CHEMIGATION WEED CONTROL IN PROCESSING ONIONS

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Determine herbicides’ efficacy and crop safety when applied via chemigation

Evaluate herbicides’ when applied to high organic matter clay loam soils

Determine the economic benefit from herbicides with regard to yield and hand-weeding costs
Planted on April 20, 2009
- 36 inch beds with 4 rows per bed
- Major weeds were pigweed, lambsquarter, kochia, clover, and spiny sowthistle
<table>
<thead>
<tr>
<th>Trt #</th>
<th>Herbicide</th>
<th>1 Leaf (5-21-09)</th>
<th>2 Leaf (5-29-09)</th>
<th>3-4 Leaf (6-12-09)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Goal 2xL</td>
<td>2 oz/a</td>
<td>6 oz/a</td>
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<tr>
<td>2</td>
<td>Goal 2xL</td>
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<td>3</td>
<td>Goal 2xL</td>
<td>5.25 oz/a</td>
<td>5.25 oz/a</td>
<td>6 oz/a</td>
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<tr>
<td></td>
<td>Outlook</td>
<td>2 pt/a</td>
<td>3 pt/a</td>
<td>6 oz/a</td>
</tr>
<tr>
<td>4</td>
<td>Goal 2xL</td>
<td>1.5 oz/a</td>
<td>4.5 oz/a</td>
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<tr>
<td></td>
<td>Outlook</td>
<td>7.9 oz/a</td>
<td>7.9 oz/a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prowl H20</td>
<td>3 pt/a</td>
<td></td>
<td></td>
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<td>6 oz/a</td>
<td>6 oz/a</td>
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<tr>
<td></td>
<td>Outlook</td>
<td>10.5 oz/a</td>
<td>10.5 oz/a</td>
<td></td>
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<tr>
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<td>Prowl H20</td>
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<tr>
<td>6</td>
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<td>9 oz/a</td>
<td>6 oz/a</td>
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<tr>
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<td>Outlook</td>
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<td>15.7 oz/a</td>
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<tr>
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<td>12 oz/a</td>
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<tr>
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<td>Outlook</td>
<td>4 pt/a</td>
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<tr>
<td>9</td>
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<td>2 oz/a</td>
<td>6 oz/a</td>
<td>6 oz/a</td>
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<td>Prowl H20</td>
<td>4 pt/a</td>
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<tr>
<td>10</td>
<td>Goal 2xL</td>
<td>2 oz/a</td>
<td>6 oz/a</td>
<td>6 oz/a</td>
</tr>
<tr>
<td></td>
<td>Prowl H20</td>
<td>4 pt/a</td>
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</tr>
</tbody>
</table>

1. All herbicide rates are product rate per acre.

- Goal Alone
- 1/2 x rate
- 3/4x rate
- 1x rate
- 1 1/2x rate
- 2x rate
- Goal + Outlook
- Goal + Prowl
- Goal + Outlook delayed until 2-leaf
Kochia at 1-leaf stage
Pigweed at 1-leaf stage
Kochia at 2-leaf stage
Lambsquarter regrowth after 2-leaf treatment
Weeds at 3–4 leaf stage
Season Hand-weeding Cost (2 Hand-weeding Events in July and August)

- Untreated
- Goal + Outlook delayed to 2 leaf
- Goal + Prowl (no Outlook)
- Goal + Outlook (no Prowl)
- 2.0x rate of Goal + Outlook + Prowl
- 1.0x rate of Goal + Outlook + Prowl
- 0.5x rate of Goal + Outlook + Prowl
- Goal alone at 1, 2, & 3 leaf

$ per acre
Trial 4569A. Varying rates of Goal/Outlook/Prowl H₂O tank-mixes

**Onion Injury and Stand**

- The 1.5x and 2x rates of Goal/Outlook/Prowl H₂O caused significant onion injury (stunting, curling, and chlorosis).

- Onions in all treatments out-grew herbicide injury by the July evaluation. None of the treatments reduced onion stand.
Injury from Goal + Outlook at 1-leaf stage
Injury from Goal + Outlook at 3-leaf stage
Weed Competition in Untreated Plots
Weed Stand Counts
• All treatments reduced total weed cover compared to the non-weeded control.

• Pre-emergent herbicides:
  • Goal + Prowl H₂₀ + Outlook applied at 1 or 2 leaf stage reduced weed density by more than 60% compared to the control
  • Adding Nortron applied pre-emergent or at loop stage to Prowl and Outlook gave the best control of kochia
  • Delaying application of Outlook and Prowl until the 2-leaf stage did not decrease weed control if Goal was applied at the 1-leaf stage

• Post-emergent treatments:
  • Adding Buctril to Goal improved control of kochia and clover compared to Goal alone.
  • Adding Starane to Goal gave excellent control of kochia, but Starane did not appear to improve control of clover compared to Goal alone.
  • Difference in weed control from Goal formulations (Tender vs. 2XL) applied at the 1 and 2-leaf stage was not evident.
  • Applications at 3-4 leaf stage may have slightly improved control with some treatments but it was not statistically different.
Weed Regrowth after 1-leaf Goal Treatment
For big weeds -
Consider Goal + Buctril + Outlook
Treated vs. Untreated
Season Hand-weeding Cost (2 Hand-weeding Events in July and August)

- Untreated
- Goal/Prowl/Outlook + Starane 2-leaf
- Goal/Prowl/Outlook + Nortron 2-leaf
- Goal/Prowl/Outlook + Buctril 2-leaf
- Goal/Prowl/Outlook (Goal only at 1-leaf stage)
- Goal/Prowl/Outlook
- Nortron + Prowl loop + Goal/Prowl/Outlook
- Prowl loop + Goal/Prowl/Outlook
- Nortron Pre + Goal/Prowl/Outlook

$ per acre
0 20 40 60 80 100 120 140 160 180 200
Injury from Starane + Goal
Goal at the 1-leaf stage was critical to weed control success

Adding Nortron pre-emergent or at loop stage improved control of kochia

Adding Buctril to Goal & Outlook at the 2-leaf stage improved control of large weeds

We did not see a difference in efficacy between Goal 2 XL and Goaltender applied at 1-leaf stage
Plans for 2010

- Compare chemigation versus broadcast applications
- Look at herbicide efficacy on sandy mineral soils in the Klamath Basin
- Fine-tune treatment tank-mixes to maximize weed control and minimize injury