|----------------------|
|                       | <b>Date:</b> | 5/14 | 6/15*                |
| <b>Soybean</b>        | Height:      | -    | 4-6"                 |
|                       | Stage:       | -    | V3                   |
| <b>waterhemp</b>      | Height       | -    | 0.5-6.5"             |
|                       | Density:     | -    | 0-160/m <sup>2</sup> |
| <b>velvetleaf</b>     | Height:      | -    | 1-5"                 |
|                       | Density:     | -    | 0-32/m <sup>2</sup>  |
| <b>lambsquarters</b>  | Height:      | -    | 0.5-4"               |
|                       | Density:     | -    | 0-32/m <sup>2</sup>  |
| <b>annual grasses</b> | Height:      | -    | 1-4"                 |
|                       | Density:     | -    | 0-24/m <sup>2</sup>  |

\*All weed densities and heights were recorded from plots with a PRE herbicide. Average waterhemp density in the check was 222 plants/m<sup>2</sup> on 6/15.

| 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        |
|       | Liberty           | 2.34 lb/gal | 10        | 32 fl oz/a  | POST       | B        |
|       | AMS               |             |           | 3 lb/a      | POST       | B        |
| 3     | Authority Supreme | 4.16 lb/gal | 14, 15    | 7 fl oz/a   | PRE        | A        |
|       | Tricor DF         | 75% w/w     | 5         | 5 oz/a      | PRE        | A        |
|       | Liberty           | 2.34 lb/gal | 10        | 32 fl oz/a  | POST       | B        |
|       | AMS               |             |           | 3 lb/a      | POST       | B        |
| 4     | Authority Supreme | 4.16 lb/gal | 14, 15    | 6.5 fl oz/a | PRE        | A        |
|       | 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        |
| 5     | Boundary          | 6.5 lb/gal  | 5, 15     | 29 fl oz/a  | PRE        | A        |
|       | Liberty           | 2.34 lb/gal | 10        | 32 fl oz/a  | POST       | B        |
|       | AMS               |             |           | 3 lb/a      | POST       | B        |
| 6     | 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        |
|       | AMS               |             |           | 3 lb/a      | POST       | B        |
| 7     | Kyber             | 2.64 lb/gal | 5, 14, 15 | 1 pt/a      | PRE        | A        |
|       | Liberty           | 2.34 lb/gal | 10        | 32 fl oz/a  | POST       | B        |
|       | AMS               |             |           | 3 lb/a      | POST       | B        |
| 8     | Anthem Maxx       | 4.3 lb/gal  | 14, 15    | 4 fl oz/a   | PRE        | A        |
|       | Liberty           | 2.34 lb/gal | 10        | 32 fl oz/a  | POST       | B        |
|       | AMS               |             |           | 3 lb/a      | POST       | B        |
| 9     | Warrant           | 3 lb/gal    | 15        | 48 fl oz/a  | PRE        | A        |
|       | Liberty           | 2.34 lb/gal | 10        | 32 fl oz/a  | POST       | B        |
|       | AMS               |             |           | 3 lb/a      | POST       | B        |
| 10    | Outlook           | 6 lb/gal    | 15        | 14 fl oz/a  | PRE        | A        |
|       | Liberty           | 2.34 lb/gal | 10        | 32 fl oz/a  | POST       | B        |
|       | AMS               |             |           | 3 lb/a      | POST       | B        |
| 11    | Dual II Magnum    | 7.64 lb/gal | 15        | 1.3 pt/a    | PRE        | A        |
|       | Liberty           | 2.34 lb/gal | 10        | 32 fl oz/a  | POST       | B        |
|       | AMS               |             |           | 3 lb/a      | POST       | B        |
| 12    | Authority Edge    | 4.25 lb/gal | 14, 15    | 8 fl oz/a   | PRE        | A        |
|       | Liberty           | 2.34 lb/gal | 10        | 32 fl oz/a  | POST       | B        |
|       | AMS               |             |           | 3 lb/a      | POST       | B        |
| 13    | Authority Edge    | 4.25 lb/gal | 15, 15    | 7 fl oz/a   | PRE        | A        |
|       | Tricor DF         | 75% w/w     | 5         | 5 oz/a      | PRE        | A        |
|       | Liberty           | 2.34 lb/gal | 10        | 32 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 |
|-------|--------------------|-------------|-----------|-------------|------------|----------|
| 14    | Authority Edge     | 4.25 lb/gal | 14, 15    | 7 fl oz/a   | PRE        | A        |
|       | Liberty            | 2.34 lb/gal | 10        | 32 fl oz/a  | POST       | B        |
|       | Anthem Maxx        | 4.3 lb/gal  | 15, 15    | 3.1 fl oz/a | POST       | B        |
|       | AMS                |             |           | 3 lb/a      | POST       | B        |
| 15    | Authority First DF | 70% w/w     | 2, 15     | 6.4 oz/a    | PRE        | A        |
|       | Liberty            | 2.34 lb/gal | 10        | 32 fl oz/a  | POST       | B        |
|       | AMS                |             |           | 3 lb/a      | POST       | B        |

**Adjuvants:** AMS = BlueAg spray grade ammonium sulfate

### Trial Summary:

This trial evaluated the weed control and crop safety of FMC's Authority Supreme, Authority Edge, and Anthem Maxx herbicide brands vs competitor products. Authority Supreme and Authority Edge are similar products with different active ingredient loads of sulfentrazone and pyroxasulfone. Authority Edge has a higher sulfentrazone:pyroxasulfone ratio (1.8:1) compared to Authority Supreme (1:1). The trial was located in a grower's field with a heavy population of glyphosate-resistant waterhemp. There was no significant herbicide injury from the PRE and POST herbicide applications (data not shown).

Waterhemp density at the time of POST application (6/15) was impacted by PRE herbicide treatment (Table 16). Waterhemp control differed among treatments at all rating timings (Table 17). The single active ingredient group 15 treatments had lower levels of waterhemp and velvetleaf control. The POST application of Liberty was effective at controlling the emerged waterhemp in most of the treatments; however, in treatments with less effective PRE herbicides POST waterhemp control was below 90%. Many of the treatments had <90% control at soybean harvest as some waterhemp emerged after the POST application. All the herbicide programs evaluated provided good to excellent annual grass (wild-proso millet, woolly cupgrass) control throughout the growing season (Table 17).

Soybean yield differed among the herbicide treatments (Table 17). Yield of the untreated check was 21 bu acre<sup>-1</sup>.

Plot photos from throughout the growing season are available at [Authority Supreme/Edge and Anthem Maxx Herbicide Programs](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 16.** Waterhemp density at the time of POST herbicide application at Brooklyn, WI

| Trt # | PRE Herbicide                 | Rate           | Density (m <sup>2</sup> )* | Standard Deviation | % Reduction** |
|-------|-------------------------------|----------------|----------------------------|--------------------|---------------|
| 1     | Check                         |                | 222                        | 200                | -             |
| 2     | Authority Supreme             | 8 fl oz        | 6                          | 8                  | 97            |
| 3     | Authority Supreme + Tricor DF | 7 fl oz + 5 oz | 8                          | 11                 | 96            |
| 4     | Authority Supreme             | 7 fl oz        | 10                         | 8                  | 95            |
| 5     | Boundary                      | 29 fl oz       | 5                          | 4                  | 98            |
| 6     | Zidua PRO                     | 6 fl oz        | 10                         | 7                  | 95            |
| 7     | Kyber                         | 1 pt           | 12                         | 9                  | 95            |
| 8     | Anthem Maxx                   | 4 fl oz        | 28                         | 6                  | 87            |
| 9     | Warrant                       | 48 fl oz       | 95                         | 75                 | 57            |
| 10    | Outlook                       | 14 fl oz       | 42                         | 36                 | 81            |
| 11    | Dual II Magnum                | 1.3 pt         | 23                         | 24                 | 90            |
| 12    | Authority Edge                | 8 fl oz        | 1                          | 2                  | 100           |
| 13    | Authority Edge + Tricor DF    | 7 fl oz + 5 oz | 5                          | 8                  | 98            |
| 14    | Authority Edge                | 7 fl oz        | 7                          | 6                  | 97            |
| 15    | Authority First DF            | 6.4 oz         | 6                          | 7                  | 97            |

\*density was collected from one 0.25 m<sup>2</sup> quadrant in each plot

\*\*percent reduction in density from untreated check

Table 17. Weed control ratings and soybean yield for trial #21-BRO-SB07 at Brooklyn, WI.<sup>a</sup>

| Trt#                                        | Herbicide (rate acre <sup>-1</sup> )                                                                 | Waterhemp (%) |        |        | Velvetleaf (%) |       |        | Lambsquarters (%) |       |       | Annual Grasses <sup>b</sup> (%) |       |       | Yield <sup>c</sup><br>bu acre <sup>-1</sup> |
|---------------------------------------------|------------------------------------------------------------------------------------------------------|---------------|--------|--------|----------------|-------|--------|-------------------|-------|-------|---------------------------------|-------|-------|---------------------------------------------|
|                                             |                                                                                                      | 6/15          | 6/30   | 9/28   | 6/15           | 6/30  | 9/28   | 6/15              | 6/30  | 9/28  | 6/15                            | 6/30  | 9/28  |                                             |
| 1                                           | Untreated Check                                                                                      | 0             | 0      | 0      | 0              | 0     | 0      | 0                 | 0     | 0     | 0                               | 0     | 0     | 21 f                                        |
| <b>Two-Pass – PRE (5/14) fb POST (6/15)</b> |                                                                                                      |               |        |        |                |       |        |                   |       |       |                                 |       |       |                                             |
| 2                                           | Authority Supreme (8 fl oz) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)                             | 91            | 97     | 82     | 96             | 100   | 100    | 100               | 100   | 100   | 99                              | 100   | 100   | 61 ab                                       |
| 3                                           | Authority Supreme (7 fl oz) + Tricor DF (5 oz) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)          | 95            | 99     | 95     | 95             | 100   | 100    | 100               | 100   | 100   | 93                              | 100   | 99    | 58 a-d                                      |
| 4                                           | Authority Supreme (6.5 fl oz) <b>fb</b><br>Liberty (32 fl oz) + Anthem Maxx (2.5 fl oz) + AMS (3 lb) | 88            | 98     | 89     | 98             | 100   | 100    | 100               | 100   | 100   | 94                              | 100   | 100   | 58 a-d                                      |
| 5                                           | Boundary (29 fl oz) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)                                     | 87            | 97     | 90     | 96             | 99    | 96     | 100               | 100   | 98    | 97                              | 100   | 100   | 61 abc                                      |
| 6                                           | Zidua PRO (6 fl oz) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)                                     | 89            | 97     | 84     | 100            | 100   | 100    | 100               | 100   | 100   | 97                              | 100   | 100   | 60 abc                                      |
| 7                                           | Kyber (1 pt) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)                                            | 81            | 95     | 84     | 90             | 100   | 94     | 98                | 100   | 100   | 85                              | 100   | 100   | 63 a                                        |
| 8                                           | Anthem Maxx (4 fl oz) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)                                   | 75            | 93     | 77     | 90             | 100   | 99     | 100               | 100   | 100   | 95                              | 100   | 100   | 59 abc                                      |
| 9                                           | Warrant (48 fl oz) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)                                      | 52            | 82     | 41     | 50             | 100   | 87     | 100               | 100   | 78    | 85                              | 100   | 100   | 52 e                                        |
| 10                                          | Outlook (14 fl oz) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)                                      | 69            | 83     | 49     | 68             | 99    | 85     | 99                | 100   | 75    | 93                              | 100   | 100   | 53 de                                       |
| 11                                          | Dual II Magnum (1.3 pt) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)                                 | 51            | 84     | 47     | 46             | 100   | 90     | 100               | 100   | 88    | 95                              | 100   | 100   | 56 b-e                                      |
| 12                                          | Authority Edge (8 fl oz) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)                                | 98            | 98     | 89     | 98             | 100   | 100    | 100               | 100   | 100   | 96                              | 99    | 99    | 55 cde                                      |
| 13                                          | Authority Edge (7 fl oz) + Tricor DF (5 oz) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)             | 94            | 97     | 94     | 97             | 100   | 100    | 100               | 100   | 100   | 93                              | 100   | 100   | 59 a-d                                      |
| 14                                          | Authority Edge (7 fl oz) <b>fb</b><br>Liberty (32 fl oz) + Anthem Maxx (2.5 fl oz) + AMS (3 lb)      | 92            | 98     | 93     | 99             | 100   | 100    | 100               | 100   | 100   | 96                              | 100   | 100   | 60 abc                                      |
| 15                                          | Authority First DF (6.4 oz) <b>fb</b><br>Liberty (32 fl oz) + AMS (3 lb)                             | 94            | 97     | 92     | 100            | 100   | 100    | 100               | 100   | 100   | 98                              | 100   | 100   | 58 a-d                                      |
| LSD ( $\alpha=0.10$ )                       |                                                                                                      | 11            | 3      | 9      | 8              | <1    | 6      | ns                | ns    | 13    | ns                              | ns    | ns    | 6                                           |
| p value                                     |                                                                                                      | <0.001        | <0.001 | <0.001 | <0.001         | 0.075 | <0.001 | 0.463             | 1.000 | 0.007 | 0.200                           | 0.470 | 0.560 | <0.001                                      |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Annual grass species in the trial area consisted of wild-proso millet and woolly cupgrass. Wild-proso millet was the predominant species.<sup>c</sup>Yield values with the same letter are not significantly different.

**Project Goal:** Evaluate the efficacy and crop safety of Preview 2.1SC in Enlist soybeans.

**Preview 2.1SC** is a new herbicide premix of metribuzin and sulfentrazone in a 2:1 ratio (2.23 lb/gal metribuzin; 1.12 lb/gal sulfentrazone) from UPL. A limited supply is available for the 2022 season with full product launch coming in 2023.

#### Site Description:

|                       |                                                                                                                                              |                        |                    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------|
| <b>Location:</b>      | Brooklyn, WI                                                                                                                                 | <b>Crop:</b>           | Enlist soybean     |
| <b>Field #:</b>       | OB-3                                                                                                                                         | <b>Variety:</b>        | P20T64E            |
| <b>Soil type:</b>     | Dresden loam                                                                                                                                 | <b>Planting Date:</b>  | 5/13               |
| <b>% OM:</b>          | 1.2                                                                                                                                          | <b>Emergence Date:</b> | 5/22               |
| <b>pH:</b>            | 7.1                                                                                                                                          | <b>Population:</b>     | 140,000 seeds/acre |
| <b>Fertilization:</b> | -                                                                                                                                            | <b>Depth:</b>          | 1.5                |
| <b>Previous crop:</b> | Seed Corn                                                                                                                                    | <b>Row spacing:</b>    | 30 in              |
| <b>Tillage:</b>       | Conventional                                                                                                                                 | <b>Plot Size:</b>      | 10 x 25 ft         |
| <b>Weed species:</b>  | glyphosate-resistant waterhemp (AMATA); velvetleaf (ABUTH); common lambsquarters (CHEAL); wild-proso millet (PANMI); woolly cupgrass (ERBVI) |                        |                    |

#### Herbicide Application Information:

|                                      |            |            |
|--------------------------------------|------------|------------|
| <b>Date:</b>                         | 5/14       | 6/22       |
| <b>Treatment:</b>                    | PRE (A)    | POST (B)   |
| <b>Air Temp (°F):</b>                | 69         | 65         |
| <b>2" Soil Temp (°F):</b>            | 70         | 51         |
| <b>Soil moisture [surface]:</b>      | dry        | damp       |
| <b>RH %:</b>                         | 33         | 51         |
| <b>Cloud cover %</b>                 | 10         | 10         |
| <b>Wind speed (mph)/direction</b>    | 1-3/NW     | 3-10/W     |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.83"      | 3.21"      |
| <b>GPA:</b>                          | 15         | 15         |
| <b>PSI:</b>                          | 34         | 34         |
| <b>Nozzle:</b>                       | TTI 110015 | TTI 110015 |
| <b>Nozzle spacing (in):</b>          | 20         | 20         |
| <b>Boom Height (in):</b>             | 20         | 24-26      |

#### Crop and weed information at application:

|                       |              |      |                      |
|-----------------------|--------------|------|----------------------|
|                       | <b>Date:</b> | 5/14 | 6/22*                |
| <b>Soybean</b>        | Height:      | -    | -                    |
|                       | Stage:       | -    | V4/V5                |
| <b>waterhemp</b>      | Height       | -    | 1-8"                 |
|                       | Density:     | -    | 8-21/ft <sup>2</sup> |
| <b>velvetleaf</b>     | Height:      | -    | 1-5"                 |
|                       | Density:     | -    | 0-2/ft <sup>2</sup>  |
| <b>lambsquarters</b>  | Height:      | -    | 1-5"                 |
|                       | Density:     | -    | 0-3/ft <sup>2</sup>  |
| <b>annual grasses</b> | Height:      | -    | -                    |
|                       | Density:     | -    | -                    |

\*All weed densities and heights were recorded from the untreated check.

