Review of Strawberry Diseases in California

Steven Koike
University of California
Cooperative Extension
Foliar
- Angular leaf spot
- Anthracnose
- Common leaf spot
- Phomopsis leaf bl.
- Leaf blotch
- Powdery mildew

Fruit
- Gray mold
- Anthracnose
- Rhizopus rot
- Mucor rot
- Leather rot
- Powdery mildew
**Foliar**

- Angular leaf spot
- Anthracnose
- Common leaf spot
- Phomopsis leaf bl.
- Leaf blotch
- **Powdery mildew**

**Fruit**

- Gray mold
- *(Anthracnose)*
- Rhizopus rot
- Mucor rot
- Leather rot
- **Powdery mildew**
Common leaf spot
Leaf blotch
Angular leaf spot
Angular leaf spot
Powdery mildew
Gray mold
Recent developments

• Dieback/collapse first noticed in 2005.
• Increasing incidence through 2011.
• Not associated with *Phytophthora*, *Verticillium*, or other pathogens.
• In fields without MB/CP flat fumigation
• Two pathogens responsible:
  – *Macrophomina phaseolina*
  – *Fusarium oxysporum f. sp. fragariae*
Recent developments

• Distribution:
  – Initially in southern CA (Orange, Ventura)
  – Now occurring in other parts of CA

• Symptoms:
  – Plant wilting
  – Poor growth
  – Plant collapse and death
  – Discoloration of crowns
Charcoal rot
Distribution

- *Macrophomina* on strawberry: Argentina, Australia, Egypt, France, India, Israel, Spain, USA (CA, FL, IL).
- California strawberry:
  - 2005-2009: Orange, Ventura, Santa Barbara, San Luis Obispo, Alameda, Sacramento counties
  - 2010-2011: Santa Clara, Santa Cruz, Monterey counties
The march of *Macrophomina*
Fusarium wilt
Distribution: *Fusarium*

- *Fusarium* on strawberry: Argentina, Australia, China, S. Korea, Spain, Japan, USA (CA, SC)
- California strawberry:
  - Ventura County
  - (Monterey: one corner of one field in 2009; was later fumigated)
Fusarium oxysporum f. sp. fragariae

2006

2011
2011: Verticillium outbreaks?
Verticillium wilt
Phytophthora root and crown rot / fruit rot
Diagnosis

?
## Diagnostic challenge I: identical symptoms

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Macroph.</th>
<th>Fusarium</th>
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<tbody>
<tr>
<td>Poor growth</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Stunting</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Dieback</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Plant collapse</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Crown discolored</td>
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<tr>
<td>Stress related</td>
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<td>yes</td>
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## Diagnostic challenge II: similar symptoms

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<th></th>
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<tbody>
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<td>Poor growth</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Stunting</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Dieback</td>
<td>yes</td>
<td>yes</td>
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<td>Pl. collapse</td>
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<td>yes</td>
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<td>yes</td>
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<tr>
<td>Crown discolor</td>
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<tr>
<td>Stress</td>
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<td>yes</td>
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<td>no</td>
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</table>
Management: soilborne diseases

• Site selection: avoid infested fields.
• Crop rotation: plant non-hosts.
• Pre-plant fumigation: still useful.
• Sanitation: don’t move infested mud, contaminated equipment.
• “Resistance”: use tolerant (?) cultivars.
• Production: reduce plant stress.