White Rot Fungicide Evaluations in Fresno County & Nitrogen Balance Progress Report

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White rot of onions and garlic

• Above ground and below ground symptoms
• Host range is limited to Alliums
>21,000 acres documented as infested with the white rot pathogen

Central San Joaquin Valley Infested Fields
Caused by *Sclerotium cepivorum*

Sclerotia survive for decades, cause disease at very low concentrations and are easily disseminated.
Fungicide Evaluation

- Not all materials evaluated are currently registered.
- Information contained in this presentation is not a recommendation.
- Carefully read all applicable, current labels before writing a pesticide recommendation.
## Fungicide Evaluation

<table>
<thead>
<tr>
<th></th>
<th>Material Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A19649B 8.55 fl oz/A</td>
</tr>
<tr>
<td>2</td>
<td>A19649B 13.7 fl oz/A</td>
</tr>
<tr>
<td>3</td>
<td>Cannonball WG 7 oz/A</td>
</tr>
<tr>
<td>4</td>
<td>Fontelis 24 fl oz/A</td>
</tr>
<tr>
<td>5</td>
<td>Fontelis 24 fl oz/A + Cannonball WG 7 oz/A</td>
</tr>
<tr>
<td>6</td>
<td>Rhyme at 7 fl oz./a</td>
</tr>
<tr>
<td>7</td>
<td>Rhyme at 14 fl oz./a</td>
</tr>
<tr>
<td>8</td>
<td>Teburol 3.6F 20.5 fl oz/a</td>
</tr>
<tr>
<td>9</td>
<td>Untreated Control Control</td>
</tr>
</tbody>
</table>

### At Planting Applications:
Materials were applied in trench where garlic cloves were dropped at planting on 7 Nov 2016
## Fungicide Evaluation

<table>
<thead>
<tr>
<th>FRAC #</th>
<th>Target Site</th>
<th>Trade name or experimental number (common name)</th>
<th>Resistance risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>?</td>
<td>?</td>
<td>A19649B</td>
<td>?</td>
</tr>
<tr>
<td>3</td>
<td>DMI</td>
<td>Rhyme (flutriafol) Tebuconazole 3.6F (tebuconazole)</td>
<td>Medium</td>
</tr>
<tr>
<td>7</td>
<td>SDHI</td>
<td>Fontelis (pentiopyrad)</td>
<td>Medium to high</td>
</tr>
<tr>
<td>12</td>
<td>MAP/Hisitidine Kinase in osmotic signal transduction (os-2, HOG1)</td>
<td>Cannonball WG (fludioxnil)</td>
<td>Low to medium</td>
</tr>
</tbody>
</table>
**Location**: Commercial Field in Five Points
Panoche clay loam

**Plot size**: single 40 inch bed x 40 ft

**Experimental design**: 4 Replication
Randomized Complete Block

**Plant Dates**: Variety: CA Late

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**Application details**:
7 Nov
CO$_2$-powered backpack sprayer
20 gallons per acre concentrated over two 6 inch wide bands
35 psi
2 Teejet 8004 EVS

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**Evaluation details**:
Disease rating based on above ground symptoms (0-10 scale) on 21 Mar, 27 Apr, 17 May and 5 Jun
Hand harvest of 1 bed x 13.1 ft on 9 Sep and total was weighed
Yields are presented as tons per acre
Disease Severity – above-ground ratings

- Untreated Control
- Rhyme at 7 fl oz./a
- Cannonball WG 7 oz/A
- Fontelis 24 fl oz/A
- A19649B 8.55 fl oz/A
- Rhyme at 14 fl oz./a
- A19649B 13.7 fl oz/A
- Tebuzol 3.6F 20.5 fl oz/a
- Fontelis 24 fl oz/A + Cannonball WG 7 oz/A
Influence of Fungicides on Yields

- Untreated Control
- Rhyme at 7 fl oz./a
- Fontelis 24 fl oz/A
- Rhyme at 14 fl oz./a
- Cannonball WG 7 oz/A
- Tebuzol 3.6F 20.5 fl oz/a
- A19649B 8.55 fl oz/A
- Fontelis 24 fl oz/A + Cannonball WG 7 oz/A
- A19649B 13.7 fl oz/A

Yield (tons per acre)
The highest yields were 78% higher than the untreated control.
Summary of Fungicide Study

• Yields of all treated plots were significantly higher than the untreated control

• The current commercial standard, tebuconazole was among the best performing materials

• Mean yields of plots treated with A19649B at 13.7 fl oz/A were higher than Fontelis treated plots

• Tebuzol treated plots were similar to plots treated with Rhyme at 14 fl oz
Nitrogen Records are to be Maintained: Based on the Nitrogen Balance Concept

\[
\text{Nitrogen Applied} \quad = \quad \text{Nitrogen Removed}
\]
Nitrogen Balance

Nitrogen put on the field should balance with nitrogen removed.

<table>
<thead>
<tr>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-crop soil levels</td>
<td>Harvested crop</td>
</tr>
<tr>
<td>Nitrogen fertilizer application</td>
<td></td>
</tr>
<tr>
<td>Nitrogen in irrigation water</td>
<td></td>
</tr>
</tbody>
</table>
Irrigation and Fertility Management in Central Valley Processing Onions

Provide details regarding nitrogen uptake in processing onions in the Central San Joaquin Valley.
Methods – monitoring commercial processing onions

• Evaluation plant development
• Nutrient concentrations in soil and tissue
• Soil moisture levels over time
• Production details – fertilizer application programs
Location of sampled fields

- 2017
- 2017
- 2018
- 2018
Estimation of canopy cover

FOLIAR COVER (%) vs DAYS AFTER PLANTING
Crop coefficient (Kc) is dependent upon crop cover, crop type and general health

Reference evapotranspiration (Eto) of a well watered grass

California Irrigation Management Information System (CIMIS)
Network of weather stations used to collect climate data for calculating Eto.
Root measurements
Soil Moisture Monitoring

Irrrometer electrical resistance sensing device with datlogger
Sensor Placement
Soil Samples for Fertility Analysis:

Ten ¾” cores per sample depth
- 0-6” and 7-12” cores (season beginning & end and at 28 to 36 day intervals)
- 13-24” and 25-36” (season beginning & end)
Plant tissue sample collection

At 3-5 week intervals from very early stages of plant development

– Five weeks to 12 weeks post plant - plant samples
– Approx. 13 weeks post plant - Foliar and root samples separated
– Samples collected at harvest
Grower’s Records

- Fertilizer: type, quantity and application method
- Yields
Time Line

• Field monitoring (present to Jul 2018)
• Data analysis (Fall 2018)
• Field selection for 2019 crop (Fall 2018)
• Field monitoring (Nov-Jul 2019)
• Data compilation and analysis (Fall 2019)
• Completed report 2020
Goals: Generalities/Ranges

• Soil fertility levels before and after cropping
• Concentrations in crops harvested
• Efficiencies
• Generate updated guidelines
Acknowledgements

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