Macrophomina and Fusarium: New Strawberry Collapse Diseases in California

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New Soilborne Issues

- Started as early as 2005.
- Plant wilting, poor growth, collapse, discoloration of crowns, plant death.
- Two different pathogens, similar symptoms:
  - Macrophomina phaseolina
  - Fusarium oxysporum
- Symptoms similar to Phytophthora, others.
New Soilborne Issues

• Distribution:
  – Macrophomina: Orange, Ventura, Santa Barbara counties. (Also in Alameda, Sacramento counties.)
  – Fusarium: Ventura County.

• Mostly associated with alternative fumigant treatments (non-MB/CP chemicals, bed applications).
Macrophomina phaseolina
Fusarium oxysporum
Worldwide Distribution

• **Macrophomina:**
  – California, Florida, Illinois, Egypt, France, India, Israel

• **Fusarium:**
  – California, Argentina, Australia, Spain, South Korea, Japan
Research Goals

- Study biology, disease cycle, epidemiology.
- Characterize the pathogens.
- Pathogen host ranges.
- Cultivar susceptibility / resistance.
- Pre-plant and/or post-plant treatments.
## Cultivar Susceptibility

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Mean Disease Severity</th>
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</thead>
<tbody>
<tr>
<td>Seascape</td>
<td>2.9 a</td>
</tr>
<tr>
<td>Ventana</td>
<td>3.9 b</td>
</tr>
<tr>
<td>Albion</td>
<td>4.0 b</td>
</tr>
<tr>
<td>Camarosa</td>
<td>4.2 bc</td>
</tr>
<tr>
<td>Diamante</td>
<td>4.9 c</td>
</tr>
</tbody>
</table>

LSD (P=0.05) = 0.8

Severity scale: 1=no symptoms, 2=a few lvs showing decline, 3=slight plant dieback, 4=moderate dieback, 5=complete collapse.
Inoculations: isolate 3

Albion  Ventana  Seascape
Field Trials: Soil Treatments

- MeBr/Pic (50/50), 200 lb
- MeBr/Pic (50/50), 300 lb
- InLine (32/62), 300 lb
- InLine (32/62), 400 lb
- Midas EC (33/67), 200 lb
- Midas EC (33/67), 300 lb
- Pic Chlor EC, 200 lb
- Pic Chlor EC, 300 lb
- Pic 60, 300 lb
- Untreated

(Topsin M 4.5F post-plant applications)
Field fumigation study: 2009

Disease severity scale:
1 = no symptoms; 2 = slight stunting and decline;
3 = significant stunting and decline; 4 = collapse and death
Management

- Select sites without history of problem.
- Crop rotation away from strawberry.
- Fumigation (but which materials?).
- Plant a resistant or less sensitive cultivar.
- Avoid stressing plants.
- Avoid moving infested soil.
Acknowledgments

• Strawberry growers in California
• California Strawberry Commission
• Maria Vidauri, Annika Forester, Emmanuel Gonzalez, Patty Ayala, Kat Kammeijer
• Research Team: Steven Koike, Tom Gordon, Mark Bolda, Husein Ajwa, Oleg Daugovish, Krishna Subbarao, Dan Legard