| Trt # | Treatment          | Formulation  | SOA Group | Rate         | App Timing | App Code |
|-------|--------------------|--------------|-----------|--------------|------------|----------|
| 1     | Untreated Check    |              |           |              |            |          |
| 2     | Preview 2.1SC      | 3.35 lb/gal  | 5, 14     | 18 fl oz/a   | PRE        | A        |
|       | Interline          | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | Enlist One         | 3.8 lbae/gal | 4         | 32 fl oz/a   | POST       | B        |
|       | AMS                |              |           | 3 lb/a       | POST       | B        |
| 3     | Preview 2.1SC      | 3.35 lb/gal  | 5, 14     | 21.4 fl oz/a | PRE        | A        |
|       | Interline          | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | Enlist One         | 3.8 lbae/gal | 4         | 32 fl oz/a   | POST       | B        |
|       | AMS                |              |           | 3 lb/a       | POST       | B        |
| 4     | Boundary           | 6.5 lb/gal   | 5, 15     | 29 fl oz/a   | PRE        | A        |
|       | Interline          | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | Enlist One         | 3.8 lbae/gal | 4         | 32 fl oz/a   | POST       | B        |
|       | AMS                |              |           | 3 lb/a       | POST       | B        |
| 5     | Boundary           | 6.5 lb/gal   | 5, 15     | 36 fl oz/a   | PRE        | A        |
|       | Interline          | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | Enlist One         | 3.8 lbae/gal | 4         | 32 fl oz/a   | POST       | B        |
|       | AMS                |              |           | 3 lb/a       | POST       | B        |
| 6     | Authority MTZ      | 45% w/w      | 5, 14     | 14 oz/a      | PRE        | A        |
|       | Interline          | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | Enlist One         | 3.8 lbae/gal | 4         | 32 fl oz/a   | POST       | B        |
|       | AMS                |              |           | 3 lb/a       | POST       | B        |
| 7     | Authority First DF | 70% w/w      | 2, 14     | 6.45 oz/a    | PRE        | A        |
|       | Interline          | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | Enlist One         | 3.8 lbae/gal | 4         | 32 fl oz/a   | POST       | B        |
|       | AMS                |              |           | 3 lb/a       | POST       | B        |
| 8     | Moccasin MTZ       | 4.47 lb/gal  | 5, 15     | 42 fl oz/a   | PRE        | A        |
|       | Interline          | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | Enlist One         | 3.8 lbae/gal | 4         | 32 fl oz/a   | POST       | B        |
|       | AMS                |              |           | 3 lb/a       | POST       | B        |
| 9     | Zidua PRO          | 4.09 lb/gal  | 2, 14, 15 | 5 fl oz/a    | PRE        | A        |
|       | Interline          | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | Enlist One         | 3.8 lbae/gal | 4         | 32 fl oz/a   | POST       | B        |
|       | AMS                |              |           | 3 lb/a       | POST       | B        |
| 10    | Valor XLT          | 40.3% w/w    | 2, 14     | 3 oz/a       | PRE        | A        |
|       | Interline          | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | Enlist One         | 3.8 lbae/gal | 4         | 32 fl oz/a   | POST       | B        |
|       | AMS                |              |           | 3 lb/a       | POST       | B        |
| 11    | Tripzin ZC         | 4 lb/gal     | 3, 5      | 44 fl oz/a   | PRE        | A        |
|       | Interline          | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | Enlist One         | 3.8 lbae/gal | 4         | 32 fl oz/a   | POST       | B        |
|       | AMS                |              |           | 3 lb/a       | POST       | B        |
| 12    | Satellite HydroCap | 3.8 lb/gal   | 3         | 2 pt/a       | PRE        | A        |
|       | Interline          | 2.34 lb/gal  | 10        | 32 fl oz/a   | POST       | B        |
|       | Enlist One         | 3.8 lbae/gal | 4         | 32 fl oz/a   | POST       | B        |
|       | AMS                |              |           | 3 lb/a       | POST       | B        |

### **Trial Summary:**

This trial evaluated the efficacy and crop safety of Preview 2.1SC in Enlist soybeans. **Preview 2.1SC** is a new herbicide premix of metribuzin and sulfentrazone in a 2:1 ratio (2.23 lb/gal metribuzin; 1.12 lb/gal sulfentrazone) from UPL. A limited supply is available for the 2022 season with full product launch coming in 2023. The trial was located in a grower's field with a heavy population of glyphosate-resistant waterhemp. There was visible injury from the PRE herbicides observed 21 days after application (Table 18). No injury symptoms were evident 38 days after application.

Preview 2.1SC provided excellent early-season residual control of waterhemp, velvetleaf, lambsquarters, and wild-prosso millet (Table 18). Several of the other competitor products also provided good to excellent residual weed control. A POST application of Interline + Enlist One was made to all treatments 38 days after the PRE application. The POST application was very effective at controlling emerged weeds, with the exception of treatment 12, as indicated by visual control ratings 16 days after application (7/8). The very poor residual waterhemp control by Satellite HydroCap resulted in taller, denser waterhemp which escaped control of the POST herbicides.

Soybean yield differed among the herbicide treatments (Table 18). Yield of the untreated check was 34 bu acre<sup>-1</sup>.

Plot photos from throughout the growing season are available at [Evaluation of Preview 2.1SC for Residual Weed Control and Crop Safety](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 18.** Crop injury, weed control ratings, and soybean yield for trial #21-BRO-SB08 at Brooklyn, WI.<sup>a</sup>

| Trt #                                              | Herbicide (rate acre <sup>-1</sup> )                                                              | Injury (%)      |              | Waterhemp (%)   |                 |                 |                 | Velvetleaf (%)  |              |                 | Lambsquarters (%) |              |              | Wild-Prosso Millet |              |              | Yield <sup>b</sup><br>bu acre <sup>-1</sup> |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|-----------------|-------------------|--------------|--------------|--------------------|--------------|--------------|---------------------------------------------|
|                                                    |                                                                                                   | 6/4             | 6/21         | 6/9             | 6/21            | 7/8             | 9/28            | 6/21            | 7/8          | 9/28            | 6/21              | 7/8          | 9/28         | 6/21               | 7/8          | 9/28         |                                             |
| 1                                                  | Untreated Check                                                                                   | 0               | 0            | 0               | 0               | 0               | 0               | 0               | 0            | 0               | 0                 | 0            | 0            | 0                  | 0            | 0            | 34 e                                        |
| <b>Two-Pass – PRE (5/14) <i>fb</i> POST (6/22)</b> |                                                                                                   |                 |              | <b>POST</b>     |                 |                 |                 | <b>POST</b>     |              |                 | <b>POST</b>       |              |              | <b>POST</b>        |              |              |                                             |
| 2                                                  | Preview 2.1SC (18 fl oz) <i>fb</i><br>Interline (32 fl oz) + Enlist One (32 fl oz) + AMS (3 lb)   | 2.8             | 0            | 97              | 92              | 100             | 94              | 97              | 100          | 100             | 100               | 100          | 100          | 96                 | 100          | 100          | 62 abc                                      |
| 3                                                  | Preview 2.1SC (21.4 fl oz) <i>fb</i><br>Interline (32 fl oz) + Enlist One (32 fl oz) + AMS (3 lb) | 2.5             | 0            | 97              | 91              | 98              | 96              | 98              | 100          | 100             | 100               | 100          | 100          | 96                 | 100          | 99           | 60 bcd                                      |
| 4                                                  | Boundary (29 fl oz) <i>fb</i><br>Interline (32 fl oz) + Enlist One (32 fl oz) + AMS (3 lb)        | 6.5             | 0            | 97              | 90              | 99              | 92              | 81              | 100          | 93              | 100               | 100          | 100          | 95                 | 100          | 100          | 61 abc                                      |
| 5                                                  | Boundary (36 fl oz) <i>fb</i><br>Interline (32 fl oz) + Enlist One (32 fl oz) + AMS (3 lb)        | 10.8            | 0            | 97              | 92              | 99              | 92              | 86              | 100          | 98              | 100               | 100          | 100          | 100                | 100          | 100          | 61 abc                                      |
| 6                                                  | Authority MTZ (14 oz) <i>fb</i><br>Interline (32 fl oz) + Enlist One (32 fl oz) + AMS (3 lb)      | 4.8             | 0            | 92              | 82              | 98              | 99              | 90              | 100          | 100             | 100               | 100          | 100          | 84                 | 100          | 100          | 66 ab                                       |
| 7                                                  | Authority First (6.45 oz) <i>fb</i><br>Interline (32 fl oz) + Enlist One (32 fl oz) + AMS (3 lb)  | 4.5             | 0            | 97              | 86              | 99              | 98              | 99              | 100          | 100             | 100               | 100          | 100          | 96                 | 100          | 100          | 63 abc                                      |
| 8                                                  | Moccasin MTZ (42 fl oz) <i>fb</i><br>Interline (32 fl oz) + Enlist One (32 fl oz) + AMS (3 lb)    | 3.5             | 0            | 97              | 91              | 100             | 94              | 81              | 100          | 98              | 100               | 100          | 100          | 96                 | 100          | 100          | 65 ab                                       |
| 9                                                  | Zidua PRO (5 fl oz) <i>fb</i><br>Interline (32 fl oz) + Enlist One (32 fl oz) + AMS (3 lb)        | 4.8             | 0            | 93              | 80              | 100             | 98              | 100             | 100          | 100             | 100               | 100          | 100          | 99                 | 100          | 100          | 65 ab                                       |
| 10                                                 | Valor XLT (3 oz) <i>fb</i><br>Interline (32 fl oz) + Enlist One (32 fl oz) + AMS (3 lb)           | 10.0            | 0            | 90              | 75              | 98              | 97              | 99              | 100          | 98              | 100               | 100          | 100          | 92                 | 100          | 98           | 58 cd                                       |
| 11                                                 | Tripzin ZC (44 fl oz) <i>fb</i><br>Interline (32 fl oz) + Enlist One (32 fl oz) + AMS (3 lb)      | 4.0             | 0            | 96              | 89              | 99              | 94              | 86              | 100          | 100             | 100               | 100          | 100          | 93                 | 100          | 100          | 66 a                                        |
| 12                                                 | Satellite HydroCap (2 pt) <i>fb</i><br>Interline (32 fl oz) + Enlist One (32 fl oz) + AMS (3 lb)  | 4.5             | 0            | 21              | 4               | 85              | 82              | 78              | 100          | 91              | 100               | 100          | 100          | 99                 | 100          | 100          | 54 d                                        |
| <b>LSD (<math>\alpha=0.10</math>)</b>              |                                                                                                   | <b>3.1</b>      | <b>ns</b>    | <b>6</b>        | <b>5</b>        | <b>4</b>        | <b>5</b>        | <b>6</b>        | <b>ns</b>    | <b>4</b>        | <b>ns</b>         | <b>ns</b>    | <b>ns</b>    | <b>7</b>           | <b>ns</b>    | <b>ns</b>    | <b>6</b>                                    |
| <b>p value</b>                                     |                                                                                                   | <b>&lt;.001</b> | <b>1.000</b> | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>0.465</b> | <b>&lt;.001</b> | <b>1.000</b>      | <b>1.000</b> | <b>1.000</b> | <b>0.016</b>       | <b>0.589</b> | <b>0.465</b> | <b>&lt;.001</b>                             |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Yield values with the same letter are not significantly different.

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

#### Site Description:

|                       |                                                                                       |                        |                    |
|-----------------------|---------------------------------------------------------------------------------------|------------------------|--------------------|
| <b>Location:</b>      | Brooklyn, WI                                                                          | <b>Crop:</b>           | Enlist soybean     |
| <b>Field #:</b>       | OB-3                                                                                  | <b>Variety:</b>        | P20T64E            |
| <b>Soil type:</b>     | Dresden loam                                                                          | <b>Planting Date:</b>  | 5/13               |
| <b>% OM:</b>          | 1.2                                                                                   | <b>Emergence Date:</b> | 5/22               |
| <b>pH:</b>            | 7.1                                                                                   | <b>Population:</b>     | 140,000 seeds/acre |
| <b>Fertilization:</b> | -                                                                                     | <b>Depth:</b>          | 1.5                |
| <b>Previous crop:</b> | Seed Corn                                                                             | <b>Row spacing:</b>    | 30 in              |
| <b>Tillage:</b>       | Conventional                                                                          | <b>Plot Size:</b>      | 10 x 25 ft         |
| <b>Weed species:</b>  | glyphosate-resistant waterhemp (AMATA); velvetleaf (ABUTH); wild-proso millet (PANMI) |                        |                    |

#### Herbicide Application Information:

|                                      |            |            |
|--------------------------------------|------------|------------|
| <b>Date:</b>                         | 5/14       | 6/15       |
| <b>Treatment:</b>                    | PRE (A)    | POST (B)   |
| <b>Air Temp (°F):</b>                | 72         | 79         |
| <b>2" Soil Temp (°F):</b>            | 71         | 80         |
| <b>Soil moisture [surface]:</b>      | dry        | very dry   |
| <b>RH %:</b>                         | 33         | 49         |
| <b>Cloud cover %</b>                 | 12         | 40         |
| <b>Wind speed (mph)/direction</b>    | 2-10/W     | 2-5/NNE    |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.83"      | 2.01"      |
| <b>GPA:</b>                          | 15         | 15         |
| <b>PSI:</b>                          | 34         | 34         |
| <b>Nozzle:</b>                       | TTI 110015 | AIXR110015 |
| <b>Nozzle spacing (in):</b>          | 20         | 20         |
| <b>Boom Height (in):</b>             | 20         | 25         |

#### Crop and weed information at application:

|                       |                 |      |                     |
|-----------------------|-----------------|------|---------------------|
|                       | <b>Date:</b>    | 5/14 | 6/15*               |
| <b>Soybean</b>        | <b>Height:</b>  | -    | 4-6"                |
|                       | <b>Stage:</b>   | -    | V3                  |
| <b>waterhemp</b>      | <b>Height</b>   | -    | 0.5-6"              |
|                       | <b>Density:</b> | -    | 3-8/ft <sup>2</sup> |
| <b>velvetleaf</b>     | <b>Height:</b>  | -    |                     |
|                       | <b>Density:</b> | -    |                     |
| <b>annual grasses</b> | <b>Height:</b>  | -    |                     |
|                       | <b>Density:</b> | -    |                     |

\*All weed densities and heights were recorded from plots with a PRE herbicide.

| Trt # | Treatment        | Formulation  | SOA Group | Rate       | App Timing | App Code |
|-------|------------------|--------------|-----------|------------|------------|----------|
| 1     | Untreated Check  |              |           |            |            |          |
| 2     | Boundary         | 6.5 lb/gal   | 5, 15     | 29 fl oz/a | PRE        | A        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3 pt/a     | POST       | B        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
| 3     | Prefix           | 5.29 lb/gal  | 14, 15    | 2 pt/a     | PRE        | A        |
|       | Tricor DF        | 75% w/w      | 5         | 6 oz/a     | PRE        | A        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3 pt/a     | POST       | B        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
| 4     | <b>Tendovo*</b>  | 4.03 lb/gal  | 2, 5, 15  | 4 pt/a     | PRE        | A        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3 pt/a     | POST       | B        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
| 5     | Broadaxe XC      | 7 lb/gal     | 14, 15    | 30 fl oz/a | PRE        | A        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3 pt/a     | POST       | B        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
| 6     | Sonic            | 70% w/w      | 2, 14     | 5 oz/a     | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 oz/a    | POST       | B        |
|       | Durango DMA      | 4 lbae/gal   | 9         | 24 oz/a    | POST       | B        |
|       | EverpreX         | 7.62 lb/gal  | 15        | 1 pt/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 oz/a    | POST       | B        |
|       | Liberty          | 2.34 lb/gal  | 10        | 32 oz/a    | POST       | B        |
|       | EverpreX         | 7.62 lb/gal  | 15        | 1 pt/a     | POST       | B        |
|       | AMS              |              |           | 3 lb/a     | POST       | B        |
| 8     | Surveil          | 48% w/w      | 2, 14     | 3 oz/a     | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 oz/a    | POST       | B        |
|       | Durango DMA      | 4 lbae/gal   | 9         | 24 oz/a    | POST       | B        |
|       | EverpreX         | 7.62 lb/gal  | 15        | 1 pt/a     | POST       | B        |
|       | AMS              |              |           | 3 lb/a     | POST       | B        |
| 9     | Kyber            | 2.64 lb/gal  | 5, 14, 15 | 1 pt       | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 oz/a    | POST       | B        |
|       | Durango DMA      | 4 lbae/gal   | 9         | 24 oz/a    | POST       | B        |
|       | EverpreX         | 7.62 lb/gal  | 15        | 1 pt/a     | POST       | B        |
|       | AMS              |              |           | 3 lb/a     | POST       | B        |
| 10    | Afforia          | 50.8% w/w    | 2, 14     | 2.5 oz/a   | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 oz/a    | POST       | B        |
|       | Durango DMA      | 4 lbae/gal   | 9         | 24 oz/a    | POST       | B        |
|       | EverpreX         | 7.62 lb/gal  | 15        | 1 pt/a     | POST       | B        |
|       | AMS              |              |           | 3 lb/a     | POST       | B        |

| Trt # | Treatment           | Formulation  | SOA Group | Rate        | App Timing | App Code |
|-------|---------------------|--------------|-----------|-------------|------------|----------|
| 11    | Fierce EZ           | 3.05 lb/gal  | 14, 15    | 6 fl oz/a   | PRE        | A        |
|       | Enlist One          | 3.8 lbae/gal | 4         | 32 fl oz/a  | POST       | B        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 32 fl oz/a  | POST       | B        |
|       | Perpetuo            | 2.3 lb/gal   | 14, 15    | 6 fl oz/a   | POST       | B        |
|       | AMS                 |              |           | 3 lb/a      | POST       | B        |
| 12    | 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        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 32 fl oz/a  | POST       | B        |
|       | Perpetuo            | 2.3 lb/gal   | 14, 15    | 6 fl oz/a   | POST       | B        |
|       | AMS                 |              |           | 3 lb/a      | POST       | B        |
| 13    | Fierce XLT          | 62.4% w/w    | 2, 14, 15 | 4 oz/a      | PRE        | A        |
|       | Enlist One          | 3.8 lbae/gal | 4         | 32 fl oz/a  | POST       | B        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 32 fl oz/a  | POST       | B        |
|       | Perpetuo            | 2.3 lb/gal   | 14, 15    | 6 fl oz/a   | POST       | B        |
|       | AMS                 |              |           | 3 lb/a      | POST       | B        |
| 14    | 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        |
| 15    | Zidua PRO           | 4.09 lb/gal  | 2, 14, 15 | 6 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        |
|       | Zidua SC            | 4.17 lb/gal  | 15        | 2.5 fl oz/a | POST       | B        |
|       | AMS                 |              |           | 3 lb/a      | POST       | B        |
| 16    | Authority Supreme   | 4.16 lb/gal  | 14, 15    | 6.5 fl oz/a | PRE        | A        |
|       | 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        |

**Adjuvants:** AMS = BlueAg spray grade ammonium sulfate; Class Act Ridion = non-AMS water conditioner + NIS

**\*Tendovo 4.14 ZC** is a new premix offering from Syngenta containing 3.33 lb/gal S-metolachlor; 0.64 lb/gal metribuzin; and 0.06 lb/gal cloransulam. Registration is expected sometime in 2022.

