Reducing Off-target Application of Herbicides

Peter Dittmar
Horticultural Sciences Dept.
Presentation outline

• Preparing to spray

• Setting up the sprayer

• Spraying the crop

• After spraying
Presentation outline

• Preparing to spray
  – Select the correct herbicide
    • Application timing
    • Carryover restrictions
  – Field Conditions
  – Speak with neighbors

• Setting up the sprayer

• Spraying the crop

• After spraying
Application timing

• Preplant
  – Preemergence weeds for residual weed control
  – Burndown herbicides for control of emerged weeds

• Postemergence / Posttransplant
  – Some preemergence herbicides
  – Selective POST herbicides
Carryover restrictions

- Consult the label
  - “Rotational Crop Restrictions”
  - “Rotational Crop Information”
  - “Crop rotation”
- Most of the time vegetables are not listed so grouped under “any other”

(Anonymous 2012)
Samples of carryover

Fomesafen in corn
Field conditions

• Wind
  – Less than 10 mph is ideal

• Rain
  – Rainfastness for postemergence herbicides
    • Allows for appropriate absorption of the herbicide
    • Varies by herbicide
  – Movement of the herbicide through the soil profile
Preemergence herbicide movement

Species specific

Little to none

Maximum emergence
Preemergence herbicide movement

- Little to none
- Species specific
- Maximum emergence

Dittmar, In-Service Training, February 27, 2013
Preemergence herbicide movement

- Little to none
- Species specific
- Maximum emergence

TOO DEEP
Field conditions

- Heavy rainfall recently or coming soon

(Crespo et al. 2012)
Talk with the neighbors

- New technologies in agronomic crops

<table>
<thead>
<tr>
<th></th>
<th>Dicamba</th>
<th>Glyphosate</th>
<th>Glufosinate</th>
<th>2,4-D</th>
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</thead>
<tbody>
<tr>
<td>Roundup Ready®</td>
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<tr>
<td>Genuity® Roundup Ready® 2 Xtend</td>
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<td>Bollgard II® Roundup Ready® Xtend with LibertyLink®</td>
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## Talk with the neighbors

- **New technologies in agronomic crops**

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**Vegetable farmer** ↔ **Corn/cotton farmer**
Auxin herbicides

Photo: Ohio State Univ

Photo: Univ. of Georgia
2,4-D drift in tomato

![Graph showing the relationship between simulated drift of 2,4-D and crop yield in tomato.](image)

*Figure 2: Crop yield as a function of 2,4-D rates applied to tomato at the beginning of flowering stage.* (Fagliari et al. 2005)
2,4-D drift in tomato

Figure 2: Crop yield as a function of 2,4-D rates applied to tomato at the beginning of flowering stage. (Fagliari et al. 2005)
Presentation outline

• Preparing to spray

• Setting up the sprayer
  – Nozzle selection
  – Hooded sprayers
  – Drift prevention adjuvants

• Spraying the crop

• After spraying
Nozzle selection & pressure

Extended Range  Drift Guard  Air Induction
Nozzle selection

Extended range
10 GPA - 21% coverage

Extended range
20 GPA - 47%

Extended range
30 GPA - 69%

Air induction
10 GPA - 11%

Air induction
20 GPA - 28%

Air induction
30 GPA - 55%
# Spray drift distance

<table>
<thead>
<tr>
<th>Droplet diameter (microns)</th>
<th>Type of Droplet</th>
<th>Time required to fall 10 ft.</th>
<th>Lateral distance 10 ft. in 3 mph wind</th>
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<tbody>
<tr>
<td>5</td>
<td>Fog</td>
<td>66 min.</td>
<td>3 miles</td>
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<tr>
<td></td>
<td>Very fine spray</td>
<td>4 min.</td>
<td>1,100 ft.</td>
</tr>
<tr>
<td>100</td>
<td>Fine spray</td>
<td>10 s.</td>
<td>44 ft.</td>
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<tr>
<td>240</td>
<td>Medium spray</td>
<td>6 s.</td>
<td>28 ft.</td>
</tr>
<tr>
<td>400</td>
<td>Coarse spray</td>
<td>2 s.</td>
<td>9 ft.</td>
</tr>
<tr>
<td>1,000</td>
<td>Fine rain</td>
<td>1 s.</td>
<td>5 ft.</td>
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(modified from Dexter 1995)
Hooded sprayer
Include a drift control adjuvant

• Increases the size of the spray particle

Figure 3. Effect of air pressure and concentration of Sta-Put® on $D_{v.5}$ of water applied with an air-assist spray system.
Presentation outline

• Preparing to spray

• Setting up the sprayer

• Spraying the crop
  – Monitor nozzles
  – Watch the weather

• After spraying
Monitor the nozzles

• Make sure a nozzle is not clogged
• Watch for tubing that comes unconnected
• Technology to assist
Spray placement

• Direct spray to the plant
• Reduce absorption of the herbicide
  – Fewer leaves
  – Stem is woodier
Spray placement

• Direct spray to the plant
• Reduce absorption of the herbicide
  – Fewer leaves
  – Stem is woodier
Continue to monitor the weather
Presentation outline

• Preparing to spray

• Setting up the sprayer

• Spraying the crop

• After spraying
  – Wash the tank
  – Rain or irrigation over the top of plastic
Triple rinse the tank
Auxin herbicide tank contamination

Plain water

Dicamba 1%
Cleaning plastic after application

• 2 – 3 in. of irrigation or rainfall after application
Conclusions

• Preparing to spray

• Setting up the sprayer

• Spraying the crop

• After spraying
Questions.

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