Integrating Variable Rates of Kocide 3000 in a Blight Management Program

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Funding: PPMRF
Background

- Streptomycin resistance widespread in Calif.
- All copper formulations can cause russetting
- Kocide 3000 has reduced MCE (30%)
- Many growers now use Kocide 3000 (0.5 lb./A) + Manzate Pro Stick (3 lbs./A)
- Copper resistance potential
Trial Protocol
2009

- RCB, 4 reps, alt. row spraying
- Rows ~100 trees long
- Treatments:
  1. Mycoshield (1.0 lb./acre), season-long
  2. Kocide 3000 (0.5 lb./acre) + Manzate Pro Stick (3 lbs./acre), season-long
  3. Kocide 3000 + Manzate Pro Stick up to April 8, Mycoshield April 14 through April 21
  4. (15 untreated trees – nearby point rows)
Layout of Two Plots – 2009
Alt. Row Spraying, Data from Center Row
Season Timeline 2009

Spray Dates

March

April

May

June

Rainfall

.66”

1.04”

.17”

.02”

.22”

5/7 Blight eval.

7/13
# Mean No. of Blight Strikes/Tree 2009

<table>
<thead>
<tr>
<th>Treatment</th>
<th>May 7</th>
<th>July 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mycoshield</td>
<td>0.11 a</td>
<td>1.52 b</td>
</tr>
<tr>
<td>Kocide + MPS</td>
<td>0.27 a</td>
<td>0.62 c</td>
</tr>
<tr>
<td>Kocide + MPS, then Myco</td>
<td>0.21 a</td>
<td>1.73 a</td>
</tr>
</tbody>
</table>

\[ P \geq 0.05, \text{Tukey’s HSD (May 7 sig. diff. at P = 0.06)} \]
## Percent Russetting 2009

<table>
<thead>
<tr>
<th>Treatment</th>
<th>July 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mycoshield</td>
<td>1.06 a</td>
</tr>
<tr>
<td>Kocide + MPS</td>
<td>1.09 a</td>
</tr>
<tr>
<td>Kocide + MPS, then Myco</td>
<td>0.69 a</td>
</tr>
</tbody>
</table>

$P \geq 0.05$, Tukey’s HSD, No significant differences
Trial Protocol
2010

- RCB, 4 reps, alt. row spraying
- Rows ~100 trees long
- Treatments:
  1. Mycoshield (1.0 lb./acre), season-long
  2. Kocide 3000 (0.5 lb./acre) + Manzate Pro Stick (3 lbs./acre), alt. with Mycoshield
  3. Kocide 3000 (0.25 lb./acre) + Manzate Pro Stick (3 lbs./acre), alt. with Mycoshield
  4. (No untreated trees)
Layout of Two Plots – 2010
Alt. Row Spraying, Data from Center Row
Season Timeline
2010

Rainfall

- 0.01” 0.32” 0.36” 0.01” 0.20” 0.08” 0.03”
- 0.54” 0.22” 0.13” 0.79” 0.33” 0.02” 0.20”
- 0.41” 0.02” 0.01” 0.01” 0.51” 0.22” 0.09” 0.17” 0.28”

Spray Dates
- = K+MPS
- = Myco

March April May June

Blight Evaluation
6/10 7/9
<table>
<thead>
<tr>
<th>Treatment</th>
<th>June 10</th>
<th>July 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mycoshield alone</td>
<td>1.37 a</td>
<td>0.88 a</td>
</tr>
<tr>
<td>K+MPS / Mycoshield</td>
<td>1.49 a</td>
<td>0.91 a</td>
</tr>
<tr>
<td>K+MPS (1/2 K) / Mycoshield</td>
<td>1.40 a</td>
<td>0.92 a</td>
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</tbody>
</table>

P ≥ 0.05, Tukey’s HSD, No significant differences
### Percent Russetting 2010

<table>
<thead>
<tr>
<th>Treatment</th>
<th>July 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mycoshield alone</td>
<td>1.54 a</td>
</tr>
<tr>
<td>K+MPS / Mycoshield</td>
<td>1.82 a</td>
</tr>
<tr>
<td>K+MPS (1/2 K) / Mycoshield</td>
<td>1.57 a</td>
</tr>
</tbody>
</table>

P ≥ 0.05, Tukey’s HSD, No significant differences
Conclusions

- Late season (shoot) blight most common
- K+MPS as last spray may reduce shoot blight
- Copper resistance potential, so rotate with Mycoshield and/or Agri-Mycin + BlightBan
- K+MPS caused no additional russetting
- Russetting seen in Delta in 2010; use K+MPS only when leaves are dry and spray should dry before rain