Weed Control in Matted Row Strawberry Production

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Herbicides for strawberries

- Many herbicides, each with its own limitations
  - Crop safety
    - Safe only at specific growth stages, timing issues
    - Age restrictions
  - No crop contact, directed spray only
  - PHI limitations, timing issue

Residual Herbicides Registered for Strawberry

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>MOA</th>
<th>Solubility (ppm)</th>
<th>½ Life (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dacthal</td>
<td>Mitosis Inhibitor</td>
<td>0.5</td>
<td>60</td>
</tr>
<tr>
<td>Devrinol</td>
<td>Mitosis Inhibitor</td>
<td>73</td>
<td>70</td>
</tr>
<tr>
<td>Prowl</td>
<td>Mitosis Inhibitor</td>
<td>0.3</td>
<td>44</td>
</tr>
<tr>
<td>Sinbar</td>
<td>PS II Inhibitor</td>
<td>710</td>
<td>120</td>
</tr>
<tr>
<td>Ultra Blazer</td>
<td>PPO Inhibitor</td>
<td>120</td>
<td>60</td>
</tr>
<tr>
<td>Chateau</td>
<td>PPO Inhibitor</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Spartan</td>
<td>PPO Inhibitor</td>
<td>780 (pH 7)</td>
<td>121</td>
</tr>
</tbody>
</table>

Postemergence Herbicides Registered for Strawberry

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>MOA</th>
<th>Solubility (ppm)</th>
<th>½ Life (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2, 4-D</td>
<td>Auxin disruption</td>
<td>900</td>
<td>10</td>
</tr>
<tr>
<td>Solix</td>
<td>Auxin disruption</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>Poast</td>
<td>ACCase Inhibitor</td>
<td>4400</td>
<td>5</td>
</tr>
<tr>
<td>Select</td>
<td>ACCase Inhibitor</td>
<td>1000</td>
<td>3</td>
</tr>
<tr>
<td>Roundup</td>
<td>EPSP Syn. Inhibitor</td>
<td>15K</td>
<td>47</td>
</tr>
<tr>
<td>Gramoxone</td>
<td>PS I Inhibitor</td>
<td>620K</td>
<td>1000</td>
</tr>
</tbody>
</table>

Chateau (flumioxazin) 51WDG

- MOA: PPO inhibitor
- Timing: early spring; to aisles only.
- Rate: 3 oz/acre
- Weeds: most annual broadleaves and grasses.
- Poor Control: horseweed.
- Other: Toxic to strawberry; do not apply over the rows; directed spray only.
**Dacthal (DCPA) 75W**
- **MOA:** Mitosis inhibitor
- **Timing:** After transplant or early spring to established fields.
- **Rate:** 8-12 lb product/acre
- **Weeds:** Annual grasses, lambsquarters, chickweed, purslane.
- **No Control:** mustards, composites, smartweed.
- **Other:** most effective on sand; expensive.

**Devrinol (napropamide) 50DF**
- **MOA:** Mitosis inhibitor
- **Timing:** After transplant or early spring.
- **Rate:** 6-8 lb product/acre
- **Weeds:** Annual grasses and broadleaves.
- **No Control:** lambsquarters, composites, mustards, nightshade.
- **Other:** expensive; needs water; may inhibit daughter plant establishment.

**Prowl H2O (pendimethalin) 3.8CS**
- **MOA:** Mitosis inhibitor
- **Timing:** Before or after transplant; early spring or at renovation.
- **Rate:** 1.5-3 pt/acre; max. 6 pt/acre
- **Weeds:** Many annual grasses and broadleaves.
- **No Control:** mustards, composites, nightshade.

**Sinbar (terbacil) 50WDG**
- **MOA:** PS II inhibitor
- **Timing:** After transplanting; after renovation or in late fall.
- **Rate:** 2-8 oz product/acre
- **Weeds:** Most annual broadleaves and grasses.
- **Poor Control:** Pigweeds, groundsel, some perennials.
- **Other:** Long carryover; do not use in year of rotation; some varieties are sensitive.

