Leafy Greens Disease Update and New Disease Protection Materials for 2011

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Today’s Outline

- New Fungicides
  - Inspire Super
  - Quadris Top
  - Actigard
  - Folicur
  - Presidio
- Potassium Phosphite and Downy Mildew
- Update on Bacterial Leaf Blight of Turnip Greens
Inspire Super

- Newly registered fungicide from Syngenta
- Mixture of 2 active ingredients
  - cyprodinil + difenoconazole
    - Switch = cyprodinil + fludioxonil
- Brassica leafy vegetables
  - All greens except turnip greens
- Controls leaf spots (Alternaria, anthracnose, Cercospora) and powdery mildew
Quadris Top

- Mixture of 2 active ingredients
  - azoxystrobin + difenoconazole (1.84 oz/A)
  - Inspire Super = cyprodinil + difenoconazole (1.8 oz/A)

- Brassica leafy vegetables
  - All greens except turnip greens

- Registered against leaf spots (Alternaria, anthracnose, Cercospora), powdery mildew, and downy mildew

- Must rotate with a non-strobilurin fungicide
Actigard—A “Plant Activator”

- Active ingredient is unique: acibenzolar-S-methyl
- Registered on all brassicas in 2010
- 4–8 applications per crop and season allowed
  - 1.0 or 0.5 oz/A
- Prevents black rot and downy mildew IF applied before infection
- I have sprayed collards many times without any growth or yield reduction
Active ingredient tebuconazole
  ◦ Generic formulations: Monsoon, Orius, Tegrol, Tebuzole
Registered on leafy brassica greens in 2009
  ◦ Cercospora, Alternaria, powdery mildew
- Registered 2008
- Head and stem brassicas only; NOT GREENS
- Downy mildew only
  - Very effective
### Review: Comparison of New Brassica Fungicides

<table>
<thead>
<tr>
<th>Frac Code</th>
<th>PHI</th>
<th>Cost/A @ Lowest Rate</th>
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</thead>
<tbody>
<tr>
<td><strong>Switch</strong></td>
<td>9 + 12</td>
<td>7</td>
</tr>
<tr>
<td><strong>Inspire Super</strong></td>
<td>9 + 3</td>
<td>7</td>
</tr>
<tr>
<td><strong>Monsoon</strong></td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td><strong>Quadris Top</strong></td>
<td>3 + 11</td>
<td>1</td>
</tr>
<tr>
<td><strong>Actigard</strong></td>
<td>21</td>
<td>7</td>
</tr>
<tr>
<td><strong>Presidio</strong></td>
<td>43</td>
<td>2</td>
</tr>
</tbody>
</table>

Note which fungicides have the same actives and DO NOT ROTATE them with each other.
Potassium Phosphite and Collard Downy Mildew—Yield Increase

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield/5-ft row (lb)</th>
<th>Value/A</th>
<th>Fungicide cost/acre</th>
<th>Net return/A**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungicides without ProPhyt*</td>
<td>6.43</td>
<td>$7070</td>
<td>$129</td>
<td>$3257</td>
</tr>
<tr>
<td>Fungicides plus ProPhyt @ 2 pints/A</td>
<td>7.46</td>
<td>$8206</td>
<td>$189</td>
<td>$4333</td>
</tr>
<tr>
<td>Difference</td>
<td>1.03 (+16%)</td>
<td>$1136</td>
<td>$60</td>
<td>$1076</td>
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</tbody>
</table>

*Mean of Ranman, Sonata, and Presidio treatments
**After production costs subtracted
Bacterial Blight of Brassica Leafy Greens

Recent Progress at Coastal REC and USDA, Charleston

Pat Wechter, Mark Farnham, and Tony Keinath
BLS is Now BB

- Bacterium is *Pseudomonas syringae* pathovar *maculicola*
  - Causes “peppery” leaf spots
- Bacterium is *Pseudomonas syringae* pathovar *alisalensis*
  - Identified in CA in 2002
  - Also present in OK
    - Originally ID’d as Psm
  - Causes leaf blight

**Bacterial Leaf Spot**

**Bacterial Blight**
Cercospora Leaf Spot or Bacterial Blight?
# Greens with Resistance to BB

<table>
<thead>
<tr>
<th>PI Line (Code number)</th>
<th>Characteristics</th>
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<tbody>
<tr>
<td>223</td>
<td>Like So. Curled Giant mustard</td>
</tr>
<tr>
<td>74</td>
<td>Mustard green</td>
</tr>
<tr>
<td>588</td>
<td>Chinese cabbage</td>
</tr>
<tr>
<td>596</td>
<td>Bok choy</td>
</tr>
</tbody>
</table>
Harvesting and Rating
Symptoms of BB on Greens
### BB Severity (%) on 12 Cultivars

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Severity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>588 (turnip)</td>
<td>6</td>
</tr>
<tr>
<td>74 (mustard)</td>
<td>8</td>
</tr>
<tr>
<td>223 (mustard)</td>
<td>8</td>
</tr>
<tr>
<td>TOP BUNCH</td>
<td>23</td>
</tr>
<tr>
<td>SO. CURLED GIANT</td>
<td>23</td>
</tr>
<tr>
<td>BLUE KNIGHT</td>
<td>27</td>
</tr>
<tr>
<td>FLORIDA BROADLEAF</td>
<td>36</td>
</tr>
<tr>
<td>596 (Bok choy)</td>
<td>37</td>
</tr>
<tr>
<td>BLUE MAX</td>
<td>40</td>
</tr>
<tr>
<td>ALAMO</td>
<td>48</td>
</tr>
<tr>
<td>TOPPER</td>
<td>64</td>
</tr>
<tr>
<td>TENDERGREEN</td>
<td>82</td>
</tr>
</tbody>
</table>

Severity values range from 0 to 100.
Yields of 4 “Worst” Varieties

- Tendergreen
- Topper
- Alamo
- Florida Broadleaf
Yields of 4 Other Varieties

- Blue Max
- So. Giant Curled
- Top Bunch
- Blue Knight
Yields of “Resistant” Mustard (Top Row) and Turnip (Bottom Row)
Healthy Leaf Weight (% of Total)

- 588 (turnip): 70%
- BLUE KNIGHT: 63%
- TOP BUNCH: 61%
- 223 (mustard): 61%
- SO. CURLLED GIANT: 57%
- 74 (mustard): 50%
- 596 (bok choy): 48%
- BLUE MAX: 47%
- FLORIDA BROADLEAF: 37%
- TOPPER: 29%
- ALAMO: 28%
- TENDERGREEN: 15%
Relationship between Disease and Yield—A Pretty Good Fit!
Conclusions

- Can inoculate plots with heavy dose of BB bacterium (*Psa*) and get disease in fall
  - Overhead misting to promote disease
- 2 mustards resistant in greenhouse resistant in the field
- 1 of 2 turnip lines resistant in the greenhouse was resistant in the field
  - Bok choy type was susceptible
- “Straight-line” relationship between disease severity and percentage healthy tissue
  - If we can reduce disease, then we can increase yield.
Research Plans for 2011

- Repeat trial with 12 varieties

- New trial with Kocide, Actigard, and line 223
  - Florida Broadleaf without fungicide will be the susceptible check