



CRDF Grower Bactericide Trials

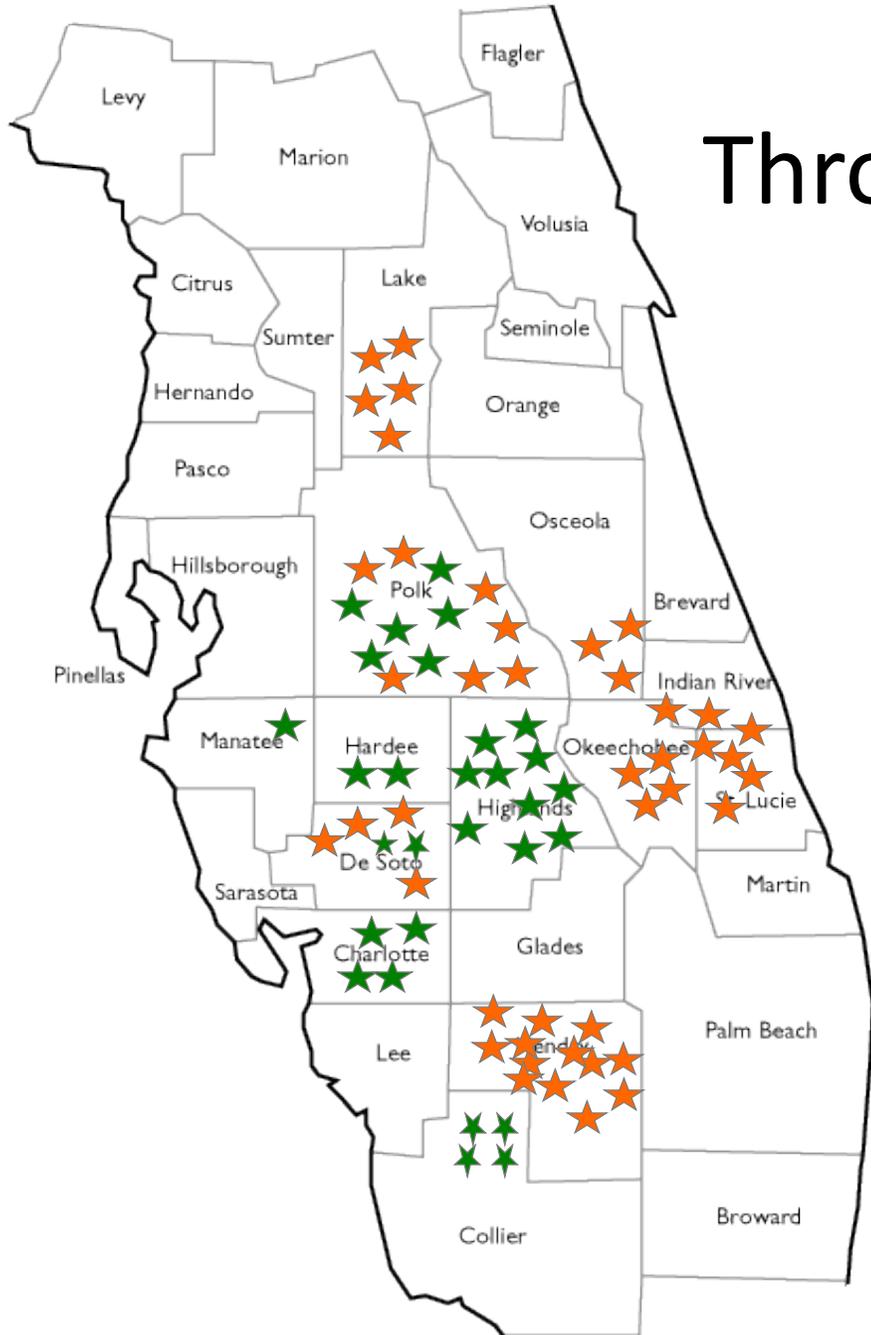
Stephanie Slinski
Citrus Expo August 18, 2016



