2018 Herbicide Performance / Fall Applications

Preharvest and combine scouting are excellent opportunities to evaluate herbicide performance. Weed escapes in corn and soybean fields provide valuable information when determining adjustments for 2019 weed management strategies. Cockleburs, velvetleaf, giant ragweed, waterhemp, Palmer amaranth and marestail are some of the key species present in recent travels. The increased presence of cockleburs, velvetleaf and giant ragweed in soybeans is effected by employing real small seeded broadleaf management strategies. Largely, producers have done a great job of employing herbicides on small-seeded broadleaves. Unfortunately, this often opens the gate for large-seeded broadleaves. Programs may be altered in soybeans next season to target ALS-susceptible escapes by adding Group 2 (ALS-inhibiting) herbicides to combinations containing at least two effective sites of action on pigweeds.

Recent trial visits have revealed winter annual weed emergence including: shepherd’s purse, common chickweed, cressleaf groundsel, henbit and marestail. Fall herbicide applications allow an easy finish next spring by removing winter annual vegetation early at vulnerable growth stages. FMC research has identified important criteria to assist in making fall herbicide decisions:

1.) Allow crop residue to settle prior to application. 2.) Foliar herbicides should be applied to actively growing weeds. 3.) Residual herbicides should be included for winter annuals with longer germination intervals. 4.) Applications including residual herbicides should be made when the soil temperature is near 55° F and decreasing.

Fall burndown plus residual will result in more manageable weed height and density when spring applications occur. For spring burndown applications, this will provide flexibility in tank mixing broad-spectrum herbicides that deliver residual activity on key broadleaf weeds including giant ragweed, cocklebur, Palmer amaranth and waterhemp with fewer plant-back restrictions. It will also facilitate an opportunity to manage weeds that may intercept herbicide patterns intended for driver weeds, such as marestail, next spring. Utilizing this strategy will provide an easier start and first step for a start clean, stay clean strategy in the 2019 spring season.
## Fall Herbicide Program Recommendations

### Attributes / Rotational Crop Guidelines

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Panoflex® herbicide 0.3-0.5 oz. + glyphosate 0.77 lb. ae + 2,4-D 16-32 oz. OR dicamba 8-16 oz.</th>
<th>Crusher® herbicide 1 oz. + glyphosate 0.77 lb. ae + 2,4-D 16-32 oz. OR dicamba 8-16 oz.</th>
<th>Authority® MTZ DF herbicide 10-12 oz. + glyphosate 0.77 lb. ae + 2,4-D 16-32 oz. OR dicamba 8-16 oz.</th>
<th>Authority® XL herbicide 3.2-4 oz. + glyphosate 0.77 lb. ae + 2,4-D 16-32 oz. OR dicamba 8-16 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Good</strong></td>
<td>• Broad-spectrum foliar activity on winter annuals.</td>
<td>• Broad-spectrum foliar activity on winter annuals.</td>
<td>• Broad-spectrum foliar activity on winter annuals, improved knockdown with metribuzin.</td>
<td>• Broad-spectrum foliar activity on winter annuals, improved knockdown with metribuzin.</td>
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<td></td>
<td>• Additional activity on perennial and biennial species e.g., dandelions, thistles.</td>
<td>• Residual activity on winter annual grasses and broadleaf weeds including ALS-susceptible marestail.</td>
<td>• Residual activity on marestail.</td>
<td>• Longest residual activity on marestail.</td>
</tr>
<tr>
<td></td>
<td>• Flexibility to plant corn or soybeans the following spring.</td>
<td>• Flexibility to plant corn or soybeans the following spring.</td>
<td>• Flexibility to plant corn or soybeans in the spring.</td>
<td>• Locked into soybeans the following spring.</td>
</tr>
<tr>
<td><strong>Better</strong></td>
<td>Authority® XL, Authority® Maxx, Authority® First DF, Authority® Assist, Authority® MTZ DF, Authority® Elite, Authority® Supreme herbicides, Anthem® herbicide</td>
<td>Authority® MTZ DF, Authority® Elite, Authority® Supreme herbicides, Anthem® Maxx herbicide</td>
<td>Authority® XL, Authority® Maxx, Authority® First DF, Authority® Assist, Authority® Elite, Authority® Supreme herbicides, Anthem® MAXX herbicide</td>
<td></td>
</tr>
<tr>
<td><strong>Best</strong></td>
<td>Authority® XL herbicide 4 oz + Weedmaster® herbicide 1.5 pt + COC 1% w/v FALL fb Authority MTZ herbicide 12 oz + Gramoxone® herbicide 2.5 pt + COC 1% v/v Spring</td>
<td>Authority® MTZ herbicide 12 oz. + Gramoxone® herbicide 2.5 pt + COC 1% v/v Spring</td>
<td>Authority® MTZ herbicide 12 oz. + Gramoxone® herbicide 2.5 pt + COC 1% v/v Spring</td>
<td>Authority® MTZ herbicide 12 oz. + Gramoxone® herbicide 2.5 pt + COC 1% v/v Spring</td>
</tr>
</tbody>
</table>