**Ultra Blazer (acifluorfen) 2L**
- **MOA:** PPO inhibitor
- **Timing:** After renovation or late fall.
- **Rate:** 1.5 pt/acre
- **Weeds:** Most annual broadleaves.
- **No Control:** Some grasses; most perennials.

**Spartan (sulfentrazone) 4F**
- **MOA:** PPO inhibitor
- **Timing:** Prior to planting, before seedlings emerge
- **Rate:** 4 oz/acre (higher for >3% OM)
- **Weeds:** Most annual broadleaves.
- **No Control:** Only fair on grasses; most perennials.
Postemergence Herbicides for Strawberry

**Formula 40 (2,4-D) 3.8L**
- **MOA:** Auxin disruption
- **Timing:** After last harvest of season.
- **Rate:** 1 qt/acre
- **Weeds:** most broadleaves.
- **No Control:** grasses; some perennials.
- **Other:** some varieties are sensitive; may cause misshapen fruit next year.

**Solix (clopyralid) 3L**
- **MOA:** Auxin disruption
- **Timing:** Renovation
- **Rate:** 2/3 pints/acre
- **Weeds:** composites, legumes, nightshade, smartweed.
- **No Control:** everything else.
- **Other:** causes curling of strawberry leaves, limited to 1 application per crop per year (MANA, Reg in Illinois)

**Poast (sethoxydim) 1.53L**
- **Select Max (clethodim) 0.97E**
  - **MOA:** ACCCase inhibitor
  - **Timing:** post to grasses; 7 day + 4 day PHI.
  - **Rate:** 1-2 pt; ½ - 1 pt/acre
  - **Weeds:** grasses; **Select** – annual bluegrass.
  - **Other:** 2-3 applications/year.

**Roundup (glyphosate) 5L**
- **MOA:** EPSP Synthase inhibitor
- **Timing:** Before transplant; or shielded between rows; 14 day PHI.
- **Rate:** 1 qt/acre
- **Weeds:** all weeds.
- **Other:** very toxic to strawberry.

**Gramoxone (paraquat) 2L**
- **MOA:** PS I inhibitor
- **Timing:** post shielded between rows.
- **Rate:** 1 qt/acre
- **Weeds:** most annuals.
- **Other:** no residual activity.
Weed Control Recommendations for Strawberry – New Planting (1)

• 1. Clean up the field previous year; kill perennial weeds.
• 2. Plow fields in spring and prepare for transplanting.
• 3. Transplant in April.
• 4. Apply Dacthal, Devrinol, or Prowl H2O after transplanting.

Weed Control Recommendations for Strawberry – New Planting (2)

• 5. Apply Sinbar in midseason before runners root; irrigate after application.
• 6. Apply Sinbar or Ultra Blazer to dormant plants before mulch in fall.
• 7. Apply Solix in fall for POST composite (horseweed, mayweed, control, dandelion) control.
• 8. Use grass killers as needed.

Weed Control Recommendations for Established Strawberry

• 1. Remove straw mulch and apply Dacthal, Devrinol, or Prowl H2O before plants green up in spring.
• 2. Use Poast or Select for postem. grass control.
• 3. Hand weed and hoe to keep field clean.

Renovation After Harvest

• 1. Apply 2, 4-D to kill broadleaves.
• 2. Mow the field as short as possible.
• 3. Rotovate the beds, leaving an 8-12 inch row in the center.
• 4. Apply herbicides before new growth begins.
• 5. Herbicides: Sinbar, Ultra Blazer, or Prowl H2O.
• 6. If composites (dandelion, horseweed) or legumes emerge, apply Solix after harvest.

Fall Herbicide Applications

• 1. Solix for horseweed, clover, dandelion, mayweed, ragweed.
• 2. Poast, Select for grasses.
• 3. Dormant berries before mulching (after Dec. 1st) Sinbar, Ultra Blazer; Chateau (row middles only).

Major weeds in strawberry

• Yellow rocket
• Shepherds purse
• Virginia pepperweed
• Common chickweed
• White campion
• Henbit
• White clover
• Wild Radish
• Horseweed
• Common groundsel
• Common ragweed
• Mayweed chamomile
• Dandelion
• Quackgrass
• Annual bluegrass
White Clover
*Trifolium repens* L.