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



CRDF Evaluated Trials	Other Evaluator
42	31

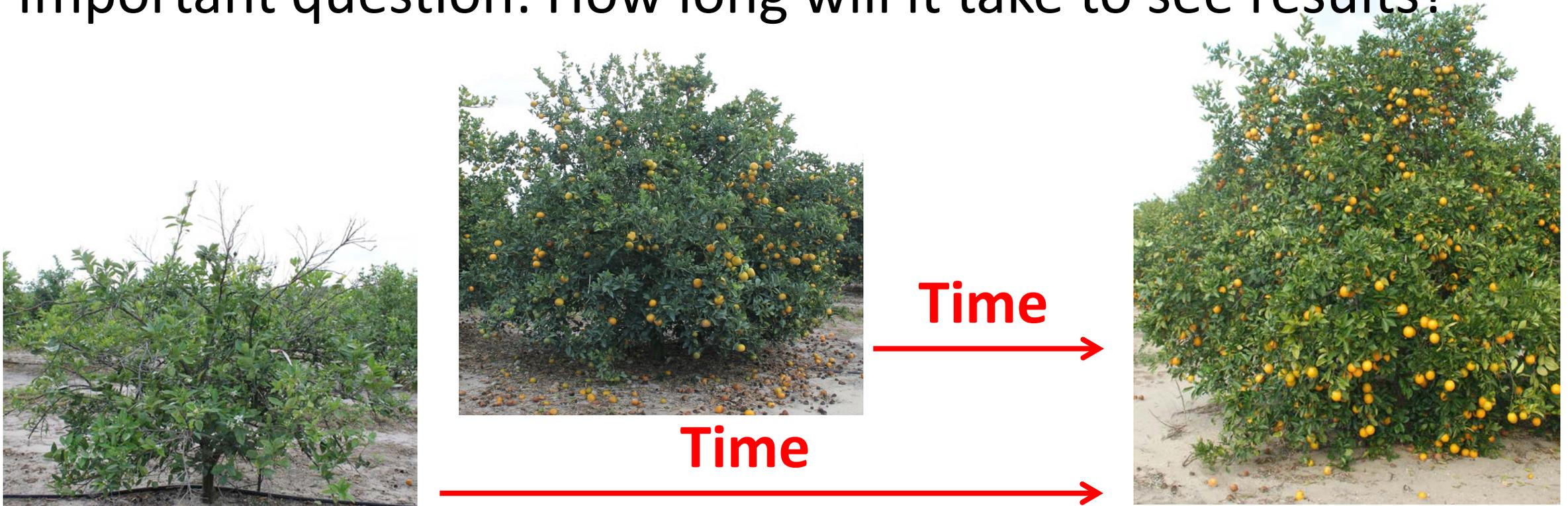
Two types of trial design were used



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?