### Suggested Spring Sequential Soybean Residual (Preplant – Preemergence)

- Authority® XL, Authority® Maxx, Authority® First DF, Authority® Assist, Authority® MTZ DF, Authority® Elite, Authority® Supreme herbicides, Anthem® herbicide
- Authority® MTZ DF, Authority® Elite, Authority® Supreme herbicides, Anthem® Maxx herbicide
- Authority® XL, Authority® Maxx, Authority® First DF, Authority® Assist, Authority® Elite, Authority® Supreme herbicides, Anthem® MAXX herbicide
- Authority® XL herbicide 4 oz + Weedmaster® herbicide 1.5 pt + COC 1% w/v FALL fb Authority MTZ herbicide 12 oz + Gramoxone® herbicide 2.5 pt + COC 1% v/v Spring

### Fall Herbicide Programs

**Purdue University– 2015/2016 Fall Application: 11/14/15, Ratings: 4/29/16**

- Roundup PowerMAX® herbicide 22 oz. + 2,4-D LV4 16 oz. + COC 1% v/v
- Roundup PowerMAX® herbicide 22 oz. + 2,4-D LV4 16 oz. + Authority® MTZ DF herbicide 11 oz. + COC 1% v/v

**Fall Herbicide Weed Control in No-Till Soybean**

**Univ. of IL. Urbana – 2013/2014 Fall Application: 11/15/13, Ratings: 4/28/14**

- Roundup® PowerMax herbicide 22 oz. + Roundup PowerMax herbicide 22 oz. + Authority® XL herbicide 4 oz. + 2,4-D LV4 16 oz.
- Roundup® PowerMax herbicide 22 oz. + Authority® XL herbicide 4 oz. + 2,4-D LV4 16 oz.
- Roundup® PowerMax herbicide 22 oz. + Authority® MTZ DF herbicide 12 oz.
Cover Crop Selection

Cover crops are being employed on more acres in many areas. Cover crops offer beneficial attributes including but not limited to: 1.) Protection from soil erosion; 2.) Nutrient scavenging; 3.) Increased biodiversity; and 4.) Suppression of winter annual and early-emerging summer annual weeds. Cover crops that are not used for feed or forage may be planted prior to normal herbicide rotation intervals. However, producers will need to determine herbicide injury potential prior to seeding. When making this decision, several factors should be considered. These factors include: active ingredients employed for the season; inherent sensitivity of cover crop species to those actives; herbicide timing as later applications of residual herbicides will increase injury probability; and season rainfall patterns. In certain areas of IL and IN, below normal rainfall patterns have occurred from May to August. Drier conditions typically represent a higher-risk scenario for cover crop injury with herbicides. Limited rainfall reduces herbicide degradation and increases persistence. Conducting bioassays prior to seeding in these areas will assist in determining whether or not to plant a specific cover crop. Bioassays can be conducted by collecting soil from the area where the cover crop is planned to be seeded, as well as a separate sample from a similar soil type that does not have any herbicide residue. Place both soil samples separately into corrugated potting trays, seed cover crops, lightly water and observe growth for three weeks. If similar emergence and growth patterns transpire, proceed with cover crop seeding in desired field. Below is a data chart from the University of Missouri showing less than 30% stand reduction is typically the threshold to determine acceptable injury for a specific cover crop species. However, in higher risk situations, planting a mixture of grass and broadleaf species will often result in adequate vegetation. Furthermore, if a mixture is employed, ensure one or two of the selected species confer tolerance to herbicides utilized the previous spring/summer.

*Cover crop establishment data was generated by third party experiments and does not constitute a recommendation, nor warranty for cover crop establishment by FMC.

