Tomato Powdery Mildew
(Leveillula taurica, Oidiopsis sicula)
Yield impact?

- Drying out/loss of foliage
- Sunburn of fruit
- No yield loss documented in processing tomatoes
- Fruit quality?
Tomato Powdery Mildew in 2007

- Higher incidence than previous years
- Abundant sporulation
- “Mature green” industry highly impacted
- Variability in processing varieties?
- Difficult to control at some locations
What was different in 2007?

☐ Different species of mildew? (coastal mildew?)

☐ New strain?

☐ Fungicide resistance?

☐ The weather?
Oidium neolycopersici

Occurs in greenhouses and can be a minor problem in coastal-grown tomatoes
Not a different species
What was different in 2007?

- Different species of mildew? (coastal mildew?)  No

- New strain?

- Fungicide resistance?

- The weather?
What was different in 2007?

- Different species of mildew? (coastal mildew?) No
- New strain? Unlikely
- Fungicide resistance?
- The weather?
What was different in 2007?

- Different species of mildew? (coastal mildew?) No
- New strain? Unlikely
- Fungicide resistance? Perhaps??
- The weather?
Fungicide efficacy trials

- Field trials conducted by
  - Gene Miyao (UCD campus 2007)
  - Jan Mickler (Stanislaus Co. 2006)
  - Scott Stoddard (Merced Co. 2007)
  - Brenna Aegerter (San Joaquin Co. 2007)

- Conducted using a backpack sprayer and the equivalent of 50 GPA spray volume
Mickler - Vernalis 2006:

Quadris/Rally rotation was best. Microthiol Disperss was second; reduced mildew by 50 to 70% (5 applications)

Miyao - UCD campus 2007:

Quadris or Cabrio
applied once 6 wks prior to harvest
reduced mildew by over 30%

Merced and San Joaquin Counties 2007:

Good control with a Rally/Cabrio rotation
Powdery mildew chemical control

- Early treatment
- Good coverage
- Support plant health
- Avoid resistance development
## Resistance Management

<table>
<thead>
<tr>
<th>Group Code</th>
<th>Chemical group name</th>
<th>Common names</th>
<th>Product examples</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Demethylation inhibitors (DMI)</td>
<td>myclobutanil</td>
<td>Rally</td>
<td>medium</td>
</tr>
<tr>
<td>11</td>
<td>Quinone outside inhibitors (QoI)</td>
<td>azoxystrobin, trifloxystrobin, pyraclostrobin</td>
<td>Quadris, Flint, Cabrio</td>
<td>high</td>
</tr>
<tr>
<td>M</td>
<td>M2 - inorganic</td>
<td>sulfur</td>
<td>Microthiol</td>
<td>low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Disperss, Thiolux, etc.</td>
<td></td>
</tr>
</tbody>
</table>
## Resistance Management

<table>
<thead>
<tr>
<th>Group Code</th>
<th>Chemical group name</th>
<th>Common names</th>
<th>Product examples</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Demethylation inhibitors (DMI)</td>
<td>myclobutanil</td>
<td>Rally</td>
<td>medium</td>
</tr>
<tr>
<td>11</td>
<td>Quinone outside inhibitors (QoI)</td>
<td>azoxystrobin, trifloxystrobin, pyraclostrobin</td>
<td>Quadris, Flint, Cabrio</td>
<td>high</td>
</tr>
</tbody>
</table>

M     M2 - inorganic sulfur  Microthiol  low Disperss, Thiolux, etc.
## Resistance Management

<table>
<thead>
<tr>
<th>Group Code</th>
<th>Chemical group name</th>
<th>Common names</th>
<th>Product examples</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Demethylation inhibitors (DMI)</td>
<td>myclobutanil</td>
<td>Rally</td>
<td>medium</td>
</tr>
<tr>
<td>11</td>
<td>Quinone outside inhibitors (QoI)</td>
<td>azoxystrobin, trifloxystrobin, pyraclostrobin</td>
<td>Quadris, Flint, Cabrio</td>
<td>high</td>
</tr>
<tr>
<td>M</td>
<td>M2 - inorganic sulfur</td>
<td></td>
<td>Microthiol Disperss, Thiolux, etc.</td>
<td>low</td>
</tr>
</tbody>
</table>
Other materials – very low risk

Biofungicides
  *Bacillus pumilus* strain (Sonata)
  *Bacillus subtilis* strain (Serenade)

Others
  Potassium bicarbonate (Kaligreen, Armicarb, Milstop and others)
  JMS stylet oil
  neem oil (Trilogy)
  Sporan
  Prev-Am
  Oxidate
Group codes are on labels

BASF

GROUP 11 FUNGICIDE

SPECIMEN

Fabrio™ EG fungicide

For use in berries, bulb vegetables, cherry, cucurbit vegetables, filberts, fruiting vegetables, pistachios, root vegetables and strawberries

Active Ingredient:
Pyraclostrobin (carbamate acid, [2-[[1-(4-chloro phenyl)-1H-pyrazol-3-yl]oxy]methyl] phenyl)methoxy-, methyl ester) .......................................................... 20.0%
What was different in 2007?

- Different species of mildew? (coastal mildew?) **NO**
- New strain? **Unlikely**
- Fungicide resistance? **Perhaps??**
- The weather?
California Weather Data

2006 California Tomato Network Weather Stations

Click on a station name or pinhead for more information.

- PestCast
  1. Fabian Tract-01 (CTR3)
  2. Firebaugh Ranch-01 (FRS1)
  3. Holt-05 (CTR1)
  4. Le Grand-01 (MER2)
  5. Jackson Slough-01 (CTR4)
  6. Marcy Springs-01 (MER1)
  7. Morada-01 (SJQ1)
  8. Rincon Tract-06 (CTR4)
  9. Thornton-05 (CTR2)
  10. UCD Ag Fields-02 (YOL2)
  11. Wesley-03 (STS1)
  12. Winters-08 (BTV1)

Legend

<table>
<thead>
<tr>
<th>Networks and Stations</th>
<th>Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactive</td>
<td>County</td>
</tr>
<tr>
<td>Automatic (daily, current data)</td>
<td>Water</td>
</tr>
<tr>
<td>TouchTone (daily, current data)</td>
<td>Expressway</td>
</tr>
<tr>
<td>PestCast (daily &amp; hourly, current data)</td>
<td>Highway</td>
</tr>
<tr>
<td>Climate (daily, at least 34 months old)</td>
<td>Connector</td>
</tr>
</tbody>
</table>

[Image of a map showing weather stations in California.]
What was different about 2007?

- Weather-based model categorized many more days as conducive to powdery mildew development – esp. July 13 to August 27

- Milder temperatures – mildew is suppressed by high temperatures
What was different in 2007?

- Different species of mildew? (coastal mildew?)  No
- New strain?  Unlikely
- Fungicide resistance?  Perhaps??
- The weather?  Yes, very conducive
Acknowledgements

Gene Miyao, UCCE Yolo, Sacramento & Solano Co.
Michelle Le Strange, UCCE Tulare & Kings Co.
Jan Mickler, UCCE Stanislaus Co.
Scott Stoddard, UCCE Merced & Madera Co.
Mike Davis, UC Davis
Joyce Strand and Marty Martino, UC IPM

Chuck Rivara & California Tomato Research Institute
California Tomato Commission

Our cooperating growers and PCAs!!