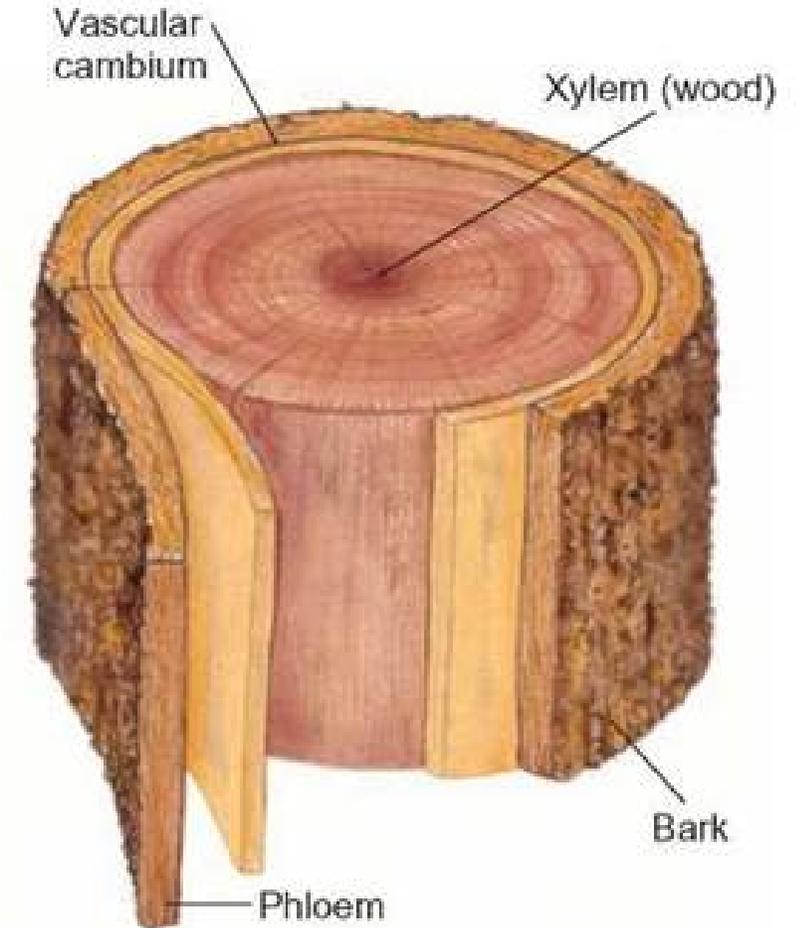


Reduction in bacteria & production of new phloem (new growth) =

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





Important question: How do we separate seasonal changes in tree appearance with improvement due to bactericides?

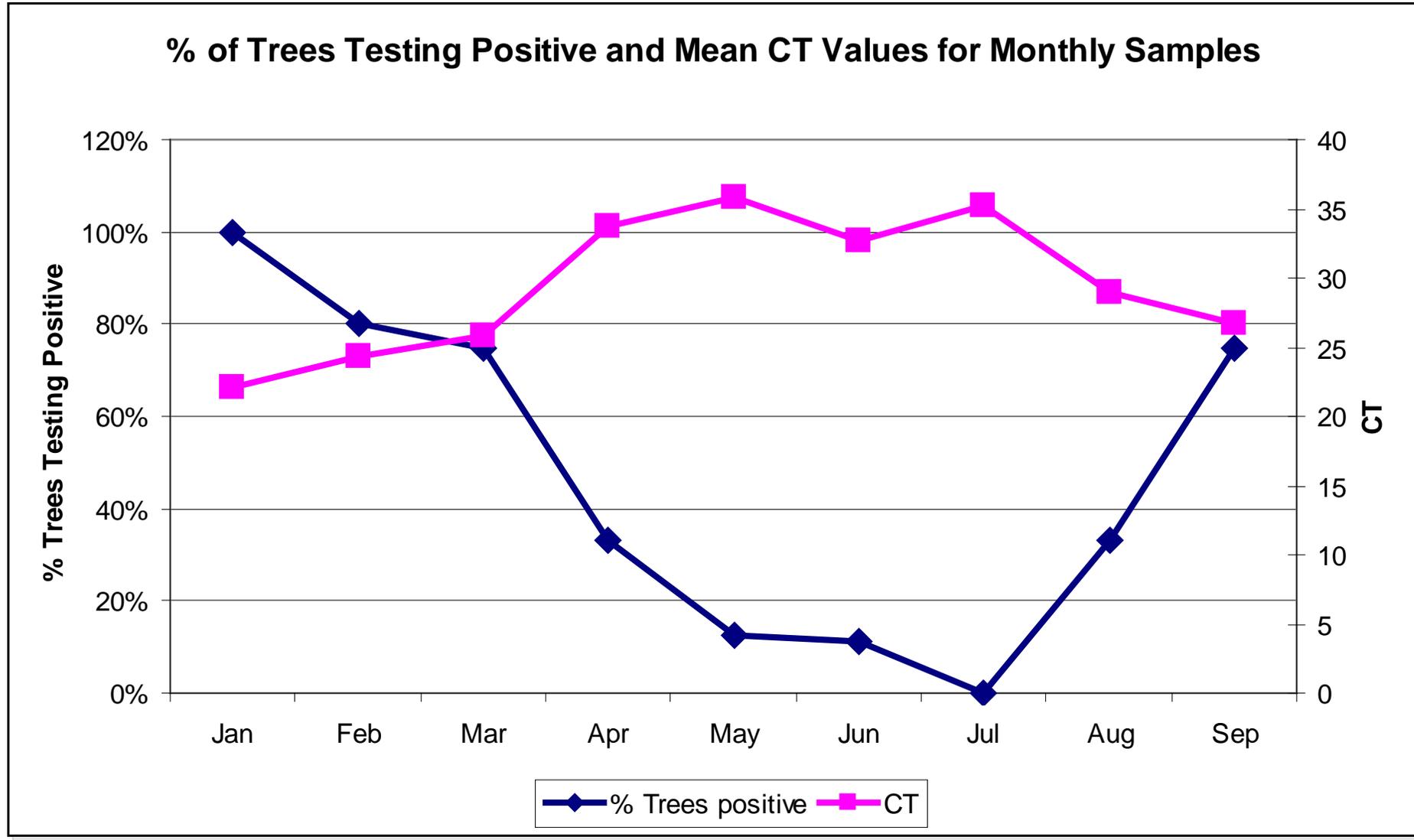
- Untreated control
- Evaluation over time

Winter Summer Spring Fall
→
Less Disease?