**Growth:** Perrenial
**Problem:** Competitor

**Control:** Solix

[Image of White Clover](http://bioinfo.noble.org/phpssrminer/images/libs/lib_white_clover.jpg)

[Image of White Clover](http://www.dpughphoto.com/images/white%20clover%20durham%2040309.JPG)

Wild Radish
*Raphanus raphanistrum* L.

**Growth:** Winter or summer annual
**Problem:** Very prolific; Large amount of seeds annually, Competitor

**Control:** Sinbar, Ultra Blazer, 2,4-D


[Image of Wild Radish](http://www.ppws.vt.edu/scott/weed_id/wradish4-3G.jpg)

Yellow Rocket
*Barbarea vulgaris* R. Br.

**Growth:** Winter annual or biennial
**Problem:** germs + flowers early, many seeds that last long time

**Control:** Sinbar, Ultra Blazer

[Image of Yellow Rocket](http://www.missouriplants.com/Yellowalt/Barbarea_vulgaris_plant.jpg)

Shepherd’s Purse
*Capsella bursa-pastoris* (L.) Medicus

**Growth:** Winter annual
**Problem:** Very prolific

**Control:** Sinbar, Ultra Blazer, 2,4-D

[Image of Shepherd’s Purse](http://www.wildflowersofireland.net/image_uploads/flowers/SHEPHERDS-PURSE-1.jpg)

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Virginia Pepperweed
*Lepidium virginicum* L.

**Growth:** Winter annual or summer annual
**Problem:** Competitor

**Control:** Sinbar, Ultra blazer, 2,4-D

[Image of Virginia Pepperweed](http://www.missouri.edu/keyindex.htm)

[Image of Virginia Pepperweed](http://plants.usda.gov/java/profile?symbol=LEVI3&photoID=levi3_006_ahp.jpg)

Common Chickweed
*Stellaria media* L. Vill.

**Growth:** Winter annual
**Problem:** Germs early; competitor

**Control:** Sinbar, Ultra Blazer, 2,4-D

[Image of Common Chickweed](http://www.missouri.edu_/gilaflora/stellaria_media.html)

[Image of Common Chickweed](http://www.conabio.gob.mx/.../fichas/pagina1.htm)
White Campion
Silene alba (Mill.)

Growth: Annual, winter annual, or biennial
Problem: Emerge early, very tough plant; very competitive
Control: 2,4-D, hoeing

Henbit
Lamium amplexicaule L.

Growth: Winter annual
Problem: Early emergence
Control: 2, 4-D

Horseweed
Conyza canadensis L.

Growth: Winter or summer annual
Problem: Very prolific; competitor; difficulty in harvest
Control: Sinbar, Solix

Common Groundsel
Senecio vulgaris L.

Growth: Winter or summer annual
Problem: Competitor
Control: Sinbar, Ultra Blazer, Solix

Common Ragweed
Ambrosia artemisiifolia L.

Growth: Annual
Problem: Competitor
Control: Sinbar, Ultra Blazer, Solix

Mayweed Chamomile
Anthemis cotula L.

Growth: Winter or summer annual
Problem: Competitor
Control: Sinbar, Solix
Dandelion
*Taraxacum officinale*

**Growth:** Perennial
**Problem:** Competitor

**Control:** Solix, 2,4-D

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Quackgrass
*Elytrigia repens L.*

**Growth:** Perennial grass
**Problem:** Competitor

**Control:** Sinbar, Poast

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Annual Bluegrass
*Poa annua*

**Growth:** Perennial or winter annual
**Problem:** Very prolific, very competitive; emerge early

**Control:** Sinbar, Select Max

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**Summary (1)**

1. Good weed control is essential for profitable strawberry production.
2. A good weed control program is part of a management plan that includes:
   - Healthy plants of a good variety
   - Sufficient nutrients (spring, summer, fall)
   - Protective winter cover (straw mulch)
   - Mechanical tillage (renovation)
   - Hand weeding and hoeing (perennials)
   - Irrigation for frost, plant growth, fruit production

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**Summary (2)**

- Without a healthy planting it will be difficult to maintain good weed control.
- Without good weed control, it will be difficult to maintain a healthy planting.

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**Questions?**

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