**Trial Summary:**

This trial evaluated multiple two-pass herbicide programs with layered residuals from several company portfolios for season-long waterhemp control in Enlist soybean. The trial was located in a grower's field with a heavy population of glyphosate-resistant waterhemp. There was minor injury from the PRE herbicides observed 21 days after application (Table 19). Treatments with flumioxazin tended to have greater % injury. No injury symptoms were visible 15 days after the POST application.

Several of the PRE herbicides provided good to excellent early-season residual control of waterhemp, velvetleaf, and wild-proso millet 21 days after application (Table 19). Residual control of some treatments fell below 80% by 32 days after PRE application. All but one treatment (trt 14) had at least 90% waterhemp control at soybean harvest. Velvetleaf and wild-proso millet control was 99% or greater for all herbicide programs at soybean harvest.

Yield was very similar among herbicide programs (Table 19). Yield across all herbicide treatments = 62 bu acre<sup>-1</sup>, while the untreated check was 29 bu acre<sup>-1</sup>.

Plot photos from throughout the growing season are available at [Evaluation of Layered Residual Herbicide Programs in Enlist Soybean](#) published on [wiscweeds.info](http://wiscweeds.info).

**Table 19.** Crop injury, weed control ratings, and soybean yield for trial #21-BRO-SB10 at Brooklyn, WI.<sup>a</sup>

| Trt # Herbicide (rate acre <sup>-1</sup> )                                                                        | Injury (%)      |              | Waterhemp (%) |                 |                 |                 | Velvetleaf (%) |                 |              |              | Wild-Proso Millet |              |              | Yield <sup>b</sup><br>bu acre <sup>-1</sup> |
|-------------------------------------------------------------------------------------------------------------------|-----------------|--------------|---------------|-----------------|-----------------|-----------------|----------------|-----------------|--------------|--------------|-------------------|--------------|--------------|---------------------------------------------|
|                                                                                                                   | 6/4             | 6/30         | 6/4           | 6/15            | 6/30            | 9/21            | 6/4            | 6/15            | 6/30         | 9/21         | 6/15              | 6/30         | 9/21         |                                             |
| 1 Untreated Check                                                                                                 | 0               | 0            | 0             | 0               | 0               | 0               | 0              | 0               | 0            | 0            | 0                 | 0            | 0            | 29 d                                        |
| <b>Two-Pass – PRE (5/14) fb POST (6/15)</b>                                                                       |                 |              |               |                 |                 |                 |                |                 |              |              |                   |              |              |                                             |
| 2 Boundary (29 fl oz) <b>fb</b><br>Sequence (3 pt) + Enlist One (32 fl oz) + Class Act Ridion 1% v/v              | 1.3             | 0            | 94            | 92              | 97              | 95              | 97             | 95              | 100          | 100          | 95                | 100          | 100          | 66 a                                        |
| 3 Prefix (2 pt) + Tricor DF (6 oz) <b>fb</b><br>Sequence (3 pt) + Enlist One (32 fl oz) + Class Act Ridion 1% v/v | 1.0             | 0            | 90            | 77              | 92              | 90              | 96             | 84              | 100          | 99           | 56                | 100          | 99           | 62 abc                                      |
| 4 Tendovo (4 pt) <b>fb</b><br>Sequence (3 pt) + Enlist One (32 fl oz) + Class Act Ridion 1% v/v                   | 2.0             | 0            | 95            | 93              | 98              | 95              | 100            | 100             | 100          | 99           | 93                | 100          | 100          | 60 c                                        |
| 5 Broadaxe XC (30 fl oz) <b>fb</b><br>Sequence (3 pt) + Enlist One (32 fl oz) + Class Act Ridion 1% v/v           | 1.3             | 0            | 94            | 85              | 93              | 94              | 96             | 92              | 100          | 100          | 87                | 100          | 100          | 63 abc                                      |
| 6 Sonic (5 oz) <b>fb</b><br>Enlist One (32 fl oz) + Durango (24 fl oz) + EverpreX (1 pt) + AMS (3 lb)             | 1.0             | 0            | 88            | 70              | 92              | 95              | 100            | 100             | 100          | 100          | 80                | 100          | 99           | 60 c                                        |
| 7 Sonic (5 oz) <b>fb</b><br>Enlist One (32 fl oz) + Liberty (32 fl oz) + EverpreX (1 pt) + AMS (3 lb)             | 1.0             | 0            | 90            | 74              | 98              | 98              | 100            | 100             | 100          | 100          | 82                | 99           | 98           | 64 ab                                       |
| 8 Surveil (3 oz) <b>fb</b><br>Enlist One (32 fl oz) + Durango (24 fl oz) + EverpreX (1 pt) + AMS (3 lb)           | 4.3             | 0            | 87            | 68              | 91              | 96              | 98             | 100             | 100          | 100          | 49                | 100          | 100          | 64 abc                                      |
| 9 Kyber (1 pt) <b>fb</b><br>Enlist One (32 fl oz) + Durango (24 fl oz) + EverpreX (1 pt) + AMS (3 lb)             | 1.3             | 0            | 89            | 71              | 93              | 94              | 94             | 87              | 100          | 100          | 61                | 100          | 100          | 63 abc                                      |
| 10 Afforia (2.5 oz) <b>fb</b><br>Enlist One (32 fl oz) + Durango (24 fl oz) + EverpreX (1 pt) + AMS (3 lb)        | 3.8             | 0            | 88            | 70              | 93              | 96              | 95             | 88              | 100          | 99           | 54                | 100          | 100          | 63 abc                                      |
| 11 Fierce EZ (6 fl oz) <b>fb</b><br>Enlist One (32 oz)+Roundup PM (32 oz)+Perpetuo (6 fl oz)+AMS (3 lb)           | 4.5             | 0            | 94            | 80              | 98              | 95              | 95             | 96              | 100          | 100          | 82                | 100          | 100          | 61 bc                                       |
| 12 Fierce MTZ (1 pt) <b>fb</b><br>Enlist One (32 oz)+Roundup PM (32 oz)+Perpetuo (6 fl oz)+AMS (3 lb)             | 1.0             | 0            | 81            | 66              | 96              | 95              | 91             | 78              | 100          | 100          | 58                | 100          | 100          | 60 c                                        |
| 13 Fierce XLT (4 oz) <b>fb</b><br>Enlist One (32 oz)+Roundup PM (32 oz)+Perpetuo (6 fl oz)+AMS (3 lb)             | 3.0             | 0            | 97            | 89              | 99              | 96              | 98             | 100             | 100          | 100          | 86                | 100          | 100          | 60 bc                                       |
| 14 Zidua PRO (6 fl oz) <b>fb</b><br>Liberty (32 fl oz) + Zidua SC (2.5 fl oz) + AMS (3 lb)                        | 3.0             | 0            | 96            | 86              | 95              | 83              | 99             | 99              | 100          | 100          | 92                | 100          | 99           | 60 bc                                       |
| 15 Zidua PRO (6 fl oz) <b>fb</b><br>Enlist One (32 fl oz)+ Liberty (32 fl oz)+ Zidua SC (2.5 fl oz)+ AMS (3 lb)   | 1.0             | 0            | 90            | 82              | 98              | 97              | 100            | 100             | 100          | 100          | 95                | 99           | 99           | 60 bc                                       |
| 16 Authority Supreme (6.5 fl oz) <b>fb</b><br>Liberty (32 fl oz) + Anthem Maxx (2.5 fl oz) + AMS (3 lb)           | 1.5             | 0            | 92            | 87              | 97              | 90              | 98             | 96              | 100          | 100          | 86                | 100          | 99           | 61 bc                                       |
| <b>LSD (<math>\alpha=0.10</math>)</b>                                                                             | <b>1.2</b>      | <b>ns</b>    | <b>6</b>      | <b>7</b>        | <b>3</b>        | <b>4</b>        | <b>4</b>       | <b>6</b>        | <b>ns</b>    | <b>ns</b>    | <b>13</b>         | <b>ns</b>    | <b>ns</b>    | <b>5</b>                                    |
| <b>p value</b>                                                                                                    | <b>&lt;.001</b> | <b>1.000</b> | <b>0.006</b>  | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>0.002</b>   | <b>&lt;.001</b> | <b>1.000</b> | <b>0.510</b> | <b>&lt;.001</b>   | <b>0.471</b> | <b>0.841</b> | <b>&lt;0.001</b>                            |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Yield values with the same letter are not significantly different.

**Project Goal:** Compare the residual weed control and crop safety of Tendovo to other Syngenta and competitor preemergence soybean herbicides.

**\*Tendovo 4.14 ZC** is a new premix offering from Syngenta containing 3.33 lb/gal S-metolachlor; 0.64 lb/gal metribuzin; and 0.06 lb/gal cloransulam. Registration is expected sometime in 2022.

#### Site Description:

|                       |                                                                                                |                        |                    |
|-----------------------|------------------------------------------------------------------------------------------------|------------------------|--------------------|
| <b>Location:</b>      | Janesville, WI                                                                                 | <b>Crop:</b>           | Enlist soybean     |
| <b>Field #:</b>       | 7                                                                                              | <b>Variety:</b>        | S20-E3             |
| <b>Soil type:</b>     | Plano silt loam                                                                                | <b>Planting Date:</b>  | 5/3                |
| <b>% OM:</b>          | 3.3                                                                                            | <b>Emergence Date:</b> | 5/21               |
| <b>pH:</b>            | 6.7                                                                                            | <b>Population:</b>     | 140,000 seeds/acre |
| <b>Fertilization:</b> | -                                                                                              | <b>Depth:</b>          | 1.25               |
| <b>Previous crop:</b> | Corn                                                                                           | <b>Row spacing:</b>    | 30 in              |
| <b>Tillage:</b>       | Conventional                                                                                   | <b>Plot Size:</b>      | 10 x 30 ft         |
| <b>Weed species:</b>  | giant ragweed (AMBTR), velvetleaf (ABUTH), common lambsquarters (CHEAL), giant foxtail (SETFA) |                        |                    |

#### Herbicide Application Information:

|                                      |            |            |           |
|--------------------------------------|------------|------------|-----------|
| <b>Date:</b>                         | 5/3        | 6/2        | 7/1       |
| <b>Treatment:</b>                    | PRE (A)    | POST (B)   | LPOST (C) |
| <b>Air Temp (°F):</b>                | 76         | 86         | 71        |
| <b>2" Soil Temp (°F):</b>            | 60         | 72         | -         |
| <b>Soil moisture [surface]:</b>      | dry        | dry        | dry       |
| <b>RH %:</b>                         | 56         | 32         | 79        |
| <b>Cloud cover %</b>                 | 98         | 45         | -         |
| <b>Wind speed (mph)/direction</b>    | 1-5/NW     | 1-6        | -         |
| <b>Rainfall (in) 1 wk after APP:</b> | 1.55"      | 0.03"      | 0.22"     |
| <b>GPA:</b>                          | 15         | 15         | 13        |
| <b>PSI:</b>                          | 35         | 34         | -         |
| <b>Nozzle:</b>                       | TTI 110015 | AIXR110015 | TT 11002  |
| <b>Nozzle spacing (in):</b>          | 20         | 20         | 20        |
| <b>Boom Height (in):</b>             | 20         | 24         | 34        |

#### Crop and Weed Information at Application:

|                      |                 |                      |                      |              |
|----------------------|-----------------|----------------------|----------------------|--------------|
|                      | <b>Date:</b>    | 5/3*                 | 6/2                  | 7/1          |
| <b>Soybean</b>       | <b>Height:</b>  | -                    | 2-3"                 | 10-12"       |
|                      | <b>Stage:</b>   | -                    | VC                   | R1           |
| <b>giant ragweed</b> | <b>Height:</b>  | -                    | 1-3.5"               | 4-14" Avg=6" |
|                      | <b>Density:</b> | 38-85/m <sup>2</sup> | 17-28/m <sup>2</sup> |              |
| <b>velvetleaf</b>    | <b>Height:</b>  | -                    |                      |              |
|                      | <b>Density:</b> | 2-18/m <sup>2</sup>  |                      |              |
| <b>lambsquarters</b> | <b>Height:</b>  | -                    |                      |              |
|                      | <b>Density:</b> | 1-25/m <sup>2</sup>  |                      |              |
| <b>giant foxtail</b> | <b>Height:</b>  | -                    |                      |              |
|                      | <b>Density:</b> | 8-55/ft <sup>2</sup> |                      |              |

\*Weed density in the untreated check 21 days after the PRE application.

| Trt # | Treatment        | Formulation  | SOA Group | Rate       | App Timing | App Code |
|-------|------------------|--------------|-----------|------------|------------|----------|
| 1     | Untreated Check  |              |           |            |            |          |
| 2     | <b>Tendovo*</b>  | 4.03 lb/gal  | 2, 5, 15  | 3.5 pt/a   | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3.5 pt/a   | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
|       | Liberty          | 2.34 lb/gal  | 10        | 32 fl oz/a | LPOST      | C        |
|       | AMS              |              |           | 2 lb/a     | LPOST      | C        |
| 3     | <b>Tendovo*</b>  | 4.03 lb/gal  | 2, 5, 15  | 4.2 pt/a   | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3.5 pt/a   | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
|       | Liberty          | 2.34 lb/gal  | 10        | 32 fl oz/a | LPOST      | C        |
|       | AMS              |              |           | 2 lb/a     | LPOST      | C        |
| 4     | Boundary         | 6.5 lb/gal   | 5, 15     | 29 fl oz/a | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3.5 pt/a   | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
|       | Liberty          | 2.34 lb/gal  | 10        | 32 fl oz/a | LPOST      | C        |
|       | AMS              |              |           | 2 lb/a     | LPOST      | C        |
| 5     | Broadaxe XC      | 7 lb/gal     | 14, 15    | 25 fl oz/a | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3.5 pt/a   | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
|       | Liberty          | 2.34 lb/gal  | 10        | 32 fl oz/a | LPOST      | C        |
|       | AMS              |              |           | 2 lb/a     | LPOST      | C        |
| 6     | Sonic            | 70% w/w      | 2, 14     | 6.45 oz/a  | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3.5 pt/a   | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
|       | Liberty          | 2.34 lb/gal  | 10        | 32 fl oz/a | LPOST      | C        |
|       | AMS              |              |           | 2 lb/a     | LPOST      | C        |
| 7     | Fierce XLT       | 62.4% w/w    | 2, 14, 15 | 4.5 oz/a   | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3.5 pt/a   | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
|       | Liberty          | 2.34 lb/gal  | 10        | 32 fl oz/a | LPOST      | C        |
|       | AMS              |              |           | 2 lb/a     | LPOST      | C        |

**Adjuvants:** AMS = BlueAg spray grade ammonium sulfate; Class Act Ridion = non-AMS water conditioner + NIS

**\*Tendovo 4.14 ZC** is a new premix offering from Syngenta containing 3.33 lb/gal S-metolachlor; 0.64 lb/gal metribuzin; and 0.06 lb/gal cloransulam. Registration is expected sometime in 2022.

| Trt # | Treatment        | Formulation  | SOA Group | Rate       | App Timing | App Code |
|-------|------------------|--------------|-----------|------------|------------|----------|
| 8     | Zidua PRO        | 4.09 lb/gal  | 2, 14, 15 | 6 fl oz/a  | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3.5 pt/a   | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
|       | Liberty          | 2.34 lb/gal  | 10        | 32 fl oz/a | LPOST      | C        |
|       | AMS              |              |           | 2 lb/a     | LPOST      | C        |
| 9     | Authority Edge   | 4.25 lb/gal  | 14, 15    | 9 fl oz/a  | PRE        | A        |
|       | Enlist One       | 3.8 lbae/gal | 4         | 32 fl oz/a | POST       | B        |
|       | Sequence         | 5.25 lb/gal  | 9, 15     | 3.5 pt/a   | POST       | B        |
|       | Class Act Ridion |              |           | 1% v/v     | POST       | B        |
|       | Liberty          | 2.34 lb/gal  | 10        | 32 fl oz/a | LPOST      | C        |
|       | AMS              |              |           | 2 lb/a     | LPOST      | C        |

**Adjuvants:** AMS = BlueAg spray grade ammonium sulfate; Class Act Ridion = non-AMS water conditioner + NIS

#### Trial Summary:

This trial compared the efficacy and crop safety of **Tendovo** to other Syngenta and competitor preemergence soybean herbicides in Enlist soybeans. **Tendovo 4.14 ZC** is a new premix offering from Syngenta containing 3.33 lb/gal S-metolachlor; 0.64 lb/gal metribuzin; and 0.06 lb/gal cloransulam. Registration is expected sometime in 2022. There was no observable soybean injury from the PRE herbicides (data not shown). There was minor (5-7%) soybean leaf necrosis 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. None of the PRE herbicides provided >80% residual control of giant ragweed 21 days after application (Table 20). Tendovo, Sonic, Fierce XLT, and Zidua PRO all provided statistically similar control 21 DAT. Velvetleaf control for these herbicides was also much greater. All these herbicides include a group 2 (ALS) herbicide. The POST application of Enlist One + Sequence was effective at controlling all weeds emerged at application (98-100%); however, several giant ragweed seedlings had emerged after the application had been made. This is evident by the poor control 28 days after application on 7/1. A rescue application of Liberty was made at this time to control weed escapes. Even three herbicide applications were not enough to achieve >90% control at soybean harvest for some of the treatments. Treatments with less effective PRE herbicides (Boundary, Broadaxe) tended to have less control at the end of the season.

