PETUNIA FLOWER MELTDOWN
Use of alternative compounds for Botrytis control

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Factors favorable to the pathogen

- Wet flowers & foliage
- High humidity (>94%)
- Moderate temperatures (18-25°C, 64-77°F)
- Duration of time plants are wrapped on carts
- Wrapping material
- Inoculum present (old flowers)
- Botrytis strains (isolates) resistant to fungicides

Expt. 1: Screening efficacy of alternative chemicals

- Control inoculated (deionized water)
- Fungicide – Palladium/Switch; (cyprodinil & fludioxonil – 6 oz/100 gal)
- Calcium chloride 500 ppm
- Calcium silicate 500 ppm
- Methyl jasmonate 8 ppm
- Q-salt (SA-201) 50 ppm

'S Pretty Grand Red' Petunia
Applications made twice a week for two weeks or according to the label

Inoculation

- Flowers harvested one day after last application and inoculated with conidial suspensions of Botrytis (Fungicide-resistant isolate)
- 70°F
- 100% relative humidity

Sensitivity to common fungicides

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>Susceptible-isolate</th>
<th>Resistant-isolate</th>
</tr>
</thead>
<tbody>
<tr>
<td>cyprodinil - Palladium</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>fludioxonil - Palladium</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>pyraclostrobin - Pageant</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>boscalid - Pageant</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>thiophanate-methyl</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>fenhexamid - Decree</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>iprodione - Chipco</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

41 hours after inoculation

Control | Calcium chloride | Calcium silicate

Fungicide | Methyl jasmonate | Q-salt
Expt. 2:
Efficacy of calcium chloride and fungicide against fungicide-resistant and fungicide-susceptible Botrytis isolates

Treatments
- Control
- Non-inoculated (water only)
- Inoculated
- Palladium/Switch Fungicide (10oz/100gal)
- Calcium chloride (500 ppm)

'Pretty Grand Rose' Petunia
Applications made twice a week for two weeks
Inoculation one day after last application
Disease development

**Fungicide-Susceptible Isolate**
- Control-inoc.
- CaCl₂
- Fungicide

**Fungicide-Resistant Isolate**
- Control-inoc.
- CaCl₂
- Fungicide

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Disease development chart:
- **Resistant Isolate**
- **Sensitive Isolate**
Nutrient content of flowers

- Controls
- Dry non-inoculated
- Wet non-inoculated
- Wet inoculated
- Fungicide: Palladium/Slash (10oz/100gal)
- Calcium chloride (400, 800, 1200 ppm)

Expt. 3: Efficacy of increasing dosage of calcium chloride against fungicide-resistant *Botrytis* isolate

- 'Pretty Grand Red' Petunia
- Applications made twice a week for two weeks
- Inoculation one day after last application
- Fungicide-resistant isolate

No phytotoxicity symptoms in plants

Buds sprayed, nutrient content measured 1 week later
Preliminary study:
Influence of single application of calcium chloride at 1200 ppm (applied day before the inoculation with fungicide-resistant isolate)

Calcium chloride 1200 ppm

24 Hours  48 Hours  60 Hours  72 Hours

Inoculated control

24 Hours

Calcium chloride 1200 ppm  48 Hours  60 Hours  72 Hours

Conclusion

• Calcium chloride delays disease development equally or better than fungicide.
  • Fungicide-susceptible isolate
    Calcium chloride = Fungicide
  • Fungicide-resistant isolate
    Calcium chloride > Fungicide

Future Directions

• Calcium:
  • Calcium forms
  • Application rates
  • # of applications
  • Application timing

Hypothesis

• Botrytis is actually a secondary factor.
• First, pollination contribute to senescence and then botrytis sensitivity increases.
  • If so, Ethylbloc could be beneficial