CRDF Grower Bactericide Trials
Stephanie Slinski
Citrus Expo August 18, 2016
Why evaluate grower bactericide applications?

• Field trials to evaluate grower applications of oxytetracycline (OTC) and streptomycin treatment
  • What works?

• Support the Section 18 renewal (formal approval pending)
Throughout FL citrus growing regions

<table>
<thead>
<tr>
<th>CRDF Evaluated Trials</th>
<th>Other Evaluator</th>
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<tbody>
<tr>
<td>42</td>
<td>31</td>
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Two types of trial design were used

Trials were evaluated by these metrics:

- Bacterial titer (concentration)
- Disease severity (DI)
- Fruit drop
- Yield
Important question: How long will it take to see results?

Reduction in bacteria & production of new phloem (new growth)  Improvement in tree health, yield and fruit quality
Production of new phloem is important because...

- Replaces blocked/collapsed phloem

  - No phloem (carbohydrate transport) = no flush (needs carbohydrates)

- Requires a reduction in the bacterial population

http://schoolbag.info/biology/concepts/147.html
Important question: How do we separate seasonal changes in tree appearance with improvement due to bactericides?

- Untreated control
- Evaluation over time
Changes in detection and concentration of bacteria over time

Greater number of samples that had detectable bacteria

Less bacteria detected

% of Trees Testing Positive and Mean CT Values for Monthly Samples

% Trees Testing Positive

% Trees positive

CT

% Trees Testing Positive

Jan Feb Mar Apr May Jun Jul Aug Sep

0% 5% 10% 15% 20% 25% 30% 35% 40% 100% 80% 60% 40% 20% 0%

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Detection of bacteria over time

All trees tested positive for HLB

% of Trees Testing Positive and Mean CT Values for Monthly Samples

Lowest $C_t$ value = date with highest concentration of bacteria detected

Less bacteria detected
Detection of bacteria over time

% of Trees Testing Positive and Mean CT Values for Monthly Samples

- No trees tested positive for HLB
- Less bacteria detected

Courtesy of Mike Irey, Southern Gardens Citrus
• A study in Brazil showed similar seasonal trends (Plant Disease (2015) 99, 1125-1132)

• Bacteria appears to be moving with carbohydrate transport

• Seasonal changes in bacterial concentrations may be due to transport of bacteria with carbohydrate stream to and from roots.
  • fruit set
  • foliar flush
  • root flush
Evaluating changes in tree health over time is also important.

How to evaluate tree health:

- Divide each side of tree into quadrants.
- 1-5 rating for each quadrant.
- Total of both sides = 0-40.
- Frequency = every 3-6 months.

Field trial evaluation methods:
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What works? What does this mean?

- Bactericides for agriculture
  - preventative or maintenance treatment

What would we expect from OTC and strep. if it “works”?

- Increase in tree health
- Increase in yield and quality
- Keep trees in production until resistant trees are in production
• What works? What does this mean?
  • Bactericides for agriculture
    • preventative or maintenance treatment

• What would we expect from OTC and strep. if it “works”?
  • Increase in tree health
  • Increase in yield and quality
  • Keep trees in production until resistant trees are in production
CRDF Grower Bactericide Trials

- When will we see results
  - Trials initiated April-June 2016
  - Disease severity (DI) and fruit drop
  - 2nd PCR Nov.-January + DI

- Some data may be available early 2017
- Full year-one report
  - post-harvest 2017
Conclusions

• We will provide data to help growers make economic decisions
• Recovery after reducing bacterial population takes time
• Healthier trees will recover sooner than severely declining trees
• Bactericides are a stop-gap solution until resistant trees are in production
Complementary efforts by CRDF

• CRDF is testing potential bactericides
  • biopesticides
  • botanical oils
  • new active ingredients

• And evaluating alternative application strategies
  • trunk injection
PFD survey - What worked and what didn’t work Spring 2016

• Not a field trial
• 25-30 groves around the state
• Grove info
  • rainfall
  • monitoring of flowering
  • PFD treatments
  • application timing
• Button and fruit count
• To participate contact: sslinski@citrusrdf.org
Thank you!

PFD survey contact: sslinski@citrusrdf.org
Field trial evaluation methods: http://bit.ly/1PQEPGT

CRDF is proud to provide support to the Florida citrus industry