Yield was very similar among herbicide programs (Table 20). Yield across all herbicide treatments = 67 bu acre<sup>-1</sup>, while the untreated check was 0 bu acre<sup>-1</sup>, an indication of the very high giant ragweed competition at this location.

Plot photos from throughout the growing season are available at [Evaluation of Tendovo for Residual Weed Control and Crop Safety](#) published on [wiscweeds.info](http://wiscweeds.info).

Table 20. Weed control ratings and soybean yield for trial #21-ROK-SB11 at Janesville, WI.<sup>a</sup>

| Trt #                                                                    | Herbicide (rate acre <sup>-1</sup> )                                                                                          | Giant Ragweed (%) |       |       |       |       | Velvetleaf (%) |       |       | Lambsquarters (%) |       |       | Giant Foxtail (%) |       |       |       | Yield <sup>b</sup><br>bu acre <sup>-1</sup> |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------|-------|-------|-------|-------|----------------|-------|-------|-------------------|-------|-------|-------------------|-------|-------|-------|---------------------------------------------|
|                                                                          |                                                                                                                               | 5/24              | 6/2   | 6/15  | 7/1   | 10/1  | 6/2            | 6/15  | 10/1  | 6/2               | 6/15  | 10/1  | 6/2               | 6/15  | 7/1   | 10/1  |                                             |
| 1                                                                        | Untreated Check                                                                                                               | 0                 | 0     | 0     | 0     | 0     | 0              | 0     | 0     | 0                 | 0     | 0     | 0                 | 0     | 0     | 0     | 0 c                                         |
| <b>Three-Pass – PRE (5/3) <i>fb</i> POST (6/2) <i>fb</i> LPOST (7/1)</b> |                                                                                                                               | <b>POST</b>       |       |       |       |       | <b>LPOST</b>   |       |       |                   |       |       |                   |       |       |       |                                             |
| 2                                                                        | Tendofo (3.5 pt) <i>fb</i><br>Enlist One (32 fl oz) + Sequence (3.5 pt)* <i>fb</i><br>Liberty (32 fl oz) + AMS (2 lb)         | 68                | 58    | 93    | 73    | 93    | 99             | 100   | 100   | 99                | 100   | 100   | 85                | 99    | 83    | 94    | 69 a                                        |
| 3                                                                        | Tendofo (4.2 pt) <i>fb</i><br>Enlist One (32 fl oz) + Sequence (3.5 pt)* <i>fb</i><br>Liberty (32 fl oz) + AMS (2 lb)         | 66                | 61    | 93    | 73    | 99    | 100            | 100   | 100   | 100               | 100   | 100   | 82                | 99    | 80    | 97    | 70 a                                        |
| 4                                                                        | Boundary (29 fl oz) <i>fb</i><br>Enlist One (32 fl oz) + Sequence (3.5 pt)* <i>fb</i><br>Liberty (32 fl oz) + AMS (2 lb)      | 16                | 3     | 96    | 80    | 89    | 65             | 100   | 100   | 97                | 100   | 100   | 54                | 100   | 86    | 92    | 65 ab                                       |
| 5                                                                        | Broadaxe XC (25 fl oz) <i>fb</i><br>Enlist One (32 fl oz) + Sequence (3.5 pt)* <i>fb</i><br>Liberty (32 fl oz) + AMS (2 lb)   | 13                | 3     | 96    | 83    | 79    | 58             | 100   | 100   | 99                | 100   | 100   | 81                | 100   | 87    | 90    | 63 b                                        |
| 6                                                                        | Sonic (6.45 oz) <i>fb</i><br>Enlist One (32 fl oz) + Sequence (3.5 pt)* <i>fb</i><br>Liberty (32 fl oz) + AMS (2 lb)          | 77                | 66    | 95    | 76    | 99    | 98             | 100   | 100   | 100               | 100   | 100   | 88                | 96    | 76    | 99    | 68 ab                                       |
| 7                                                                        | Fierce XLT (4.5 oz) <i>fb</i><br>Enlist One (32 fl oz) + Sequence (3.5 pt)* <i>fb</i><br>Liberty (32 fl oz) + AMS (2 lb)      | 67                | 63    | 91    | 63    | 92    | 100            | 100   | 100   | 100               | 100   | 100   | 97                | 99    | 86    | 99    | 67 ab                                       |
| 8                                                                        | Zidua PRO (6 fl oz) <i>fb</i><br>Enlist One (32 fl oz) + Sequence (3.5 pt)* <i>fb</i><br>Liberty (32 fl oz) + AMS (2 lb)      | 79                | 77    | 94    | 75    | 98    | 100            | 100   | 100   | 100               | 100   | 100   | 99                | 100   | 97    | 99    | 65 ab                                       |
| 9                                                                        | Authority Edge (9 fl oz) <i>fb</i><br>Enlist One (32 fl oz) + Sequence (3.5 pt)* <i>fb</i><br>Liberty (32 fl oz) + AMS (2 lb) | 31                | 11    | 95    | 81    | 95    | 62             | 100   | 100   | 99                | 100   | 100   | 91                | 96    | 84    | 95    | 65 ab                                       |
| LSD ( $\alpha=0.10$ )                                                    |                                                                                                                               | 17                | 10    | 3     | 6     | 4     | 16             | ns    | ns    | ns                | ns    | ns    | 16                | ns    | ns    | 6     | 6                                           |
| p value                                                                  |                                                                                                                               | <.001             | <.001 | 0.039 | <.001 | <.001 | <.001          | 1.000 | 1.000 | 0.304             | 1.000 | 1.000 | 0.004             | 0.450 | 0.132 | 0.098 | <0.001                                      |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Yield values with the same letter are not significantly different.

\*Class Act Ridion at 1% v/v was included in the first POST application of Enlist One + Sequence.

**Project Goal:** Evaluate Reviton for control of weeds in a burndown management situation.

#### Site Description:

|                       |                                                                                                                   |                        |                    |
|-----------------------|-------------------------------------------------------------------------------------------------------------------|------------------------|--------------------|
| <b>Location:</b>      | Arlington, WI                                                                                                     | <b>Crop:</b>           | Soybean            |
| <b>Field #:</b>       | 452                                                                                                               | <b>Variety:</b>        | AG15XF1            |
| <b>Soil type:</b>     | Plano silt loam                                                                                                   | <b>Planting Date:</b>  | 6/1                |
| <b>% OM:</b>          | 3.2                                                                                                               | <b>Emergence Date:</b> | 6/9                |
| <b>pH:</b>            | 6.7                                                                                                               | <b>Population:</b>     | 140,000 seeds/acre |
| <b>Fertilization:</b> | -                                                                                                                 | <b>Depth:</b>          | 1.25 in            |
| <b>Previous crop:</b> | Soybean                                                                                                           | <b>Row spacing:</b>    | 30 in              |
| <b>Tillage:</b>       | no-till                                                                                                           | <b>Plot Size:</b>      | 10 x 25 ft         |
| <b>Weed species:</b>  | glyphosate resistant marestail (ERICA); dandelion (TAROF); common lambsquarters (CHEAL); shepherd's purse (CAPBP) |                        |                    |

#### Herbicide Application Information:

|                                      |              |
|--------------------------------------|--------------|
| <b>Date:</b>                         | 5/12         |
| <b>Treatment:</b>                    | Burndown (A) |
| <b>Air Temp (°F):</b>                | 66           |
| <b>2" Soil Temp (°F):</b>            | 65           |
| <b>Soil moisture [surface]:</b>      | dry          |
| <b>RH %:</b>                         | 20           |
| <b>Cloud cover %</b>                 | 40           |
| <b>Wind speed (mph)/direction</b>    | 0-2          |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.3"         |
| <b>GPA:</b>                          | 15           |
| <b>PSI:</b>                          | 34           |
| <b>Nozzle:</b>                       | TT 110015    |
| <b>Nozzle spacing (in):</b>          | 20           |
| <b>Boom Height (in):</b>             | 23           |

#### Crop and weed information at application:

|                         |                  |                      |
|-------------------------|------------------|----------------------|
|                         | <b>Date:</b>     | 5/12                 |
| <b>Soybean</b>          | <b>Height:</b>   | -                    |
|                         | <b>Stage:</b>    | -                    |
| <b>Marestail</b>        | <b>Height:</b>   | 0.5-6" Avg=3"        |
|                         | <b>Density:</b>  | 1-27/ft <sup>2</sup> |
| <b>Dandelion</b>        | <b>Diameter:</b> | 1-7"                 |
|                         | <b>Density:</b>  | 0-5/ft <sup>2</sup>  |
| <b>Lambsquarters</b>    | <b>Height:</b>   | 1-2"                 |
|                         | <b>Density:</b>  | 2-5/ft <sup>2</sup>  |
| <b>Shepherd's Purse</b> | <b>Height:</b>   | 0.5-4"               |
|                         | <b>Density:</b>  | 0-5/ft <sup>2</sup>  |

| Trt # | Treatment           | Formulation  | SOA Group | Rate           | App Timing | App Code |
|-------|---------------------|--------------|-----------|----------------|------------|----------|
| 1     | Untreated Check     |              |           |                |            |          |
| 2     | Reviton             | 2.83 lb/gal  | 14        | 2 fl oz/a      | Burndown   | A        |
|       | Destiny HC          |              |           | 0.25% v/v      | Burndown   | A        |
| 3     | Reviton             | 2.83 lb/gal  | 14        | 1 fl oz/a      | Burndown   | A        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 22 fl oz/a     | Burndown   | A        |
|       | Destiny HC          |              |           | 0.25% v/v      | Burndown   | A        |
|       | AMS                 |              |           | 8.5 lb/100 gal | Burndown   | A        |
| 4     | Sharpen             | 2.85 lb/gal  | 14        | 1.5 fl oz/a    | Burndown   | A        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 22 fl oz/a     | Burndown   | A        |
|       | Destiny HC          |              |           | 0.25% v/v      | Burndown   | A        |
|       | AMS                 |              |           | 8.5 lb/100 gal | Burndown   | A        |
| 5     | Reviton             | 2.83 lb/gal  | 14        | 1 fl oz/a      | Burndown   | A        |
|       | Zone Elite          | 7 lb/gal     | 14, 15    | 30 fl oz/a     | Burndown   | A        |
|       | Roundup PowerMAX II | 4.5 lbae/gal | 9         | 22 fl oz/a     | Burndown   | A        |
|       | Destiny HC          |              |           | 0.25% v/v      | Burndown   | A        |
|       | AMS                 |              |           | 8.5 lb/100 gal | Burndown   | A        |

**Adjuvants:** AMS = BlueAg spray grade ammonium sulfate; Destiny HC = high surfactant oil concentrate (HSOC)

#### Trial Summary:

This trial evaluated Reviton for control of weeds in a burndown management situation before planting soybean. Reviton (tiafenacil; group 14) is a relatively new herbicide offering from Helm Agro which can be used as part of a pre-plant burndown before corn, soybean, and wheat. There is a 14 day preplant interval before soybean. For this trial, soybean was planted 20 days after the burndown application. There was no observable soybean injury from any of the herbicide programs (data not shown).

Glyphosate-resistant marestail was the predominant weed species in the trial area. Dandelion common lambsquarters, and shepherd's purse were also rated for burndown control. Weed control was impacted by burndown herbicide program (Table 21). Initial control was excellent for all treatments across all four weed species 5 days after treatment (DAT); however, there was regrowth of previously burndowned marestail and dandelion plants. Sharpen + Roundup outperformed all treatments containing Reviton. If horseweed is present, an appropriate tank mix partner should be included with Reviton to achieve adequate control. Reviton alone and with tank mix partners provided excellent shepherd's purse control.

Plot photos from throughout the growing season are available at [Reviton Burndown Programs in Soybean](#) published on [wiscweeds.info](#).

**Table 21.** Weed control ratings for trial #21-ARL-SB12 at Arlington, WI.<sup>a</sup>

| Trt #                                       | Herbicide (rate acre <sup>-1</sup> )                                                               | Marestail <sup>b</sup> (%) |                  |                  | Dandelion (%) |                  |              | Lambsquarters (%) |                  |                  | Shepherd's Purse (%) |              |              |
|---------------------------------------------|----------------------------------------------------------------------------------------------------|----------------------------|------------------|------------------|---------------|------------------|--------------|-------------------|------------------|------------------|----------------------|--------------|--------------|
|                                             |                                                                                                    | 5 DAT                      | 14 DAT           | 22 DAT           | 5 DAT         | 14 DAT           | 22 DAT       | 5 DAT             | 14 DAT           | 22 DAT           | 5 DAT                | 14 DAT       | 22 DAT       |
| 1                                           | Untreated Check                                                                                    | 0                          | 0                | 0                | 0             | 0                | 0            | 0                 | 0                | 0                | 0                    | 0            | 0            |
| <b>One-Pass – Pre-plant Burndown (5/12)</b> |                                                                                                    |                            |                  |                  |               |                  |              |                   |                  |                  |                      |              |              |
| 2                                           | Reviton (2 oz) + Destiny HC 0.25% v/v                                                              | 96                         | 79               | 68               | 98            | 70               | 50           | 97                | 73               | 61               | 93                   | 100          | 100          |
| 3                                           | Reviton (1 oz) + Roundup PM (22 oz) + Destiny HC 0.25% v/v + AMS <sup>c</sup>                      | 91                         | 77               | 61               | 98            | 96               | 77           | 99                | 100              | 94               | 91                   | 100          | 100          |
| 4                                           | Sharpen (1.5 oz) + Roundup PM (22 oz) + Destiny HC 0.25% v/v + AMS <sup>c</sup>                    | 99                         | 95               | 90               | 98            | 99               | 89           | 98                | 99               | 96               | 97                   | 100          | 100          |
| 5                                           | Reviton (1 oz) + Zone Elite (30 oz) + Roundup PM (22 oz) + Destiny HC 0.25% v/v + AMS <sup>c</sup> | 97                         | 88               | 76               | 99            | 95               | 80           | 99                | 100              | 100              | 96                   | 100          | 100          |
| <b>LSD (<math>\alpha=0.10</math>)</b>       |                                                                                                    | <b>3</b>                   | <b>3</b>         | <b>6</b>         | <b>ns</b>     | <b>8</b>         | <b>15</b>    | <b>2</b>          | <b>5</b>         | <b>5</b>         | <b>ns</b>            | <b>ns</b>    | <b>ns</b>    |
| <b>p value</b>                              |                                                                                                    | <b>0.008</b>               | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>0.406</b>  | <b>&lt;0.001</b> | <b>0.006</b> | <b>0.086</b>      | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>0.142</b>         | <b>1.000</b> | <b>1.000</b> |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Marestail population is glyphosate resistant.<sup>c</sup>Spray grade AMS applied at 8.5 lb/100 gal.

**Project Goal:** Evaluate herbicide programs to provide recommendations for XtendFlex soybean weed management in counties under restrictions from the endangered species act (ESA).

