Weed Emergence Patterns and the Effect of Time of Weed Removal, with Glyphosate, on Corn and Soybean Yield

• In 2004 - 2006, research compared weed removal at 5 glyphosate timings (1”, 3”, 5”, 7” and 9” weed heights), with and without a ½-rate of a PRE herbicide, on crop yield and economic returns.

• Studies were conducted at four locations for corn and six locations for soybean in 2004; five locations for corn and soybean in 2005; four locations for corn and soybean in 2006.
Table 5. Effects of Glyphosate Timing on Weed Control and Crop Yield in Corn in 2006

<table>
<thead>
<tr>
<th>Trt</th>
<th>Herbicide(^1)</th>
<th>Post Application Stage</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Harness / Roundup WeatherMAX + AMS</td>
<td>1&quot; Weeds</td>
<td>37.75</td>
</tr>
<tr>
<td>2</td>
<td>Roundup WeatherMAX + AMS</td>
<td>1&quot; Weeds</td>
<td>17.85</td>
</tr>
<tr>
<td>3</td>
<td>Harness / Roundup WeatherMAX + AMS</td>
<td>3&quot; Weeds</td>
<td>37.75</td>
</tr>
<tr>
<td>4</td>
<td>Roundup WeatherMAX + AMS</td>
<td>3&quot; Weeds</td>
<td>17.85</td>
</tr>
<tr>
<td>5</td>
<td>Harness / Roundup WeatherMAX + AMS</td>
<td>5&quot; Weeds</td>
<td>37.75</td>
</tr>
<tr>
<td>6</td>
<td>Roundup WeatherMAX + AMS</td>
<td>5&quot; Weeds</td>
<td>17.85</td>
</tr>
<tr>
<td>7</td>
<td>Harness / Roundup WeatherMAX + AMS</td>
<td>7&quot; Weeds</td>
<td>37.75</td>
</tr>
<tr>
<td>8</td>
<td>Roundup WeatherMAX + AMS</td>
<td>7&quot; Weeds</td>
<td>17.85</td>
</tr>
<tr>
<td>9</td>
<td>Harness / Roundup WeatherMAX + AMS</td>
<td>9&quot; Weeds</td>
<td>37.75</td>
</tr>
<tr>
<td>10</td>
<td>Roundup WeatherMAX + AMS</td>
<td>9&quot; Weeds</td>
<td>17.85</td>
</tr>
<tr>
<td>11</td>
<td>Harness</td>
<td>-</td>
<td>19.89</td>
</tr>
<tr>
<td>12</td>
<td>Roundup WeatherMAX + AMS / Roundup WeatherMAX + AMS</td>
<td>3&quot; Weeds / 2-4&quot; regrowth</td>
<td>35.70</td>
</tr>
<tr>
<td>13</td>
<td>Weed Free</td>
<td>-</td>
<td>0.00</td>
</tr>
<tr>
<td>14</td>
<td>Weedy</td>
<td>-</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Post – Roundup WeatherMax (22 oz/A)
Pre + Post - Harness (1.25 pt./A) / Roundup WeatherMax (22 oz/A) + AMS
Trt 11 – Harness PRE
Trt 12 – Roundup WeatherMax + AMS / Roundup WeatherMax + AMS at 3”/ 2-4” regrowth
Weed Emergence Patterns and the Effect of Time of Weed Removal on Corn

Lamberton, 3-4 inch weed removal date - June 18, 2005

204 bu/A
Weed Emergence Patterns and the Effect of Time of Weed Removal on Corn

Lamberton, 9-12 inch weed removal date – July 1, 2005

170 bu/A

Post – Roundup WeatherMax (22 oz/A)
Pre + Post - Harness (1.25 pt./A) / Roundup WeatherMax (22 oz/A) + AMS
Trt 11 – Harness PRE
Trt 12 – Roundup WeatherMax + AMS / Roundup WeatherMax + AMS at 3”/ 2-4” regrowth
Average nitrogen sequestered by corn and giant foxtail across nitrogen sources. Rate of N applied was 170 lbs./A.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1.48</td>
<td>3.27</td>
<td>---***</td>
<td>---***</td>
</tr>
<tr>
<td>4</td>
<td>3.50</td>
<td>15.04</td>
<td>9.15</td>
<td>11.94</td>
</tr>
<tr>
<td>6</td>
<td>11.92</td>
<td><strong>44.82</strong></td>
<td>19.63</td>
<td><strong>29.60</strong></td>
</tr>
<tr>
<td><strong>LSD(0.05)</strong></td>
<td>1.45</td>
<td>9.84</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

* Height at which nicosulfuron was applied.
** Comparisons not done due to limited degrees of freedom.
*** Lost due to excessive rain.

Pre + Post - Boundary (1.5 pt/A) + Touchdown Total (24 oz/A) + AMS
Post - Touchdown Total (24 oz/A) + AMS
Pre – Boundary (1.5 pt/A)
2-pass Post - Touchdown Total + AMS / Touchdown Total + AMS at 3”/ 2-4” regrowth
2004 - 2006 Summary

**Corn**
One-pass glyphosate does not maximize yield or returns.

Longer the duration of early-season competition the greater impact on yield.

PRE/POST (5 inch weeds) gave the best economic returns.

Two pass glyphosate can work but has more time management risk than PRE/POST (5 inch weeds).

**Soybean**
One-pass glyphosate (5 inch weeds) could maximize yield and return.

Application of glyphosate too early (less than 5 inch weeds) reduced crop yield and economic return.

PRE/POST (5 inch weeds or larger) provided less favorable economic returns.

Two pass glyphosate is very effective and risk efficient.
What is at Risk when Developing Herbicide Programs?

- **Loss of:**
  - Yield and Profit
- **Replenished weed seed banks**
- **Stress**
  - Lack of Time
  - Fatigue and Operator Error
- **Other Farm Operations**
  - Cutting Hay
  - Soil Compaction
  - Etc.
- **Weed species shifts**

Photo by Liz Stahl – Regional Extension Educator
Minnesota Extension Service