Changes in detection and concentration of bacteria over time

Greater number of samples that had detectable bacteria



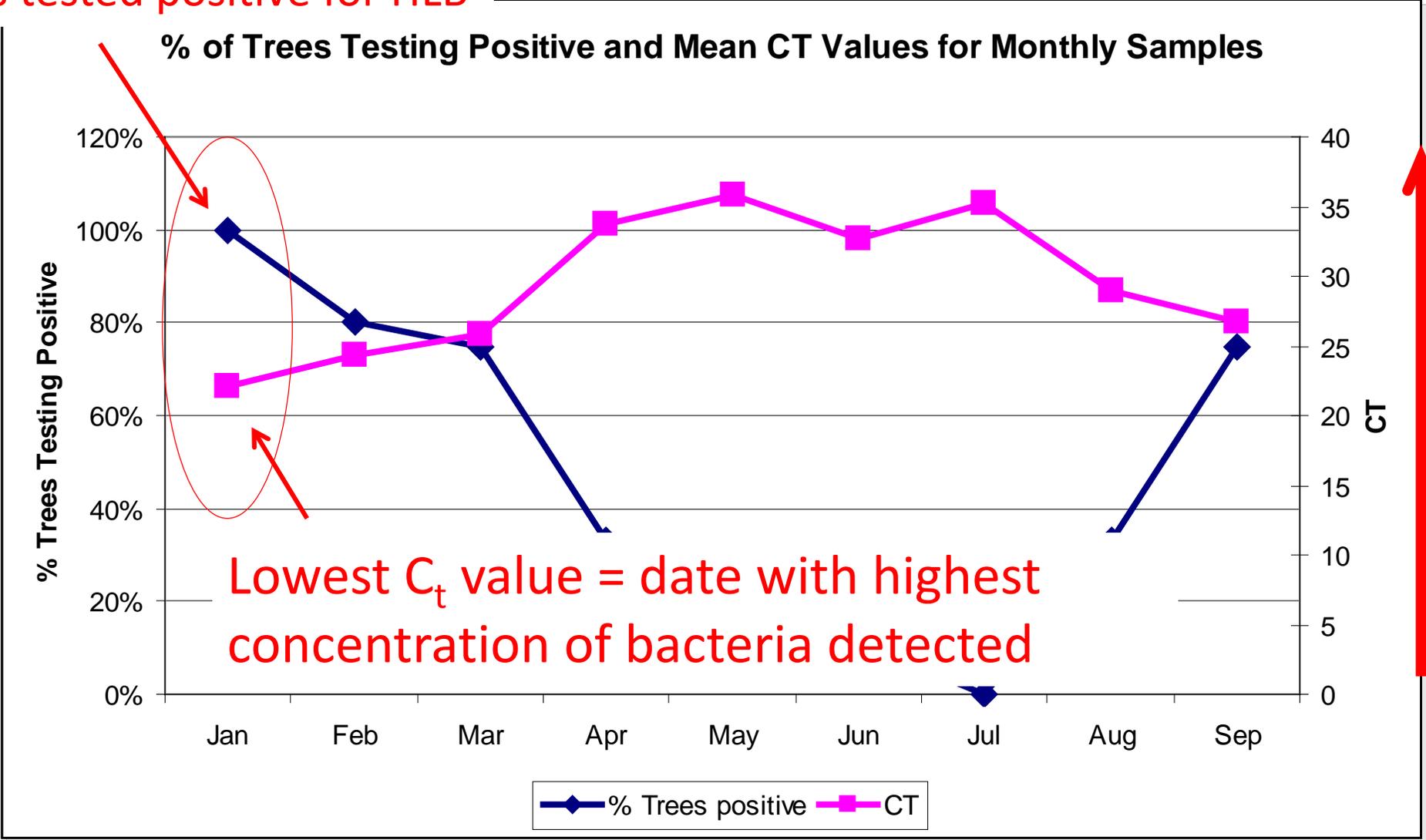
Less bacteria detected



Courtesy of Mike Irey, Southern Gardens Citrus