#### Site Description:

|                       |                                                                                           |                        |                    |
|-----------------------|-------------------------------------------------------------------------------------------|------------------------|--------------------|
| <b>Location:</b>      | Brooklyn, WI                                                                              | <b>Crop:</b>           | XtendFlex soybean  |
| <b>Field #:</b>       | OB-1                                                                                      | <b>Variety:</b>        | AG20XF1            |
| <b>Soil type:</b>     | Kegonsa silt loam                                                                         | <b>Planting Date:</b>  | 5/25               |
| <b>% OM:</b>          | 2                                                                                         | <b>Emergence Date:</b> | 6/2                |
| <b>pH:</b>            | 7.1                                                                                       | <b>Population:</b>     | 140,000 seeds/acre |
| <b>Fertilization:</b> | -                                                                                         | <b>Depth:</b>          | 1.25 in            |
| <b>Previous crop:</b> | Seed Corn                                                                                 | <b>Row spacing:</b>    | 30 in              |
| <b>Tillage:</b>       | conventional                                                                              | <b>Plot Size:</b>      | 10 x 30 ft         |
| <b>Weed species:</b>  | glyphosate resistant waterhemp (AMATA); velvetleaf (ABUTH); common lambsquarters; (CHEAL) |                        |                    |

#### Herbicide Application Information:

|                                      |            |           |
|--------------------------------------|------------|-----------|
| <b>Date:</b>                         | 5/26       | 6/22      |
| <b>Treatment:</b>                    | PRE (A)    | POST (B)  |
| <b>Air Temp (°F):</b>                | 73         | 65        |
| <b>2" Soil Temp (°F):</b>            | 69         | 51        |
| <b>Soil moisture [surface]:</b>      | dry        | damp      |
| <b>RH %:</b>                         | 58         | 51        |
| <b>Cloud cover %</b>                 | 55         | 10        |
| <b>Wind speed (mph)/direction</b>    | 6-12/NW    | 3-10/W    |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.61"      | 3.21"     |
| <b>GPA:</b>                          | 15         | 15        |
| <b>PSI:</b>                          | 34         | 34        |
| <b>Nozzle:</b>                       | TTI 110015 | TT 110015 |
| <b>Nozzle spacing (in):</b>          | 20         | 20        |
| <b>Boom Height (in):</b>             | 20         | 24        |

#### Crop and weed information at application:

|                      |              |      |                    |
|----------------------|--------------|------|--------------------|
|                      | <b>Date:</b> | 5/26 | 6/22               |
| <b>Soybean</b>       | Height:      | -    | -                  |
|                      | Stage:       | -    | V3                 |
| <b>waterhemp</b>     | Height:      | -    | 1-4"               |
|                      | Density:     | -    | 0-8/m <sup>2</sup> |
| <b>velvetleaf</b>    | Height:      | -    | 1-4"               |
|                      | Density:     | -    | 0-4/m <sup>2</sup> |
| <b>lambsquarters</b> | Height:      | -    | 0.5-4"             |
|                      | Density:     | -    | 0-4/m <sup>2</sup> |

\*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     | 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        |
|       | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | POST       | B        |
|       | AMS                |               |           | 2.5% v/v   | POST       | B        |
| 3     | Fierce EZ          | 3.04 lb/gal   | 14, 15    | 6 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        |
|       | Liberty            | 2.34 lb/gal   | 10        | 32 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | POST       | B        |
|       | AMS                |               |           | 2.5% v/v   | POST       | B        |
| 4     | 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        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal  | 9         | 30 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | POST       | B        |
|       | AMS                |               |           | 2.5% v/v   | POST       | B        |
| 5     | Fierce EZ          | 3.04 lb/gal   | 14, 15    | 6 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        |
|       | Liberty            | 2.34 lb/gal   | 10        | 32 fl oz/a | POST       | B        |
|       | Roundup PowerMAX 3 | 4.8 lbae/gal  | 9         | 30 fl oz/a | POST       | B        |
|       | <b>MON 301668*</b> | 4.61 lb/gal   | 15        | 30 fl oz/a | POST       | B        |
|       | AMS                |               |           | 2.5% v/v   | POST       | B        |
| 6     | Fierce EZ          | 3.04 lb/gal   | 14, 15    | 6 fl oz/a  | PRE        | A        |
|       | Warrant Ultra      | 3.45 lb/gal   | 14, 15    | 48 fl oz/a | POST       | B        |
|       | Liberty            | 2.34 lb/gal   | 10        | 32 fl oz/a | POST       | B        |
|       | AMS                |               |           | 2.5% v/v   | POST       | B        |
| 7     | Fierce EZ          | 3.04 lb/gal   | 14, 15    | 6 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        |
|       | Warrant Ultra      | 3.45 lb/gal   | 14, 15    | 48 fl oz/a | POST       | B        |
|       | Liberty            | 2.34 lb/gal   | 10        | 32 fl oz/a | POST       | B        |
|       | AMS                |               |           | 2.5% v/v   | POST       | B        |
| 8     | Fierce EZ          | 3.04 lb/gal   | 14, 15    | 6 fl oz/a  | PRE        | A        |
|       | Warrant Ultra      | 3.45 lb/gal   | 14, 15    | 48 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         | 30 fl oz/a | POST       | B        |
|       | AMS                |               |           | 2.5% v/v   | POST       | B        |
| 9     | Fierce EZ          | 3.04 lb/gal   | 14, 15    | 6 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        |
|       | Warrant Ultra      | 3.45 lb/gal   | 14, 15    | 48 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         | 30 fl oz/a | POST       | B        |
|       | AMS                |               |           | 2.5% v/v   | POST       | B        |

**Adjuvants:** AMS = Amsol (liquid AMS); VaporGrip Xtra = volatility reducing agent (VRA)

\***MON301668** is an experimental formulation of encapsulated acetochlor similar to Warrant herbicide with a higher active ingredient load per gallon of formulated product.

### **Trial Summary:**

This trial evaluated multiple 2-pass herbicide programs to provide recommendations for weed management in XtendFlex soybeans in counties under restrictions from the endangered species act (ESA). Currently 26 Wisconsin counties are listed as counties under the ESA. Since, over the top applications of XtendiMax have further in field buffer requirements these programs were designed to avoid POST applications of XtendiMax all together. There was no observable soybean injury from the PRE herbicides (data not shown). There was soybean injury 8 and 16 days after the POST application (Table 22). Injury symptoms included leaf necrosis (burn) and leaf crinkling. Tank mixes with Warrant Ultra had the greatest % injury (~22%) while tank mixes with Liberty + MON 301668 had ~12% injury.

The trial was conducted in a field with a population of glyphosate-resistant waterhemp. All treatments provided excellent season long waterhemp control (Table 22). Waterhemp control from the PRE herbicides at the time of POST application was good to excellent ~88-97%. The addition of XtendiMax to the tank at the PRE application resulted in better control of waterhemp and other broadleaf species (velvetleaf, common lambsquarters) in the trial area. Averaged across all PRE treatments, broadleaf residual control of Fierce EZ + XtendiMax was 95% vs 83% of Fierce EZ alone. All POST herbicide programs provided excellent waterhemp control.

Yield differed among herbicide programs (Table 22). Treatments with applications of Warrant Ultra + Liberty POST had slightly lower yields when compared to other POST tank mixes.

Plot photos from throughout the growing season are available at [XtendFlex Soybean Herbicide Recommendations for ESA Counties](#) published on [wiscweeds.info](#).

**Table 22.** Soybean injury, weed control ratings, and soybean yield for trial #21-BRO-SB13 at Brooklyn, WI.<sup>a</sup>

| Trt #                                              | Herbicide (rate acre <sup>-1</sup> )                                                                                                     | Injury <sup>c</sup> (%) |                 | Waterhemp (%) |              |              |              | Overall <sup>d</sup> (%) |                 |              |              | Yield <sup>b</sup><br>bu acre <sup>-1</sup> |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|---------------|--------------|--------------|--------------|--------------------------|-----------------|--------------|--------------|---------------------------------------------|
|                                                    |                                                                                                                                          | 6/30                    | 7/7             | 6/16          | 6/22         | 7/7          | 9/21         | 6/16                     | 6/22            | 7/7          | 9/21         |                                             |
| 1                                                  | Untreated Check                                                                                                                          | 0                       | 0               | 0             | 0            | 0            | 0            | 0                        | 0               | 0            | 0            | 50 d                                        |
| <b>Two-Pass – PRE (5/26) <i>fb</i> POST (6/22)</b> |                                                                                                                                          |                         |                 |               |              |              |              |                          |                 |              |              |                                             |
| 2                                                  | Fierce EZ (6 fl oz) <i>fb</i><br>Liberty (32 fl oz) + MON 301668 (30 fl oz) + AMS**                                                      | 12.5                    | 10.0            | 95            | 91           | 100          | 99           | 90                       | 85              | 98           | 99           | 66 abc                                      |
| 3                                                  | Fierce EZ (6 fl oz) + XtendiMax (22 fl oz) * <i>fb</i><br>Liberty (32 fl oz) + MON 301668 (30 fl oz) + AMS**                             | 12.5                    | 10.5            | 98            | 96           | 100          | 100          | 97                       | 95              | 100          | 100          | 66 abc                                      |
| 4                                                  | Fierce EZ (6 fl oz) <i>fb</i><br>Liberty (32 fl oz) + Roundup PM3 (30 fl oz) + MON 301668 (30 fl oz) + AMS**                             | 12.0                    | 9.3             | 96            | 92           | 100          | 99           | 88                       | 81              | 99           | 99           | 68 ab                                       |
| 5                                                  | Fierce EZ (6 fl oz) + XtendiMax (22 fl oz) * <i>fb</i><br>Liberty (32 fl oz) + Roundup PM3 (30 fl oz) + MON 301668 (30 fl oz) + AMS**    | 12.0                    | 10.8            | 98            | 96           | 100          | 100          | 97                       | 96              | 100          | 100          | 69 a                                        |
| 6                                                  | Fierce EZ (6 fl oz) <i>fb</i><br>Warrant Ultra (48 fl oz) + Liberty (32 fl oz) + AMS**                                                   | 21.8                    | 16.3            | 94            | 90           | 99           | 100          | 87                       | 83              | 98           | 99           | 63 c                                        |
| 7                                                  | Fierce EZ (6 fl oz) + XtendiMax (22 fl oz) * <i>fb</i><br>Warrant Ultra (48 fl oz) + Liberty (32 fl oz) + AMS**                          | 21.3                    | 15.0            | 100           | 97           | 100          | 100          | 98                       | 96              | 100          | 100          | 63 c                                        |
| 8                                                  | Fierce EZ (6 fl oz) <i>fb</i><br>Warrant Ultra (48 fl oz) + Liberty (32 fl oz) + Roundup PM3 (30 fl oz) + AMS**                          | 23.3                    | 16.5            | 94            | 88           | 100          | 100          | 90                       | 85              | 97           | 98           | 66 abc                                      |
| 9                                                  | Fierce EZ (6 fl oz) + XtendiMax (22 fl oz) * <i>fb</i><br>Warrant Ultra (48 fl oz) + Liberty (32 fl oz) + Roundup PM3 (30 fl oz) + AMS** | 23.5                    | 16.3            | 99            | 97           | 100          | 100          | 96                       | 95              | 100          | 100          | 64 bc                                       |
| <b>LSD (<math>\alpha=0.10</math>)</b>              |                                                                                                                                          | <b>3.0</b>              | <b>1.9</b>      | <b>3</b>      | <b>4</b>     | <b>ns</b>    | <b>0.5</b>   | <b>3</b>                 | <b>4</b>        | <b>ns</b>    | <b>ns</b>    | <b>4</b>                                    |
| <b>p value</b>                                     |                                                                                                                                          | <b>&lt;.001</b>         | <b>&lt;.001</b> | <b>0.006</b>  | <b>0.002</b> | <b>0.168</b> | <b>0.080</b> | <b>&lt;.001</b>          | <b>&lt;.001</b> | <b>0.398</b> | <b>0.704</b> | <b>&lt;.001</b>                             |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>Yield values with the same letter are not significantly different.<sup>c</sup>Crop injury symptoms included leaf necrosis (burn) and leaf crinkling.<sup>d</sup>Overall weed control included all species in the trial area: waterhemp, velvetleaf, and common lambsquarters.

\*All PRE applications of XtendiMax included 20 fl oz/a VaporGrip Xtra, a volatility reducing agent.

\*\*Liquid AMS was applied at 2.5% v/v

**Project Goal:** Evaluate tank mixture combinations of Liberty with Enlist, Basagran, and PPO herbicides for waterhemp control and crop safety.

| Site Description               |                  |                  |                  |
|--------------------------------|------------------|------------------|------------------|
| Trial #:                       | 21-BRO-SB16      | 21-ARL-SB17      | 21-ROK-SB17      |
| Location:                      | Brooklyn, WI     | Arlington, WI    | Janesville, WI   |
| Soil Type:                     | Kegonsa          | Plano            | Plano            |
| Soil Texture % sand/silt/clay: | 40 / 41 / 19     | 4 / 71/ 25       | 8 / 66 / 26      |
| % OM:                          | 2                | 3.8              | 4.1              |
| pH:                            | 7.1              | 6.6              | 6.7              |
| Previous Crop:                 | seed corn        | corn             | corn             |
| Tillage:                       | conventional     | conventional     | conventional     |
| Variety:                       | P22T86E          | P22T86E          | P22T86E          |
| Planting Date:                 | 5/25             | 5/12             | 4/29             |
| Emergence Date:                | 6/2              | 5/20             | 5/14             |
| Seeding Rate:                  | 140,000 sds/acre | 140,000 sds/acre | 140,000 sds/acre |
| Depth:                         | 1.25 in          | 1.5 in           | 1.5 in           |
| Row Spacing:                   | 30 in            | 30 in            | 30 in            |
| Plot Size:                     | 10 x 30 ft       | 10 x 30 ft       | 10 x 30 ft       |

| Herbicide Application Information |             |         |             |         |             |         |  |
|-----------------------------------|-------------|---------|-------------|---------|-------------|---------|--|
| Trial #:                          | 21-BRO-SB16 |         | 21-ARL-SB17 |         | 21-ROK-SB17 |         |  |
| Date:                             | 5/26        | 6/30    | 5/12        | 6/28    | 4/29        | 6/18    |  |
| Treatment:                        | PRE (A)     | POST(B) | PRE (A)     | POST(B) | PRE (A)     | POST(B) |  |
| Air Temp (°F):                    | 73          | 74      | 70          | 74      | 85          | 76      |  |
| 2" Soil Temp (°F):                | 69          | 60      | 65          | 60      | 60          | 60      |  |
| Soil moisture [surface]:          | dry         | moist   | dry         | moist   | dry         | wet     |  |
| RH %:                             | 58          | 75      | 24          | 87      | 24          | 74      |  |
| Cloud cover %:                    | 55          | 10      | 40          | 100     | 30          | 95      |  |
| Wind speed (mph)/direction:       | 6-12/NW     | 0-4/W   | 3-6/ESE     | 3-5/S   | 4-13/SE     | 0-4/W   |  |
| Rainfall (in) 1 wk after APP:     | 0.61"       | 0.36"   | 0.30"       | 0.43"   | 1.40"       | 0.27"   |  |
| GPA:                              | 15          | 15      | 13.4        | 15      | 13.4        | 15      |  |
| PSI:                              | 34          | 35      | -           | 34      | -           | 34      |  |
| Nozzle Type:                      | TTI         | AIXR    | TTI         | AIXR    | TTI         | AIXR    |  |
| Nozzle Size:                      | 110015      | 110015  | 11002       | 110015  | 11002       | 110015  |  |

| Crop and Weed Information at POST Application |         |                     |         |         |        |         |
|-----------------------------------------------|---------|---------------------|---------|---------|--------|---------|
|                                               | Height  | Stage               | Height  | Stage   | Height | Stage   |
| Soybean                                       | 8-10 in | V5                  | 9-11 in | V4/V5   | 6-9 in | V3/V4   |
|                                               | Height  | Density             | Height  | Density | Height | Density |
| Waterhemp                                     | 1-11 in | 4-16/m <sup>2</sup> | -       | -       | -      | -       |
| Velvetleaf                                    | 2-10 in | 1-16/m <sup>2</sup> | -       | -       | -      | -       |
| Common Lambsquarters                          | 2-11 in | 4-12/m <sup>2</sup> | -       | -       | -      | -       |

\*All weed densities and heights were recorded from plots with a PRE herbicide.

| Trt # | Treatment                    | Formulation                 | SOA Group | Rate                                 | App Timing           | App Code    |
|-------|------------------------------|-----------------------------|-----------|--------------------------------------|----------------------|-------------|
| 1     | Untreated Check              |                             |           |                                      |                      |             |
| 2     | PRE Only*                    |                             |           |                                      |                      |             |
| 3     | Liberty<br>AMS               | 2.34 lb/gal                 | 10        | 32 fl oz/a<br>2 lb/a                 | POST<br>POST         | B<br>B      |
| 4     | Cobra<br>COC<br>AMS          | 2 lb/gal                    | 14        | 12.5 fl oz/a<br>1% v/v<br>2 lb/a     | POST<br>POST<br>POST | B<br>B<br>B |
| 5     | Cobra<br>Liberty<br>AMS      | 2 lb/gal<br>2.34 lb/gal     | 14<br>10  | 12.5 fl oz/a<br>32 fl oz/a<br>2 lb/a | POST<br>POST<br>POST | B<br>B<br>B |
| 7     | Flexstar<br>COC<br>AMS       | 1.88 lb/gal                 | 14        | 1 pt/a<br>1% v/v<br>2 lb/a           | POST<br>POST<br>POST | B<br>B<br>B |
| 8     | Flexstar<br>Liberty<br>AMS   | 1.88 lb/gal<br>2.34 lb/gal  | 14<br>10  | 1 pt/a<br>32 fl oz/a<br>2 lb/a       | POST<br>POST<br>POST | B<br>B<br>B |
| 10    | Resource<br>COC<br>AMS       | 0.86 lb/gal                 | 14        | 8 fl oz/a<br>1% v/v<br>2 lb/a        | POST<br>POST<br>POST | B<br>B<br>B |
| 11    | Resource<br>Liberty<br>AMS   | 0.86 lb/gal<br>2.34 lb/gal  | 14<br>10  | 8 fl oz/a<br>32 fl oz/a<br>2 lb/a    | POST<br>POST<br>POST | B<br>B<br>B |
| 13    | Cadet<br>COC<br>AMS          | 0.91 lb/gal                 | 14        | 0.9 fl oz/a<br>1% v/v<br>2 lb/a      | POST<br>POST<br>POST | B<br>B<br>B |
| 14    | Cadet<br>Liberty<br>AMS      | 0.91 lb/gal<br>2.34 lb/gal  | 14<br>10  | 0.9 fl oz/a<br>32 fl oz/a<br>2 lb/a  | POST<br>POST<br>POST | B<br>B<br>B |
| 16    | Basagran<br>COC<br>AMS       | 5 lb/gal                    | 6         | 1.6 pt/a<br>1% v/v<br>2 lb/a         | POST<br>POST<br>POST | B<br>B<br>B |
| 17    | Basagran<br>Liberty<br>AMS   | 5 lb/gal<br>2.34 lb/gal     | 6<br>10   | 1.6 pt/a<br>32 fl oz/a<br>2 lb/a     | POST<br>POST<br>POST | B<br>B<br>B |
| 19    | Enlist One<br>AMS            | 3.8 lbae/gal                | 4         | 32 fl oz/a<br>2 lb/a                 | POST<br>POST         | B<br>B      |
| 20    | Enlist One<br>Liberty<br>AMS | 3.8 lbae/gal<br>2.34 lb/gal | 4<br>10   | 32 fl oz/a<br>32 fl oz/a<br>2 lb/a   | POST<br>POST<br>POST | B<br>B<br>B |
| 21    | Liberty<br>AMS               | 2.34 lb/gal                 | 10        | 43 fl oz/a<br>2 lb/a                 | POST<br>POST         | B<br>B      |

**Adjuvants:** AMS = BlueAg spray grade ammonium sulfate; COC = CropOil

\*A PRE application was made to all treatments. SB16: Valor at 2 oz/a; SB17: FierceEZ at 6 fl oz/a

**Trial Summary:**

This study was a joint effort between the [UW-Madison Nutrient and Pest Management Program](#) (NPM; Dan Smith) and the WiscWeed team. This study evaluated the impact of glufosinate tank-mixes with PPO-inhibitors (Cobra, Flexstar, Resource, and Cadet), Basagran and Enlist One. The trial was conducted at two locations with natural infestations of waterhemp in Brooklyn and Lancaster, WI. The Brooklyn waterhemp population has a greater density and is known to be glyphosate-resistant. Only waterhemp control data from the Brooklyn, WI location is included in this report. The trial was also replicated at two additional locations (Arlington, WI; Janesville, WI) to evaluate only crop response and yield in the absence of weed competition. Crop response trials were kept weed free with POST glyphosate applications as needed.

