Carving Out a Pumpkin Spray Program

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Pumpkin disease control should be an integrated program that combines chemical and cultural practices. We will focus on the spray program. How to design it?
Focus on the big three diseases. *These form the basis of the spray program:*

- Downy mildew
- Powdery mildew
- Plectosporium blight (Microdochium blight; white blight)

Why? These are the most common diseases and effective control products are available.
Other diseases can occur, but are not as common.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foliar bacterial diseases</td>
<td>copper</td>
</tr>
<tr>
<td>Bacterial wilt</td>
<td>insecticides</td>
</tr>
<tr>
<td>Virus diseases</td>
<td>insecticides</td>
</tr>
<tr>
<td>Cucurbit yellow vine disease</td>
<td>insecticides</td>
</tr>
<tr>
<td>Phytophthora blight</td>
<td>certain fungicides</td>
</tr>
</tbody>
</table>
Downy mildew
Powdery mildew
Plectosporium blight
(White blight)
The strategy

• Begin spraying when vines begin to run
• Spray every 7 to 14 days, depending on rainfall
• Use chlorothalonil* every time (don’t worry about resistance developing)
  
  * Sold as Bravo, Echo, Equus, Initiate, and Chlorothalonil

  Exception – If white blight occurs, substitute Flint or Cabrio for chlorothalonil every other spray. Don’t need to tank mix.

• Scout closely and add specialized products as needed
Spray strategy continued

• Learn to ID diseases in their **early stages**, so that correct specialized fungicides can be added in a timely manner.

• Follow resistance management practices – rotate FRAC codes.

• Downy mildew products should be applied prior to infection for best control. Watch for warnings and reports from [http://cdm.ipmpipe.org/](http://cdm.ipmpipe.org/)
Downy Mildew

Applying sprays before infection provides best control for any disease, but is particularly important for downy mildew.
Procedure

Scout young plants

Begin spray program when vines begin to run
How to scout

Recognize early symptoms and signs

They trigger your application of specialized products
Early signs of powdery mildew

On stems or individual colonies on leaves. More likely in interior of canopy.

Add powdery mildewcides to program as soon as you see the 1st colonies.
Don’t mistake genetic silvering for powdery mildew.
Early symptoms of white blight

- Downward cupping and tan midrib of young leaves
- Tan, spindle-shaped lesions
Don’t mistake abrasions for white blight.

This is white blight. Abrasions can mimic it.
Early symptoms of downy mildew

Faint yellow to light-green spots
Check underside of leaf

What may look like downy mildew may actually be powdery mildew.
May also see gray lesions
Dessication of green leaves
Don’t try to ID by mold growth.
Too hard to see.
Bacterial spot
Can resemble downy mildew. Presence of white lesions helps distinguish it.
Fungicides

**Powdery Mildew**
- Quintec
- Fontelis
- sulfur
- Pristine
- Torino

**Downy Mildew**
- Presidio
- Ranman
- Zampro
- chlorothalonil

**White Blight**
- Cabrio
- Flint
- Pristine
- chlorothalonil
- mancozeb
# Fungicide efficacies

(0=no control, 5=excellent control)

<table>
<thead>
<tr>
<th>Product</th>
<th>FRAC code</th>
<th>Powdery</th>
<th>Downy</th>
<th>White blight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorothalonil</td>
<td>*</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Mancozeb</td>
<td>*</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sulfur</td>
<td>*</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Quintec</td>
<td>13</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rally</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pristine</td>
<td>7+11</td>
<td>3</td>
<td>0&lt;sup&gt;R&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>Quadris</td>
<td>11</td>
<td>0&lt;sup&gt;R&lt;/sup&gt;</td>
<td>0&lt;sup&gt;R&lt;/sup&gt;</td>
<td>2</td>
</tr>
<tr>
<td>Cabrio</td>
<td>11</td>
<td>0&lt;sup&gt;R&lt;/sup&gt;</td>
<td>0&lt;sup&gt;R&lt;/sup&gt;</td>
<td>4</td>
</tr>
<tr>
<td>Torino</td>
<td>U6</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Presidio</td>
<td>43</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Ranman</td>
<td>21</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Zampro</td>
<td>45+40</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

* These three products do not need to be rotated – no resistance problem.

<sup>R</sup> Indicates widespread resistance.

THIS IS NOT A COMPLETE LIST OF REGISTERED FUNGICIDES.
Consider the weather forecast
It affects your fungicide choice

<table>
<thead>
<tr>
<th>Disease</th>
<th>Favorable weather</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powdery mildew</td>
<td>dry</td>
</tr>
<tr>
<td>Downy mildew</td>
<td>dry or wet</td>
</tr>
<tr>
<td>White blight</td>
<td>wet</td>
</tr>
</tbody>
</table>
There is no one-size-fits-all
Your program design depends on what diseases are present

<table>
<thead>
<tr>
<th>Diseases present</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Chlorothalonil or mancozeb every 7 to 14 days; scout field.</td>
</tr>
<tr>
<td>Powdery mildew</td>
<td>Choose two powdery mildew products and alternate them.</td>
</tr>
<tr>
<td></td>
<td>Tank mix with chlorothalonil or mancozeb.</td>
</tr>
<tr>
<td>Downy mildew</td>
<td>Choose two downy mildew products and alternate them.</td>
</tr>
<tr>
<td></td>
<td>Tank mix with chlorothalonil or mancozeb.</td>
</tr>
<tr>
<td>White blight</td>
<td>Choose two non-related white blight products and alternate them.</td>
</tr>
</tbody>
</table>
How to apply foliar disease-control products

- backpack mist blower (small plantings)
- boom
- air blast
Which works best – over-the-top boom or air blast?
Pumpkin powdery mildew control
Trial conducted at HRREC

Percent defoliation at harvest:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Boom</th>
<th>Mist blower</th>
</tr>
</thead>
<tbody>
<tr>
<td>unsprayed check</td>
<td>66 ab</td>
<td>64 b</td>
</tr>
<tr>
<td>bicarbonate</td>
<td>72 a</td>
<td>65 ab</td>
</tr>
<tr>
<td>fish oil</td>
<td>60 b</td>
<td>60 b</td>
</tr>
<tr>
<td>copper</td>
<td>48 c</td>
<td>17 d</td>
</tr>
<tr>
<td>sulfur</td>
<td>42 c</td>
<td>10 d</td>
</tr>
</tbody>
</table>

The products that were effective worked much better when applied by the mist blower. AIR-ASSIST HELPS.
Spray Program Design

SUMMARY

Before diseases appear
Follow the basic preventive program.

After diseases appear
• Choose two unrelated products for each disease and rotate them.
• Product selection for each application driven by:
  – What diseases are present
  – The weather forecast
Your source of information

Caution: Be careful where you get your information! Every product used must be registered with EPA!

• The Southeastern US Vegetable Crop Handbook
  http://www.thegrower.com/south-east-vegetable-guide/

• Commercial Vegetable Disease Control Guide (TN)
  http://utextension.tennessee.edu/publications/Documents/W141.pdf