University of Missouri Cover Crop Seeding Trial – Selected Treatments

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Rate</th>
<th>Wheat</th>
<th>Tillage Radish</th>
<th>Cereal Rye</th>
<th>Crimson Clover</th>
<th>Oats</th>
<th>Annual Ryegrass</th>
<th>Hairy Vetch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LB A1/A</td>
<td>% Stand Reduction 28 Days After Emergence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfentrazone - Spartan® brand herbicide (Authority® brand herbicides)</td>
<td>0.25</td>
<td>16</td>
<td>7</td>
<td>12</td>
<td>6</td>
<td>7</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Authority® First DF herbicide</td>
<td>0.28</td>
<td>6</td>
<td>24</td>
<td>9</td>
<td>8</td>
<td>18</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>Pyroxasulfone – Anthem® MAXX herbicide</td>
<td>0.16</td>
<td>11</td>
<td>4</td>
<td>15</td>
<td>14</td>
<td>30</td>
<td>53</td>
<td>3</td>
</tr>
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</table>

Data Courtesy of The University of Missouri, Influence of Soybean Herbicide Treatments on Subsequent Cover Crop Stand Reduction in the Fall. © Kevin Bradley, Univ. of Missouri.
Studies Observing Authority® Brand Herbicides' Influence Upon Cover Crops

2014 fall planted winter wheat (top); tillage radish (middle); annual ryegrass on 9-10-14. Application made 5-27-14. Photo’d 11-4-14.

(Purdue University, Throckmorton Farm, West Lafayette, IN 14S-THP-CTS)

Fall planted tillage radish - Fishers, IN, Heartland Technologies

Fall planted annual ryegrass - Fishers, IN, Heartland Technologies

Potential injury by specific pre-emergence herbicides to fall planted cover crops — % Stand Reduction 105 days after application. Non-Replicated Trial
(2014 Ohio State – OARDC Western Branch, South Charleston, OH)

<table>
<thead>
<tr>
<th>Herbicide – rate/ac</th>
<th>Wild Radish</th>
<th>Field Pea</th>
<th>Winter Rye</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthem herbicide 8 oz.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Authority MTZ herbicide 14 oz.</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Authority XL herbicide 4 oz.</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Authority First herbicide 4 oz.</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Authority First herbicide 6.4 oz.</td>
<td>0</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Authority Assist herbicide 6 oz.</td>
<td>0</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Authority Maxx herbicide 8 oz.</td>
<td>0</td>
<td>30</td>
<td>0</td>
</tr>
</tbody>
</table>

2014 Preemergence herbicide carryover to cereal (winter) rye cover crops planted 98 days after application.
(Univ. of Delaware Georgetown, DE.)
AIM® EC Herbicide – Harvest Aid

Broadleaf weed escapes are evident in many fields. A harvest aid application may provide a few benefits:

1. Reduce growth and/or desiccate weeds to improve harvest.
2. Reduce weed seed production from late-developing weeds to reduce pressure next season.

Corn (Field, Seed, Pop), Soybeans and Sorghum

Use a tank mix for weeds like velvetleaf, morning glories, bindweed, black nightshade, waterhemp, lambsquarters and others.

Soybeans

1.0-1.5 oz./A Aim® EC herbicide + 1.5 lbs. glyphosate + 1 pt./A COC/MSO
OR
1.0-1.5 oz./A Aim EC herbicide + 1 pt./A Gramoxone® herbicide + NIS 0.25%

➢ Aim EC herbicide + Gramoxone herbicide is better for waterhemp and other glyphosate-resistant weeds.
➢ Aim EC herbicide + glyphosate is good for velvetleaf, morning glories and grasses.
➢ Soybeans - when pods turn brown.

Corn & Sorghum

1.0 oz./A Aim EC herbicide + 1-2 pt./A 2,4-D + 1.0 lb. ai/A glyphosate + 1 pt./A COC/MSO

• Roundup Ready® herbicide corn - start after hard dough.
• Sorghum - Grain moisture at <30% to avoid crop damage.
• Check Aim EC herbicide partner product for timing and PHI restrictions.
• Aim EC herbicide preharvest interval on above crops - three days.
• PHI for glyphosate and 2,4-D is seven days.

3-5 gal./A aerial application
15-20 gal./A ground application

Untreated Check

Aim EC herbicide 1 oz. + 2,4-D. Seven days after appl. Seed corn. Velvetleaf 3-5 ft. tall
Gramoxone is a Restricted Use Pesticide. Always read and follow label directions, precautions and restrictions for use. Some products may not be registered for sale or use in all states. As of November 1, 2017, the USEPA registration for DuPont™ Panoflex® herbicide was sold by E.I. du Pont de Nemours and Company to FMC Corporation. FMC, Panoflex, Crusher, Authority, Anthem, Spartan and Aim are trademarks of FMC Corporation or an affiliate. Roundup PowerMAX and Roundup Ready are trademarks of Monsanto. Gramoxone is a trademark of Syngenta Group Company. Weedmaster is a trademark of Nufarm Agricultural Products. ©2018 FMC Corporation. All rights reserved. 17-FMC-0560 08/18