Key Take Home Points from 2021 Data:

***Waterhemp Control Study (SB16):***

- All tank mixes with Liberty had excellent (>90%) waterhemp control (Table 23).
- Soybean yield was similar for all treatments containing Liberty (Table 23).
- Solo applications of Cobra, Flexstar, and Basagran had lower soybean yields, likely due to increased weed competition from common lambsquarters.
- Results from 2020 indicated an improvement in waterhemp control with the addition of Cobra, Flexstar, or Enlist One to the tank with Liberty when compared to Liberty alone. Published results from the 2020 study are available in the [2020 Wisconsin Weed Science Research Report](#) published on our blog at [wiscweeds.info](#).
  - This response was not evident in the 2021 field trials.

***Crop Response Study (SB17):***

- Cobra treatments had the greatest crop injury and least canopy coverage 14 days after application at both locations (Table 24).
- In general, the addition of Liberty to the tank did not increase soybean injury or reduce crop canopy closure with the exception of Flexstar (Table 24).
  - Soybean injury 14 days after the POST application averaged across both locations: Flexstar alone = 11.2%; Flexstar + Liberty = 17.6%.
- While there were notable differences in crop injury among the treatments, there was not a significant difference in soybean yield in the absence of weed competition at either location (Table 24).
- Plot photos from throughout the growing season are available at [Liberty Tank Mix Combinations: Crop Tolerance](#) published on [wiscweeds.info](#).

**Table 23.** Crop injury, weed control visual ratings and soybean yield for trial #21-BRO-SB16 at Brooklyn, WI.<sup>abc</sup>

| Trt # Herbicide (rate acre <sup>-1</sup> )                                              | Injury <sup>d</sup> (%) |                 | AMATA (%)       |                 | CHEAL (%)       |                 | ABUTH (%)    |                 | Yield <sup>e</sup><br>bu acre <sup>-1</sup> |
|-----------------------------------------------------------------------------------------|-------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|-----------------|---------------------------------------------|
|                                                                                         | 7/8                     | 7/14            | 7/14            | 9/21            | 7/14            | 9/21            | 7/14         | 9/21            |                                             |
| 1 Untreated Check                                                                       | 0                       | 0               | 0               | 0               | 0               | 0               | 0            | 0               | 33 e                                        |
| <b>One-Pass – PRE (5/26)</b>                                                            |                         |                 |                 |                 |                 |                 |              |                 |                                             |
| 2 Valor SX (2 oz)                                                                       | 0                       | 0               | 77              | 95              | 75              | 88              | 83           | 93              | 45 d                                        |
| <b>Two-Pass – PRE (5/26) fb POST (6/30)</b>                                             |                         |                 |                 |                 |                 |                 |              |                 |                                             |
| 3 Valor SX (2 ox) <b>fb</b><br>Liberty (32 fl oz) + AMS (2 lb)                          | 10.0                    | 5.8             | 98              | 100             | 100             | 100             | 100          | 100             | 66 a                                        |
| 21 Valor SX (2 ox) <b>fb</b><br>Liberty (43 fl oz) + AMS (2 lb)                         | 12.5                    | 7.8             | 100             | 100             | 100             | 100             | 100          | 100             | 61 ab                                       |
| 4 Valor SX (2 ox) <b>fb</b><br>Cobra (12.5 fl oz) + COC 1% v/v + AMS (2 lb)             | 39.5                    | 25.0            | 95              | 99              | 88              | 86              | 93           | 98              | 47 d                                        |
| 5 Valor SX (2 ox) <b>fb</b><br>Cobra (12.5 fl oz) + Liberty (32 fl oz) + AMS (2 lb)     | 40.3                    | 31.8            | 100             | 100             | 99              | 99              | 100          | 100             | 65 ab                                       |
| 7 Valor SX (2 ox) <b>fb</b><br>Flexstar (1 pt) + COC 1% v/v + AMS (2 lb)                | 33.0                    | 22.8            | 94              | 100             | 92              | 92              | 98           | 97              | 59 bc                                       |
| 8 Valor SX (2 ox) <b>fb</b><br>Flexstar (1 pt) + Liberty (32 fl oz) + AMS (2 lb)        | 30.8                    | 22.5            | 99              | 100             | 99              | 100             | 100          | 100             | 67 a                                        |
| 10 Valor SX (2 ox) <b>fb</b><br>Resource (8 fl oz) + COC 1% v/v + AMS (2 lb)            | 29.0                    | 20.8            | 84              | 98              | 86              | 92              | 100          | 100             | 63 ab                                       |
| 11 Valor SX (2 ox) <b>fb</b><br>Resource (8 fl oz) + Liberty (32 fl oz) + AMS (2 lb)    | 30.3                    | 22.3            | 100             | 100             | 100             | 99              | 100          | 100             | 65 ab                                       |
| 13 Valor SX (2 ox) <b>fb</b><br>Cadet (0.9 fl oz) + COC 1% v/v + AMS (2 lb)             | 31.3                    | 23.8            | 77              | 94              | 96              | 93              | 100          | 100             | 63 ab                                       |
| 14 Valor SX (2 ox) <b>fb</b><br>Cadet (0.9 fl oz) + Liberty (32 fl oz) + AMS (2 lb)     | 25.3                    | 18.0            | 99              | 100             | 100             | 100             | 100          | 100             | 67 a                                        |
| 16 Valor SX (2 ox) <b>fb</b><br>Basagran (1.6 pt) + COC 1% v/v + AMS (2 lb)             | 14.3                    | 4.3             | 76              | 91              | 86              | 85              | 100          | 98              | 52 cd                                       |
| 17 Valor SX (2 ox) <b>fb</b><br>Basagran (1.6 pt) + Liberty (32 fl oz) + AMS (2 lb)     | 19.8                    | 8.0             | 100             | 100             | 98              | 98              | 100          | 100             | 61 ab                                       |
| 19 Valor SX (2 ox) <b>fb</b><br>Enlist One (32 fl oz) + AMS (2 lb)                      | 6.5                     | 0.5             | 99              | 100             | 100             | 100             | 100          | 100             | 62 ab                                       |
| 20 Valor SX (2 ox) <b>fb</b><br>Enlist One (32 fl oz) + Liberty (32 fl oz) + AMS (2 lb) | 12.8                    | 4.3             | 100             | 100             | 100             | 100             | 100          | 100             | 62 ab                                       |
| <b>LSD (<math>\alpha=0.10</math>)</b>                                                   | <b>4.9</b>              | <b>3.9</b>      | <b>4</b>        | <b>2</b>        | <b>5</b>        | <b>4</b>        | <b>ns</b>    | <b>1</b>        | <b>7</b>                                    |
| <b>p value</b>                                                                          | <b>&lt;.001</b>         | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>&lt;.001</b> | <b>0.123</b> | <b>&lt;.001</b> | <b>&lt;.001</b>                             |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.<sup>b</sup>AMATA, common waterhemp (glyphosate-R); CHEAL, common lambsquarters; ABUTH, velvetleaf<sup>c</sup>Crop injury and weed control values from the untreated check and PRE only treatments were not included in the statistical analysis.<sup>d</sup>Crop injury rated as % leaf necrosis (leaf burn)<sup>e</sup>Yield values with the same letter are not significantly different.

**Table 24.** Crop injury, canopy coverage and soybean yield for trials #21-ARL-SB17 at Brooklyn, WI and #21-ROK-SB17 and Janesville, WI.

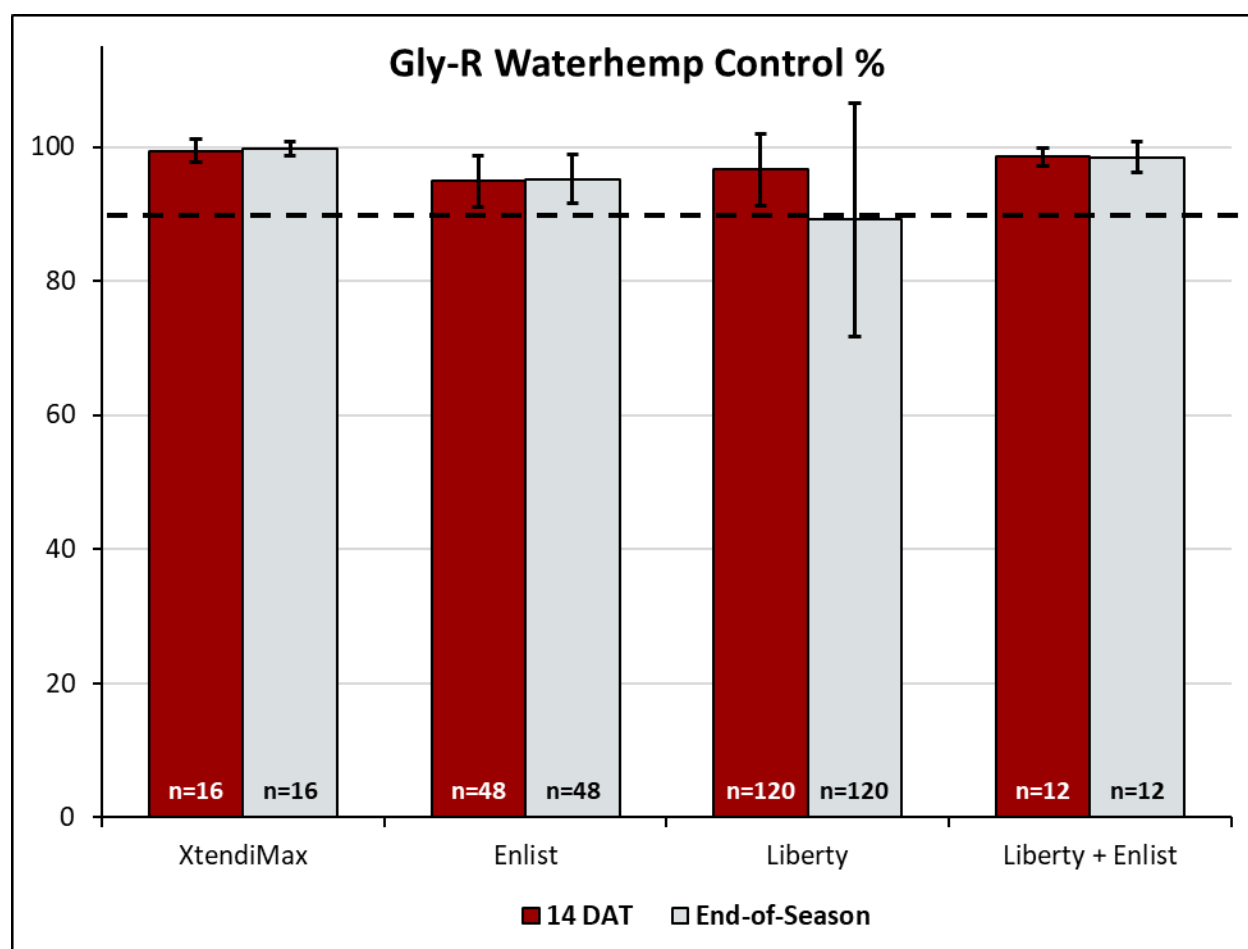
| Trt # Herbicide (rate acre <sup>-1</sup> )                                              | Arlington, WI                |                  |                         |                       | Janesville, WI               |                  |                         |                       |
|-----------------------------------------------------------------------------------------|------------------------------|------------------|-------------------------|-----------------------|------------------------------|------------------|-------------------------|-----------------------|
|                                                                                         | Crop Injury <sup>a</sup> (%) |                  | Canopy <sup>b</sup> (%) | Yield                 | Crop Injury <sup>a</sup> (%) |                  | Canopy <sup>b</sup> (%) | Yield                 |
|                                                                                         | 7 DAT                        | 14 DAT           | 14 DAT                  | bu acre <sup>-1</sup> | 11 DAT                       | 18 DAT           | 18 DAT                  | bu acre <sup>-1</sup> |
| 1 Untreated Check                                                                       | 0                            | 0                | 61 ef                   | 60                    | 0                            | 0                | 81 abc                  | 84                    |
| <b>One-Pass – PRE (5/26)</b>                                                            |                              |                  |                         |                       |                              |                  |                         |                       |
| 2 Valor SX (2 oz)                                                                       | 0                            | 0                | 70 bc                   | 60                    | 0.8                          | 0.5              | 78 abc                  | 84                    |
| <b>Two-Pass – PRE (5/26) fb POST (6/30)</b>                                             |                              |                  |                         |                       |                              |                  |                         |                       |
| 3 Valor SX (2 ox) <b>fb</b><br>Liberty (32 fl oz) + AMS (2 lb)                          | 2.5                          | 2.5              | 72 ab                   | 67                    | 3.0                          | 1.0              | 76 bcd                  | 83                    |
| 21 Valor SX (2 ox) <b>fb</b><br>Liberty (43 fl oz) + AMS (2 lb)                         | 4.3                          | 5.5              | 70 abc                  | 64                    | 3.5                          | 1.8              | 78 abc                  | 86                    |
| 4 Valor SX (2 ox) <b>fb</b><br>Cobra (12.5 fl oz) + COC 1% v/v + AMS (2 lb)             | 35.5                         | 37.3             | 42 g                    | 59                    | 38.3                         | 23.3             | 66 d                    | 85                    |
| 5 Valor SX (2 ox) <b>fb</b><br>Cobra (12.5 fl oz) + Liberty (32 fl oz) + AMS (2 lb)     | 32.0                         | 33.8             | 46 g                    | 58                    | 47.0                         | 26.0             | 65 d                    | 85                    |
| 7 Valor SX (2 ox) <b>fb</b><br>Flexstar (1 pt) + COC 1% v/v + AMS (2 lb)                | 6.0                          | 13.0             | 67 bcd                  | 62                    | 17.3                         | 9.3              | 78 abc                  | 87                    |
| 8 Valor SX (2 ox) <b>fb</b><br>Flexstar (1 pt) + Liberty (32 fl oz) + AMS (2 lb)        | 15.5                         | 19.3             | 63 def                  | 58                    | 26.3                         | 15.8             | 85 ab                   | 84                    |
| 10 Valor SX (2 ox) <b>fb</b><br>Resource (8 fl oz) + COC 1% v/v + AMS (2 lb)            | 14.5                         | 20.0             | 60 f                    | 59                    | 31.0                         | 16.5             | 81 abc                  | 89                    |
| 11 Valor SX (2 ox) <b>fb</b><br>Resource (8 fl oz) + Liberty (32 fl oz) + AMS (2 lb)    | 15.0                         | 20.8             | 61 ef                   | 62                    | 28.0                         | 15.0             | 77 bcd                  | 89                    |
| 13 Valor SX (2 ox) <b>fb</b><br>Cadet (0.9 fl oz) + COC 1% v/v + AMS (2 lb)             | 13.5                         | 15.3             | 65 cde                  | 64                    | 22.0                         | 12.3             | 85 ab                   | 89                    |
| 14 Valor SX (2 ox) <b>fb</b><br>Cadet (0.9 fl oz) + Liberty (32 fl oz) + AMS (2 lb)     | 10.0                         | 10.5             | 71 ab                   | 64                    | 19.5                         | 11.3             | 75 bcd                  | 87                    |
| 16 Valor SX (2 ox) <b>fb</b><br>Basagran (1.6 pt) + COC 1% v/v + AMS (2 lb)             | 0.8                          | 1.8              | 69 bc                   | 61                    | 20.3                         | 7.3              | 70 cd                   | 87                    |
| 17 Valor SX (2 ox) <b>fb</b><br>Basagran (1.6 pt) + Liberty (32 fl oz) + AMS (2 lb)     | 0.3                          | 0.3              | 71 ab                   | 64                    | 15.3                         | 6.5              | 82 ab                   | 86                    |
| 19 Valor SX (2 ox) <b>fb</b><br>Enlist One (32 fl oz) + AMS (2 lb)                      | 0.0                          | 0.0              | 75 a                    | 61                    | 1.3                          | 0.8              | 89 a                    | 86                    |
| 20 Valor SX (2 ox) <b>fb</b><br>Enlist One (32 fl oz) + Liberty (32 fl oz) + AMS (2 lb) | 2.8                          | 3.5              | 69 bc                   | 60                    | 4.5                          | 1.5              | 75 bcd                  | 86                    |
| <b>LSD (<math>\alpha=0.10</math>)</b>                                                   | <b>1.3</b>                   | <b>1.9</b>       | <b>5</b>                | <b>ns</b>             | <b>6.2</b>                   | <b>3.8</b>       | <b>11</b>               | <b>ns</b>             |
| <b>p value</b>                                                                          | <b>&lt;0.001</b>             | <b>&lt;0.001</b> | <b>&lt;0.001</b>        | <b>0.351</b>          | <b>&lt;0.001</b>             | <b>&lt;0.001</b> | <b>0.057</b>            | <b>0.511</b>          |

<sup>a</sup>Crop injury rated as % leaf necrosis (leaf burn)<sup>b</sup>Soybean canopy coverage % estimated by analyzing 3 pictures of each plot with the CANAPEO application. Values with the same letters are not significantly different.

