Rice Blast

- Fungal disease caused by *Pyricularia grisea*
- Widespread throughout the world and has been reported in more than 85 countries
- Considered endemic in southern U.S. rice production - yield losses reported as high as 20 to 60% in southern U.S.
- Identified in CA in 1996
Rice Blast Symptoms

- May infect several tissues: leaf blast, collar rot, node blast, neck blast, panicle blast
Collar rot portrait
Blast Cycle

- Fungus overwinters in crop residue and seeds
- Several cycles of spore production per season (1000s of spores produced per infection)
- New spores infect plants in 7-10 days
- Lesions form after 4-14 days
- Spore formation after 2-3 days
- Spores dispersed by air – collar and neck blast without leaf blast
Factors Associated with Blast Susceptibility

- Host resistance
- Environmental Conditions
- Water management
- Nitrogen Management
- Plant Stress
Host Resistance

• M-208 is currently only race IG-1 resistant rice variety in CA

• No other varieties have specific resistance
  – They do vary in their tolerance though
    • M-205 and M-104 have least tolerance
    • M-202 and M-206 have more tolerance
  – Difference in tissue susceptibility w/age: younger tissue is more susceptible
Evaluation of relative susceptibility of California rice cultivars in University of California Cooperative Extension regional variety trials.

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Colusa Co.</th>
<th>Glenn Co.</th>
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<tbody>
<tr>
<td>94-Y-615</td>
<td>33.57 a</td>
<td>7.60 bcd</td>
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<td>M-201</td>
<td>32.31 a</td>
<td>6.10 bcde</td>
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<td>96-Y-55</td>
<td>29.83 a</td>
<td>8.80 bc</td>
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<td>96-Y-480</td>
<td>27.90 ab</td>
<td>1.70 de</td>
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<td>L-204</td>
<td>20.41 bc</td>
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<td>L-203</td>
<td>20.36 bc</td>
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<td>19.13 bcd</td>
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<td>M-204</td>
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<td>92-Y-624</td>
<td>16.86 cde</td>
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<td>14.94 cdef</td>
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<td>96-Y-5</td>
<td>13.16 cdefg</td>
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<td>94-Y-40</td>
<td>11.24 cdefgh</td>
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<td>M-202</td>
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<td>96-Y-203</td>
<td>7.85 efgh</td>
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<td>96-Y-90</td>
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<td>M-103</td>
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<td>Calmochi-101</td>
<td>4.09 gh</td>
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<td>S-201</td>
<td>2.82 h</td>
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<td>96-Y-341</td>
<td>2.64 h</td>
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<td>95-Y-214</td>
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<td>96-Y-420</td>
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<td>96-Y-253</td>
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<tr>
<td>97-Y-613</td>
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<tr>
<td>97-Y-315</td>
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<td>LSD (P = 0.05)</td>
<td>9.4055</td>
<td>6.4274</td>
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</table>

Means with the same letter within each column are not significantly different

Four replications per cultivar

Values represent mean percent neck of four replications per variety
Environmental Conditions

• Sporulation
  – Favored by relative humidity ≥ 89%, optimal temperatures of 77-82 F and a minimum of 4 h of leaf wetness (Ou 1985)

• Germination
  – Optimal at 92-96% rh and 77-82 F (Ou 1985)

• Infection
  – Dependent upon leaf wetness and temperature (Yoshino 1974)
Summary of Host and Environment

• California environmental conditions are permissive but not optimal for rice blast
  – Relatively dry days
  – Little rainfall or cloud cover during season
• Extended cloudy, rainfall or dew periods may result in more favorable blast conditions!!!!!
Water Management

• Any practice that promotes and aerobic environment predispose rice plants to blast
  – Drill seeding
  – Draining
• Deeper water increases plant resistance
  – Notice higher disease incidence in high spots
• Maintaining moderate continuous flood is best practice for minimizing risk of disease
Nitrogen Management

• Excessive nitrogen fertilizer will lead to increased disease susceptibility, increased disease incidence, and increased disease severity
  – Look for blast in nitrogen overlaps
Plant Stress

• Any form of stress predisposes plants to disease
  – Nutrient deficiencies (K and Si especially)
  – Salinity
  – Extreme temperatures
  – Herbicide injury

• Manage crop to avoid stress
Rice Blast Management

- Prevent the introduction of new races
- Crop residue management
- Plant clean seed and more tolerant/resistant varieties
- Water management (level field/avoid extended periods of draining)
- Avoid excessive nitrogen fertilization
- Scout your fields throughout season
- Fungicide application if appropriate
What happened in 2010?

Delayed planting, mild temperatures during growing season and favorable environmental conditions = wider window for spore production and infections
Questions?