Herbicide Injury

Plant injury symptoms often indicate the chemical that caused the problem.
- Leaf twisting or curling, yellowing or whitening of leaves
- Plant tissue browning or burning
- Stunted root or shoot growth
- Root or shoot malformation, stalk brittleness, leaf crinkling

Herbicide Injury

Even when herbicides are applied according the label, injury can occur. Many times injury results from:
- herbicide carry-over from previous crop applications,
- drift from nearby applications, and/or
- improper application of labeled chemicals.

Identifying herbicide injury

Herbicide injury symptoms can be confused with nutrient deficiencies or toxicities, waterlogged soils, mechanical damage, cultural damage, frost or wind damage, or other pest damage. Hybrids may vary in their response to herbicides.

Look for patterns in the field associated with soil types and with overspray at field borders or overlap patterns from application equipment. Crop advisers, commercial applicators and other experts can help farmers determine why the injury happened. Operator error (high rates, wrong chemical and overlaps) can be the cause, but the interaction of temperature, crop vigor, moisture and soil type often combine to cause injury, even when the chemical is properly applied. Many times, the corn plant will recover when growing conditions become more favorable.

Herbicide injury checklist:
- Document corn injury symptoms and patterns.
- Contact the applicator or chemical representative.
- Photograph injury symptoms.
- Check growing points to determine plant recovery potential.
- Count damaged plants to determine the extent of injury.
- Map areas of the field damaged.
- Keep records of crop yield losses.

BMP

Use band and spot applications of pesticides where appropriate to reduce environmental hazards and treatment costs.
Avoid overspray and drift, especially when surface water is in close proximity to treated fields.
Establish buffer zones a safe distance (minimum of 50 to 100 feet recommended) from wells and surface water, where pesticide is not applied.
Herbicide injury symptoms and causes by mode of action and chemical family

**Growth regulators**

**Phenoxy acids**

Example: 2,4-D

<table>
<thead>
<tr>
<th>Injury Symptoms</th>
<th>Injury Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Rolled leaves</td>
<td>• Applied to rapidly growing corn</td>
</tr>
<tr>
<td>• Fused brace roots</td>
<td>• Applied too late</td>
</tr>
<tr>
<td>• Stalk bending &amp; brittleness</td>
<td></td>
</tr>
<tr>
<td>• Missing kernels</td>
<td></td>
</tr>
</tbody>
</table>

**Benzoic acids**

Example: dicamba (Banvel)

<table>
<thead>
<tr>
<th>Injury Symptoms</th>
<th>Injury Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Similar to 2,4-D</td>
<td>• Same as 2,4-D</td>
</tr>
<tr>
<td></td>
<td>• Variable hybrid sensitivity</td>
</tr>
</tbody>
</table>

**Amino acid synthesis inhibitors**

**Imidazolines**

Example: imazethapyr (Pursuit)

<table>
<thead>
<tr>
<th>Injury Symptoms</th>
<th>Injury Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Stunted</td>
<td>• Drift, carryover</td>
</tr>
<tr>
<td>• Emerging leaves trapped, and yellow to translucent</td>
<td>• Misapplied to non-tolerant corn</td>
</tr>
<tr>
<td>• Root pruning</td>
<td></td>
</tr>
</tbody>
</table>

**Amino Acid Derivatives**

Example: glyphosate (Roundup)

<table>
<thead>
<tr>
<th>Injury Symptoms</th>
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</tr>
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<tbody>
<tr>
<td>• Yellow, then brown foliage</td>
<td>• Misapplied to non-tolerant corn</td>
</tr>
<tr>
<td>• Growing point necrosis, then plant dies</td>
<td></td>
</tr>
</tbody>
</table>

**Phosphoric acids**

Example: glufosinate (Liberty)

<table>
<thead>
<tr>
<th>Injury Symptoms</th>
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</tr>
</thead>
<tbody>
<tr>
<td>• Pale, yellow, or purplish leaves</td>
<td>• Applied too late</td>
</tr>
<tr>
<td>• Water soaked lesions</td>
<td>• Misapplied to non-tolerant corn</td>
</tr>
</tbody>
</table>
Amino acid synthesis inhibitors, continued

Sulfonylureas
Example: primsulfuron (Beacon)

Injury Symptoms
• Stunted, yellow to translucent leaves

Injury Cause
• Variable hybrid sensitivity

Lipid synthesis inhibitors
Cyclohexanediones
Example: sethoxydim (Poast)

Injury Symptoms
• Chlorotic to necrotic new leaf tissue

Injury Cause
• Misapplication

Seedling growth inhibitors
Dinitroanilines
Example: trifluralin (Treflan), pendimethalin (Prowl)

Injury Symptoms
• Stunted plants
• Roots are short and thickened

Injury Cause
• Carryover, misapplication, over-application

Acetanilides
Example: alachlor (Lasso), metalochlor (Dual), propachlor (Ramrod)

Injury Symptoms
• Poor emergence
• Stunting
• Leaf-out before emergence
• Leaf entrapment

Injury Cause
• Over-application

Thiocarbamates
Example: EPTC (eradicane), butylate (Sutan+)

Injury Symptoms
• Leaf entrapment, buggy whipping, stunting

Injury Cause
• Cool, wet soils
• Over-application

Read all label instructions prior to chemical mixing.
Herbicide Injury

Photosynthetic inhibitors
Triazines
Example: atrazine, simazine (Princep)

<table>
<thead>
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<th>Injury Symptoms</th>
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</thead>
<tbody>
<tr>
<td>Yellow and brown leaf tissue</td>
<td>Cool, wet soils</td>
</tr>
<tr>
<td></td>
<td>Crop oil synergy</td>
</tr>
</tbody>
</table>

Nitriles
Example: bromoxynil (Buctril)

<table>
<thead>
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<th>Injury Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow or spotted leaf tissue</td>
<td>Crop oil synergy</td>
</tr>
</tbody>
</table>

Chlorophyll inhibitor
Ioxazole
Example: isoxaflutole (Balance)

<table>
<thead>
<tr>
<th>Injury Symptoms</th>
<th>Injury Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whitened tissue, poor emergence, stunting</td>
<td>Over-application on cool, wet or sandy soils</td>
</tr>
</tbody>
</table>

Cell membrane disrupter
Bipyridyliums
Example: paraquat (Gramoxone)

<table>
<thead>
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<tbody>
<tr>
<td>Limp, water soaked lesions, spotting</td>
<td>Drift</td>
</tr>
</tbody>
</table>