### Multi-Trial Summary:

The following figures summarize waterhemp control from some of the soybean herbicide evaluation trials conducted in 2021 at the Obrien Hybrids Farm near Brooklyn, WI. Waterhemp at this location is known to be resistant to glyphosate and ALS herbicides. All trials were conducted on soybeans with either the Enlist E3 or XtendFlex herbicide tolerant traits.

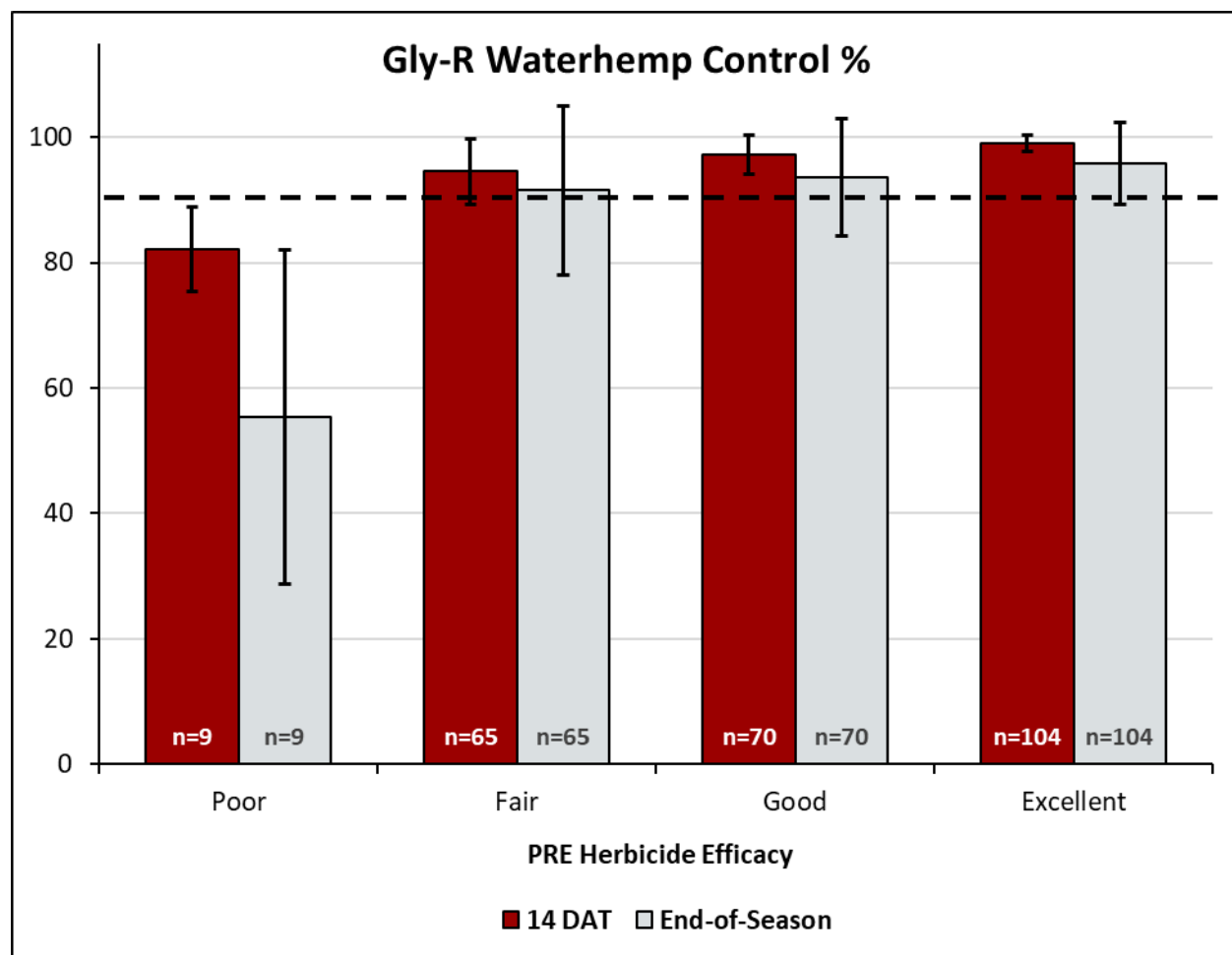
Treatments were grouped by POST herbicide program: XtendiMax (dicamba), Enlist (2,4-D choline), Liberty (glufosinate), and Liberty + Enlist. Some of the POST herbicide programs included glyphosate as tank-mix partner. Some of the POST treatments also had a group 15 herbicide for further residual control. To see how certain herbicides or herbicide tank mixes performed see individual trial data presented in this report.



**Figure 4.** Glyphosate resistant waterhemp control (%) of four soybean POST herbicide systems. Bars indicate the average % control  $\pm$  the standard deviation 14 days after POST herbicide application and at the end of the growing season. n-values at the base of each bar represent the number of observations (plots) evaluated in each POST herbicide system. Some of the POST treatments included glyphosate as a tank-mix partner.

## Multi-Trial Summary: Waterhemp Control in Soybean

Waterhemp control was also broken down by the relative effectiveness of the PRE herbicide used prior the POST herbicide application. PRE herbicide efficacy was evaluated at or near the time of POST application and was categorized as excellent (90-100%), good (80-89%), fair (60-79%), or poor (0-59%). See Figure 6 for a visual representation of each category. Waterhemp control averaged across all POST herbicide systems is presented in Figure 5.



**Figure 5.** Glyphosate resistant waterhemp control (%) of four soybean POST herbicide systems (XtendiMax, Liberty, Enlist, Liberty plus Enlist) broken down by PRE herbicide efficacy. PRE herbicide efficacy was evaluated at or near the time of POST application. Bars indicate the average % control  $\pm$  the standard deviation 14 days after POST herbicide application and at the end of the growing season. n-values at the base of each bar represent the number of observations (plots) within each PRE herbicide efficacy category.



Figure 6. Plot photos indicating categories of PRE herbicide waterhemp efficacy.

**Project Goal:** Evaluate and demonstrate the effectiveness of multiple single active ingredient postemergence corn and soybean herbicides on burndown control of giant ragweed.

#### Site Description:

|                       |                       |                        |           |
|-----------------------|-----------------------|------------------------|-----------|
| <b>Location:</b>      | Janesville, WI        | <b>Crop:</b>           | none      |
| <b>Field #:</b>       | 7                     | <b>Variety:</b>        | -         |
| <b>Soil type:</b>     | Plano silt loam       | <b>Planting Date:</b>  | -         |
| <b>% OM:</b>          | 3.3                   | <b>Emergence Date:</b> | -         |
| <b>pH:</b>            | 6.7                   | <b>Population:</b>     | -         |
| <b>Fertilization:</b> | -                     | <b>Depth:</b>          | -         |
| <b>Previous crop:</b> | corn                  | <b>Row spacing:</b>    | -         |
| <b>Tillage:</b>       | conventional          | <b>Plot Size:</b>      | 8 x 25 ft |
| <b>Weed species:</b>  | giant ragweed (AMBTR) |                        |           |

#### Herbicide Application Information:

|                                      |          |
|--------------------------------------|----------|
| <b>Date:</b>                         | 5/26     |
| <b>Treatment:</b>                    | POST (A) |
| <b>Air Temp (°F):</b>                | 73       |
| <b>2" Soil Temp (°F):</b>            | 68       |
| <b>Soil moisture [surface]:</b>      | moist    |
| <b>RH %:</b>                         | 58       |
| <b>Cloud cover %</b>                 | 0        |
| <b>Wind speed (mph)/direction</b>    | 5-11/WNW |
| <b>Rainfall (in) 1 wk after APP:</b> | 0.5"     |
| <b>GPA:</b>                          | 15       |
| <b>PSI:</b>                          | 34       |
| <b>Nozzle:</b>                       | TT*/TTI* |
| <b>Nozzle spacing (in):</b>          | 20       |
| <b>Boom Height (in):</b>             | 23       |

\*Used TT 110015 nozzles for all treatments except XtendiMax, Enlist One, and Status.

\*\*Used TTI 110015 nozzles for XtendiMax, Enlist One and Status treatments.

#### Crop and Weed Information at Application:

|                      |                 |                      |
|----------------------|-----------------|----------------------|
|                      | <b>Date:</b>    | 5/26                 |
| <b>giant ragweed</b> | <b>Height:</b>  | 1-4" (Avg = 2")      |
|                      | <b>Density:</b> | 1-28/ft <sup>2</sup> |

| Trt # | Treatment                     | Formulation   | SOA Group | Rate         | App Timing | App Code |
|-------|-------------------------------|---------------|-----------|--------------|------------|----------|
| 1     | Pursuit<br>COC<br>AMS         | 3 lb/gal      | 2         | 4 fl oz/a    | POST       | A        |
|       |                               |               |           | 1.25% v/v    | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |
| 2     | Classic<br>COC<br>AMS         | 25% w/w       | 2         | 0.75 oz/a    | POST       | A        |
|       |                               |               |           | 1% v/v       | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |
| 3     | FirstRate<br>COC<br>AMS       | 84% w/w       | 2         | 0.3 oz/a     | POST       | A        |
|       |                               |               |           | 1.2% v/v     | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |
| 4     | Python<br>COC<br>AMS          | 80% w/w       | 2         | 1 oz/a       | POST       | A        |
|       |                               |               |           | 1% v/v       | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |
| 5     | XtendiMax<br>Class Act Ridion | 2.89 lbae/gal | 4         | 22 fl oz/a   | POST       | A        |
|       |                               |               |           | 1% v/v       | POST       | A        |
| 6     | Enlist One<br>AMS             | 3.8 lbae/gal  | 4         | 32 fl oz/a   | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |
| 7     | Stinger                       | 3 lbae/gal    | 4         | 6 fl oz/a    | POST       | A        |
| 8     | Status<br>NIS<br>AMS          | 56% w/w       | 2, 4      | 5 oz/a       | POST       | A        |
|       |                               |               |           | 0.25% v/v    | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |
| 9     | Aatrex<br>COC                 | 4 lb/gal      | 5         | 2 pt/a       | POST       | A        |
|       |                               |               |           | 1 qt/a       | POST       | A        |
| 10    | Buctril                       | 2 lb/gal      | 6         | 1.5 pt/a     | POST       | A        |
| 11    | Basagran 5L<br>COC<br>AMS     | 5 lb/gal      | 6         | 1.6 pt/a     | POST       | A        |
|       |                               |               |           | 1% v/v       | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |
| 12    | Roundup PowerMAX<br>AMS       | 4.5 lbae/gal  | 9         | 32 fl oz/a   | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |
| 13    | Liberty<br>AMS                | 2.34 lb/gal   | 10        | 32 fl oz/a   | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |
| 14    | Cobra<br>COC<br>AMS           | 2 lb/gal      | 14        | 12.5 fl oz/a | POST       | A        |
|       |                               |               |           | 1.5 pt/a     | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |
| 15    | Flexstar<br>MSO<br>AMS        | 1.88 lb/gal   | 14        | 1 pt/a       | POST       | A        |
|       |                               |               |           | 1% v/v       | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |
| 16    | Cadet<br>COC<br>AMS           | 0.91 lb/gal   | 14        | 0.9 fl oz/a  | POST       | A        |
|       |                               |               |           | 1% v/v       | POST       | A        |
|       |                               |               |           | 2 lb/a       | POST       | A        |

**Adjuvants:** AMS = BlueAg spray grade ammonium sulfate; COC = Crop Oil; MSO=Emulate; NIS = Prefer90; Non-AMS water conditioner=Class Act Ridion

| Trt # | Treatment     | Formulation | SOA Group | Rate         | App Timing | App Code |
|-------|---------------|-------------|-----------|--------------|------------|----------|
| 17    | Resource      | 0.86 lb/gal | 14        | 8 fl oz/a    | POST       | A        |
|       | COC           |             |           | 1 qt/a       | POST       | A        |
|       | AMS           |             |           | 2 lb/a       | POST       | A        |
| 18    | Callisto      | 4 lb/gal    | 27        | 3 fl oz/a    | POST       | A        |
|       | COC           |             |           | 1% v/v       | POST       | A        |
|       | AMS           |             |           | 2 lb/a       | POST       | A        |
| 19    | Laudis        | 3.5 lb/gal  | 27        | 3 fl oz/a    | POST       | A        |
|       | MSO           |             |           | 1% v/v       | POST       | A        |
|       | AMS           |             |           | 2 lb/a       | POST       | A        |
| 20    | Armezon       | 2.8 lb/gal  | 27        | 0.75 fl oz/a | POST       | A        |
|       | MSO           |             |           | 1% v/v       | POST       | A        |
|       | AMS           |             |           | 2 lb/a       | POST       | A        |
| 21    | Balance Flexx | 2 lb/gal    | 27        | 5 fl oz/a    | POST       | A        |
|       | MSO           |             |           | 1% v/v       | POST       | A        |
|       | AMS           |             |           | 2 lb/a       | POST       | A        |

**Adjuvants:** AMS = BlueAg spray grade ammonium sulfate; COC = Crop Oil; MSO=Emulate; NIS = Prefer90; Class Act Ridion = non-AMS water conditioner + NIS

#### Trial Summary:

This trial evaluated the effectiveness of multiple single active ingredient postemergence corn and soybean herbicides on burndown control of giant ragweed. Using a single active ingredient or site of action herbicide is not recommended for POST waterhemp or giant ragweed control due to resistance concerns. Our intent was not to promote the use of a single herbicide, but rather, demonstrate the value of each herbicide active ingredient for the control of emerged weeds. Results clearly indicate the difference in effectiveness among herbicides evaluated for burndown control of giant ragweed (Table 25).

Key Take Home Points from 2021 Data:

- Several herbicides provided excellent burndown control of giant ragweed (Table 25).
- None of the ALS (group 2) herbicides had >60% control. We suspect some level of ALS resistance in this population.

Plot photos from throughout the growing season are available at [Burndown Control of Giant Ragweed](#) published on [wiscweeds.info](#)

**Table 25.** Giant Ragweed burndown ratings for trial #21-ROK-BG04 at Janesville, WI.<sup>a</sup>

| Trt #   Herbicide (rate acre <sup>-1</sup> ) |                                                    | Giant Ragweed <sup>b</sup> (%) |        |
|----------------------------------------------|----------------------------------------------------|--------------------------------|--------|
|                                              |                                                    | 7 DAT                          | 15 DAT |
| One-Pass – POST (5/26)                       |                                                    |                                |        |
| 1                                            | Pursuit (4 fl oz) + COC 1% v/v + AMS (2 lb)        | 36 g                           | 50 f   |
| 2                                            | Classic (0.75 oz) + COC 1% v/v + AMS (2 lb)        | 40 f                           | 45 g   |
| 3                                            | FirstRate (0.3 oz) + COC 1.2% v/v + AMS (2 lb)     | 34 g                           | 51 f   |
| 4                                            | Python (1 oz) + COC 1% v/v + AMS (2 lb)            | 34 g                           | 51 f   |
| 5                                            | XtendiMax (22 fl oz) + Class Act Ridion 1% v/v     | 73 d                           | 96 ab  |
| 6                                            | Enlist One (32 fl oz) + AMS (2 lb)                 | 71 de                          | 95 ab  |
| 7                                            | Stinger (6 fl oz)                                  | 72 d                           | 85 d   |
| 8                                            | Status (5 oz) + NIS 0.25% v/v + AMS (2 lb)         | 74 d                           | 95 ab  |
| 9                                            | AAtrex (2 pt) + COC (1 qt)                         | 91 b                           | 84 d   |
| 10                                           | Buctril (1.5 pt)                                   | 99 a                           | 96 ab  |
| 11                                           | Basagran 5L (1.6 pt) + COC 1% v/v + AMS (2 lb)     | 96 a                           | 95 b   |
| 12                                           | Roundup PowerMAX II (32 fl oz) + AMS (2 lb)        | 98 a                           | 97 ab  |
| 13                                           | Liberty (32 fl oz) + AMS (2 lb)                    | 98 a                           | 99 a   |
| 14                                           | Cobra (12.5 fl oz) + COC 1.5 (1.5 pt) + AMS (2 lb) | 99 a                           | 99 ab  |
| 15                                           | Flexstar (1 pt) + MSO 1% v/v + AMS (2 lb)          | 99 a                           | 98 ab  |
| 16                                           | Cadet (0.9 fl oz) + COC 1% v/v + AMS (2 lb)        | 81 c                           | 66 e   |
| 17                                           | Resource (8 fl oz) + COC (1 qt) + AMS (2 lb)       | 96 a                           | 90 c   |
| 18                                           | Callisto (3 fl oz) + COC 1% v/v + AMS (2 lb)       | 68 e                           | 84 d   |
| 19                                           | Laudis (3 fl oz) + MSO 1% v/v + AMS (2 lb)         | 72 d                           | 97 ab  |
| 20                                           | Armezon (0.75 fl oz) + MSO 1% v/v + AMS (2 lb)     | 72 d                           | 97 ab  |
| 21                                           | Balance Flexx (5 fl oz) + MSO 1% v/v + AMS (2 lb)  | 72 d                           | 95 b   |
| LSD (α=0.10)                                 |                                                    | 3                              | 4      |
| p value                                      |                                                    | <0.001                         | <0.001 |

<sup>a</sup>Visual control from 70-100% is illustrated on a color scale with green representing greater weed control values.

<sup>b</sup>Giant ragweed control values with the same letter are not significantly different.

**Table 26. 2021 Temperature and Precipitation Summary**

| Location                                                       | Month        | Precipitation (in) |                |                | Average Temperature (F) |                |                |
|----------------------------------------------------------------|--------------|--------------------|----------------|----------------|-------------------------|----------------|----------------|
|                                                                |              | 2021               | 30-year norm** | 2021 departure | 2021                    | 30-year norm** | 2021 departure |
| <b>Arlington*</b>                                              | May          | 2.61               | 3.69           | -1.08          | 56.5                    | 55.7           | 0.8            |
|                                                                | June         | 3.79               | 4.68           | -0.89          | 70.6                    | 65.6           | 5.0            |
|                                                                | July         | 1.49               | 4.16           | -2.67          | 69.2                    | 69.4           | -0.2           |
|                                                                | August       | 3.56               | 3.90           | -0.34          | 69.7                    | 67.3           | 2.4            |
|                                                                | September    | 2.32               | 3.54           | -1.22          | 61.6                    | 59.3           | 2.3            |
|                                                                | <b>Total</b> | <b>13.77</b>       | <b>19.97</b>   | <b>-6.20</b>   | -                       | -              | -              |
| <b>Brooklyn*</b><br>(30-year norm from Stoughton NOAA station) | May          | 2.35               | 3.85           | -1.50          | 58.3                    | 57.8           | 0.5            |
|                                                                | June         | 5.22               | 4.34           | 0.88           | 72.6                    | 67.4           | 5.2            |
|                                                                | July         | 3.01               | 3.85           | -0.84          | 74.2                    | 71.7           | -0.5           |
|                                                                | August       | 2.46               | 4.42           | -1.96          | 71.5                    | 69.5           | 2.0            |
|                                                                | September    | 1.20               | 3.60           | -2.40          | 64.6                    | 61.2           | 3.4            |
|                                                                | <b>Total</b> | <b>14.25</b>       | <b>20.07</b>   | <b>-5.81</b>   | -                       | -              | -              |
| <b>Janesville*</b><br>(30-year norm from Beloit NOAA station)  | May          | 2.93               | 3.80           | -0.87          | 58.7                    | 58.7           | 0.0            |
|                                                                | June         | 2.18               | 4.73           | -2.55          | 73.1                    | 68.6           | 4.5            |
|                                                                | July         | 2.09               | 3.85           | -1.76          | 71.8                    | 72.5           | -0.7           |
|                                                                | August       | 3.12               | 4.27           | -1.15          | 72.7                    | 70.8           | 1.9            |
|                                                                | September    | 0.69               | 3.65           | -2.96          | 65.6                    | 62.9           | 2.7            |
|                                                                | <b>Total</b> | <b>11.01</b>       | <b>20.30</b>   | <b>-9.29</b>   | -                       | -              | -              |
| <b>Lancaster*</b>                                              | May          | 2.86               | 4.13           | -1.27          | 55.0                    | 57.3           | -2.3           |
|                                                                | June         | 1.72               | 5.26           | -3.54          | 68.3                    | 66.9           | 1.4            |
|                                                                | July         | 4.76               | 4.32           | 0.44           | 68.2                    | 70.8           | -2.6           |
|                                                                | August       | 5.21               | 4.20           | 1.01           | 67.2                    | 69.0           | -1.8           |
|                                                                | September    | 1.95               | 3.14           | -1.19          | 58.6                    | 60.8           | -2.2           |
|                                                                | <b>Total</b> | <b>16.50</b>       | <b>21.05</b>   | <b>-4.55</b>   | -                       | -              | -              |

\*2021 data recorded from on-site weather stations. 2021 Janesville rain data was recorded from a NOAA weather station at Rock County Regional Airport.

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

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| <a href="#">Table 16</a> | Waterhemp density at POST application: FMC                            | SB07    | 64     |
| <a href="#">Table 17</a> | Waterhemp control and soybean yield in Enlist soybeans: FMC           | SB07    | 65     |
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| <a href="#">Table 21</a> | Burndown weed control programs with Reviton in soybean                | SB12    | 81     |
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| <a href="#">Table 24</a> | Soybean injury and yield: Liberty tank mix combinations               | SB17    | 90     |
| <a href="#">Table 25</a> | Giant ragweed burndown control with POST herbicides                   | BG04    | 97     |
| <a href="#">Table 26</a> | Temperature and precipitation summary                                 | -       | 98     |
| <a href="#">Figure 1</a> | Giant ragweed control in corn : multi-trial summary                   | -       | 44     |
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| <a href="#">Figure 3</a> | Corn yield by giant ragweed control: multi-trial summary              | -       | 46     |
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| <a href="#">Figure 5</a> | Waterhemp control in soybean: multi-trial summary                     | -       | 92     |
| <a href="#">Figure 6</a> | PRE efficacy categories plot photos                                   | -       | 93     |

**Index of Weed Species Evaluated**

| Weed (common name)    | Bayer Code | Page Number(s)                                        |
|-----------------------|------------|-------------------------------------------------------|
| dandelion             | TAROF      | 32, 81                                                |
| foxtail, giant        | SETFA      | 37, 42, 50, 54, 78                                    |
| grasses, annual       | GGGAN      | 20, 37, 65                                            |
| lambsquarters, common | CHEAL      | 25, 32, 50, 54, 60, 65, 69, 78, 81, 85, 89            |
| marestail             | ERICA      | 32, 81                                                |
| millet, wild-proso    | PANMI      | 43, 65, 69, 74                                        |
| pigweed, redroot      | AMARE      | 20                                                    |
| ragweed, common       | AMBEL      | 37, 42, 50, 54                                        |
| ragweed, giant        | AMBTR      | 4, 8, 12, 16, 20, 25, 29, 44, 46, 78, 97              |
| shepherd's purse      | CAPBP      | 81                                                    |
| velvetleaf            | ABUTH      | 8, 12, 20, 37, 42, 43, 50, 60, 65, 69, 74, 78, 85, 89 |
| waterhemp, common     | AMATA      | 20, 25, 43, 60, 65, 69, 74, 85, 89, 91, 92            |
| woolly cupgrass       | ERBVI      | 37, 65                                                |

**Index of Adjuvants**

| Adjuvant Brand            | Adjuvant Type                             | Page Number(s)                                |
|---------------------------|-------------------------------------------|-----------------------------------------------|
| Amsol                     | ammonium sulfate (liquid)                 | 2, 6, 27, 56, 83                              |
| BlueAg spray<br>grade AMS | ammonium sulfate (dry)                    | 14, 31, 34, 39, 62, 67, 71, 76,<br>80, 87, 95 |
| Class Act Ridion          | water conditioner (non-AMS) + NIS         | 2, 34, 56, 71, 76, 95                         |
| Crop Oil                  | crop oil concentrate                      | 6, 10, 34, 39, 87, 95                         |
| Destiny HC                | high surfactant oil concentrate           | 2, 18, 31, 34, 80                             |
| Emulate                   | methyated seed oil                        | 39, 95                                        |
| Induce                    | nonionic surfatant                        | 14                                            |
| Intact                    | drift retardant and deposition aid        | 56                                            |
| Prefer 90                 | nonionic surfactant                       | 27, 34, 39, 95                                |
| Superb HC                 | high surfactant petroleum oil concentrate | 27, 39                                        |
| VaporGrip Xtra            | volatility reducing agent                 | 48, 52, 56, 83                                |
| Zaar                      | methyated seed oil + water conditioner    | 18                                            |

## Index of Herbicides Evaluated

| Herbicide            | Active Ingredient(s)                               | Page Number(s)           |
|----------------------|----------------------------------------------------|--------------------------|
| Aatrex/atrazine 4L   | atrazine                                           | 2, 6, 10, 14, 18, 23, 95 |
| Accent Q             | nicosulfuron + safener                             | 39                       |
| Acuron               | bicyclopyrone+mesotrione+ atrazine+S-metolachlor   | 14, 23, 27               |
| Acuron GT            | bicyclopyrone+mesotrione+S-metolachlor+ glyphosate | 27, 34                   |
| Acuron XR*           | bicyclopyrone+mesotrione+ atrazine+S-metolachlor   | 27                       |
| Acuron Flexi         | bicyclopyrone + mesotrione + S-metolachlor         | 23, 34, 39               |
| Acuron Flexi XR*     | bicyclopyrone + mesotrione + S-metolachlor         | 27                       |
| Afforia              | thifensulfuron + tribenuron + flumioxazin          | 71                       |
| Anthem Maxx          | pyroxasulfone + fluthiacet                         | 62, 72                   |
| Argos                | mesotrione                                         | 31                       |
| Armezon              | topramezone                                        | 39, 96                   |
| Armezon PRO          | topramezone + dimethenamid-P                       | 14, 18, 27, 34, 39       |
| Authority Edge       | sulfentrazone + pyroxasulfone                      | 62, 77                   |
| Authority First DF   | sulfentrazone + cloransulam                        | 63, 67                   |
| Authority MTZ        | sulfentrazone + metribuzin                         | 48, 67                   |
| Authority Supreme    | sulfentrazone + pyroxasulfone                      | 62, 72                   |
| Balance Flexx        | isoxaflutole                                       | 2, 23, 96                |
| Basagran 5L          | bentazon                                           | 87, 95                   |
| Bicep Lite II Magnum | S-metolachlor + atrazine                           | 6, 23, 27                |
| Boundary             | S-metolachlor + metribuzin                         | 62, 67, 71, 76           |
| Broadaxe XC          | S-metolachlor + sulfentrazone                      | 71, 76                   |
| Buctril              | bromoxynil                                         | 95                       |
| Cadet                | fluthiacet                                         | 87, 95                   |
| Callisto             | mesotrione                                         | 23, 35, 39, 96           |
| Capreno              | tembotrione + thien carbazone                      | 2, 34, 39                |
| Classic              | chlorimuron-ethyl                                  | 95                       |
| Cobra                | lactofen                                           | 87, 95                   |
| Corvus               | isoxaflutole + thien carbazone                     | 2, 23, 34                |
| DiFlexx              | dicamba (DGA salt)                                 | 2, 23                    |
| DiFlexx Duo          | dicamba (DGA salt) + tembotrione                   | 2, 34, 39                |
| Dual II Magnum       | S-metolachlor                                      | 23, 40, 52, 62           |
| Durango DMA          | glyphosate (DMA salt)                              | 34, 71                   |
| Empyros              | tolpyralate + S-metolachlor                        | 18                       |
| Enlist One           | 2,4-D (choline salt)                               | 67, 71, 76, 87, 95       |
| EverpreX             | S-metolachlor                                      | 71                       |
| Fearless             | acetochlor                                         | 18, 31, 35               |
| Fierce EZ            | flumioxazin + pyroxasulfone                        | 48, 72, 83, 87           |
| Fierce MTZ           | flumioxazin + pyroxasulfone + metribuzin           | 72                       |
| Fierce WDG           | flumioxazin + pyroxasulfone                        | 56                       |

| Herbicide           | Active Ingredient(s)                      | Page Number(s)                   |
|---------------------|-------------------------------------------|----------------------------------|
| Fierce XLT          | flumioxazin + pyroxasulfone + chlorimuron | 72, 76                           |
| FirstRate           | cloransulam-methyl                        | 95                               |
| Flexstar            | fomesafen                                 | 87, 95                           |
| Halex GT            | S-metolachlor + mesotrione + glyphosate   | 14                               |
| Harness             | acetochlor                                | 2, 23, 27, 34, 39                |
| Harness MAX         | acetochlor + mesotrione                   | 2, 23, 27, 34, 39                |
| Harness Xtra        | acetochlor + atrazine                     | 23                               |
| Harness Xtra 5.6L   | acetochlor + atrazine                     | 2                                |
| Hornet WDG          | clopyralid + flumetsulam                  | 23                               |
| Impact              | topramezone                               | 6                                |
| Impact Core         | topramezone + acetochlor                  | 18                               |
| Interline           | glufosinate                               | 67                               |
| Katagon             | tolpyralate + nicosulfuron                | 18, 35                           |
| Kyber               | flumioxazin + pyroxasulfone + metribuzin  | 62, 71                           |
| Laudis              | tembotrione                               | 2, 6, 27, 40, 96                 |
| Liberty             | glufosinate                               | 6, 56, 62, 71, 76, 83, 87, 95    |
| Lumax EZ            | mesotrione + atrazine + S-metolachlor     | 27                               |
| Mauler              | metribuzin                                | 48, 52, 56                       |
| Maverick*           | mesotrione + clopyralid + pyroxasulfone   | 3, 14, 23, 35                    |
| Moccasin MTZ        | S-metolachlor + metribuzin                | 67                               |
| MON 301668*         | acetochlor (encapsulated)                 | 48, 52, 56, 83                   |
| Outlook             | dimethenamid-P                            | 52, 62                           |
| Perpetuo            | flumiclorac + pyroxasulfone               | 72                               |
| Prefix              | S-metolachlor + fomesafen                 | 71                               |
| Preview 2.1SC*      | sulfentrazone + metribuzin                | 67                               |
| Princep 4FL         | simazine                                  | 23, 35, 39                       |
| Pursuit             | imazethapyr                               | 95                               |
| Python              | flumetsulam                               | 95                               |
| Realm Q             | rimsulfuron + mesotrione                  | 34                               |
| Resicore            | clopyralid + acetochlor + mesotrione      | 10, 14, 23, 27, 34               |
| Resource            | flumiclorac                               | 87, 96                           |
| Restraint           | tolpyralate + acetochlor                  | 10, 35                           |
| Reviton             | tiafenacil                                | 31, 80                           |
| Revolin Q           | nicosulfuron + mesotrione                 | 39                               |
| Roundup PowerMAX II | glyphosate (potassium salt)               | 2, 6, 14, 27, 31, 34, 72, 80, 95 |
| Roundup PowerMAX 3  | glyphosate (potassium salt)               | 56, 83                           |
| Satellite HydroCap  | pendimethalin                             | 67                               |
| Select Max          | clethodim                                 | 56                               |
| Sequence            | S-metolachlor + glyphosate                | 71, 76                           |
| Sharpen             | saflufenacil                              | 31, 80                           |

| Herbicide         | Active Ingredient(s)                          | Page Number(s)     |
|-------------------|-----------------------------------------------|--------------------|
| Shieldex          | tolpyralate                                   | 6, 10, 40          |
| Sonic             | sulfentrazone + cloransulam                   | 71, 76             |
| Status            | dicamba (sodium salt) + diflufenzopyr         | 35, 39, 95         |
| Stinger           | clopyralid                                    | 34, 95             |
| Surestart II      | acetochlor + clopyralid + flumetsulam         | 23, 27, 34, 39     |
| Surpass NXT       | acetochlor                                    | 34                 |
| Surveil           | flumioxazin + cloransulam                     | 71                 |
| Tendovo*          | S-metolachlor + metribuzin + cloransulam      | 71, 76             |
| Tricor DF         | metribuzin                                    | 62, 71             |
| TripleFlex II     | acetochlor + clopyralid + flumetsulam         | 2, 34              |
| Tripzin ZC        | pendimethalin + metribuzin                    | 67                 |
| Valor EZ/Valor SX | flumioxazin                                   | 48, 87             |
| Valor XLT         | flumioxazin + chlorimuron                     | 67                 |
| Verdict           | saflufenacil + dimethenamid-P                 | 23, 27, 34, 39     |
| Warrant           | acetochlor                                    | 40, 52, 62         |
| Warrant Ultra     | acetochlor + fomesafen                        | 48, 58, 83         |
| XtendiMax         | dicamba (DGA salt) with VaporGrip® Technology | 48, 52, 56, 83, 95 |
| Zidua/Zidua SC    | pyroxasulfone                                 | 35, 39, 52, 72     |
| Zidua PRO         | pyroxasulfone + saflufenzicil + imazethapyr   | 62, 67, 72, 77     |
| Zone Elite        | sulfentrazone + metolachlor                   | 80                 |

\*Pending approval for use in Wisconsin as of January 2022.

## Index of Trial Sponsors

| Company                           | Trial Number (s)*                                                                                                                                  |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| ADAMA                             | CN05, SB06                                                                                                                                         |
| Adjuvants Unlimited               | SB30                                                                                                                                               |
| AMVAC                             | CN10                                                                                                                                               |
| BASF                              | <a href="#">CN08</a> , CN09, SB09, <a href="#">SB10</a>                                                                                            |
| Bayer Crop Science                | CN01, <a href="#">CN02</a> , <a href="#">SB01</a> , SB02, <a href="#">SB03</a> , <a href="#">SB04</a> , SB05, <a href="#">SB13</a> ,<br>BG01, BG02 |
| Belchim Crop Protection           | SB21                                                                                                                                               |
| CHS Agronomy                      | CN12, BG03                                                                                                                                         |
| Corteva Agriscience               | CN07, <a href="#">SB10</a>                                                                                                                         |
| FMC                               | <a href="#">SB07</a>                                                                                                                               |
| Helm Agro                         | <a href="#">CN08</a> , <a href="#">CN15</a> , <a href="#">SB12</a> , SB28                                                                          |
| Stoller USA                       | SB29                                                                                                                                               |
| Summit Agro                       | <a href="#">CN03</a> , <a href="#">CN04</a>                                                                                                        |
| Syngenta                          | <a href="#">CN13</a> , CN14, <a href="#">SB10</a> , <a href="#">SB11</a>                                                                           |
| UPL                               | <a href="#">SB08</a>                                                                                                                               |
| Valent                            | <a href="#">CN02</a> , <a href="#">CN06</a> , <a href="#">SB10</a>                                                                                 |
| Wisconsin Soybean Marketing Board | SB15, <a href="#">SB16</a> , <a href="#">SB17</a>                                                                                                  |
| Wisconsin Weed Science            | <a href="#">CN11</a> , SB15, <a href="#">CN16</a> , <a href="#">CN18</a> , <a href="#">SB16</a> , <a href="#">SB17</a> , <a href="#">BG04</a>      |

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