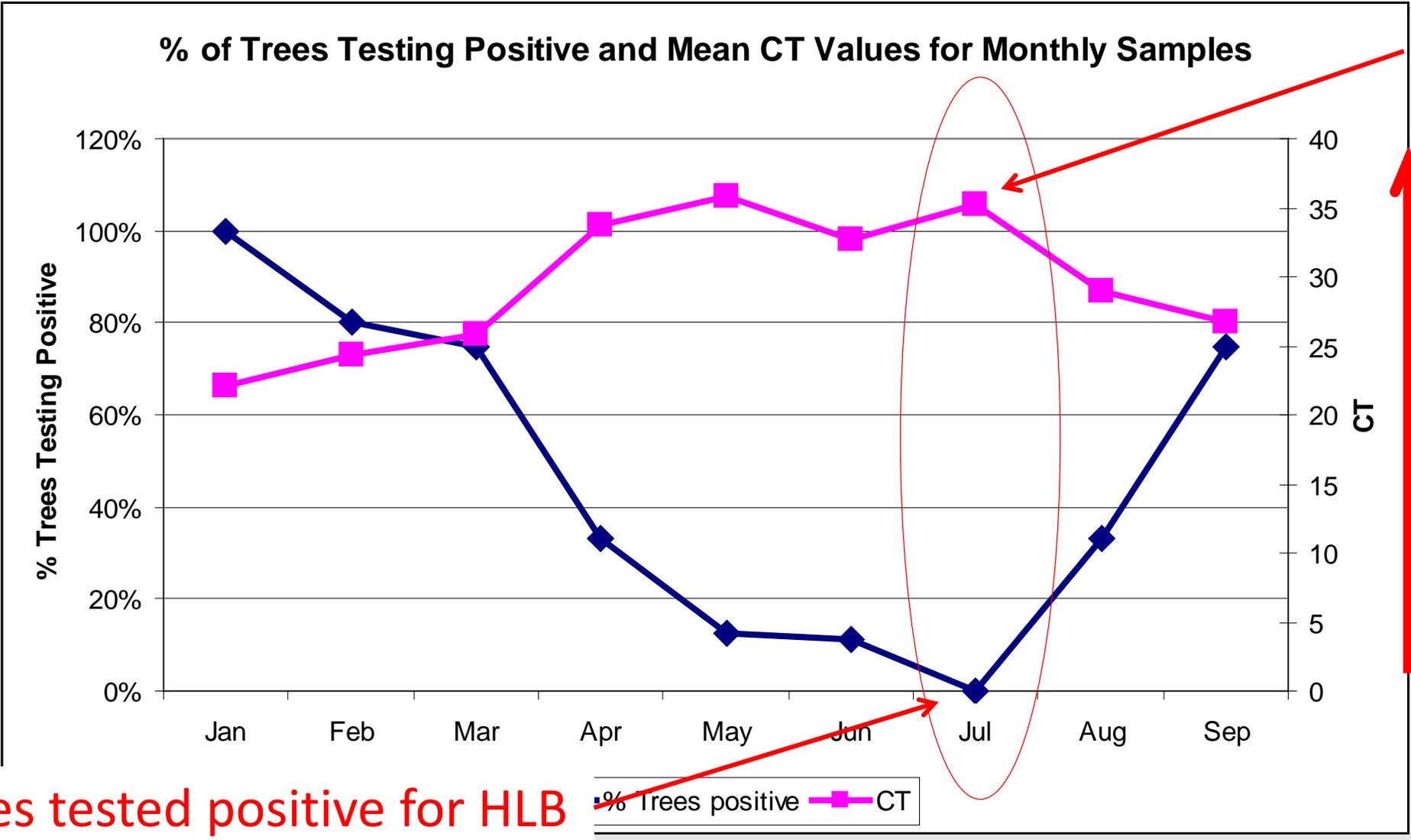
Detection of bacteria over time

All trees tested positive for HLB



Courtesy of Mike Irey, Southern Gardens Citrus

Detection of bacteria over time



HLB negative

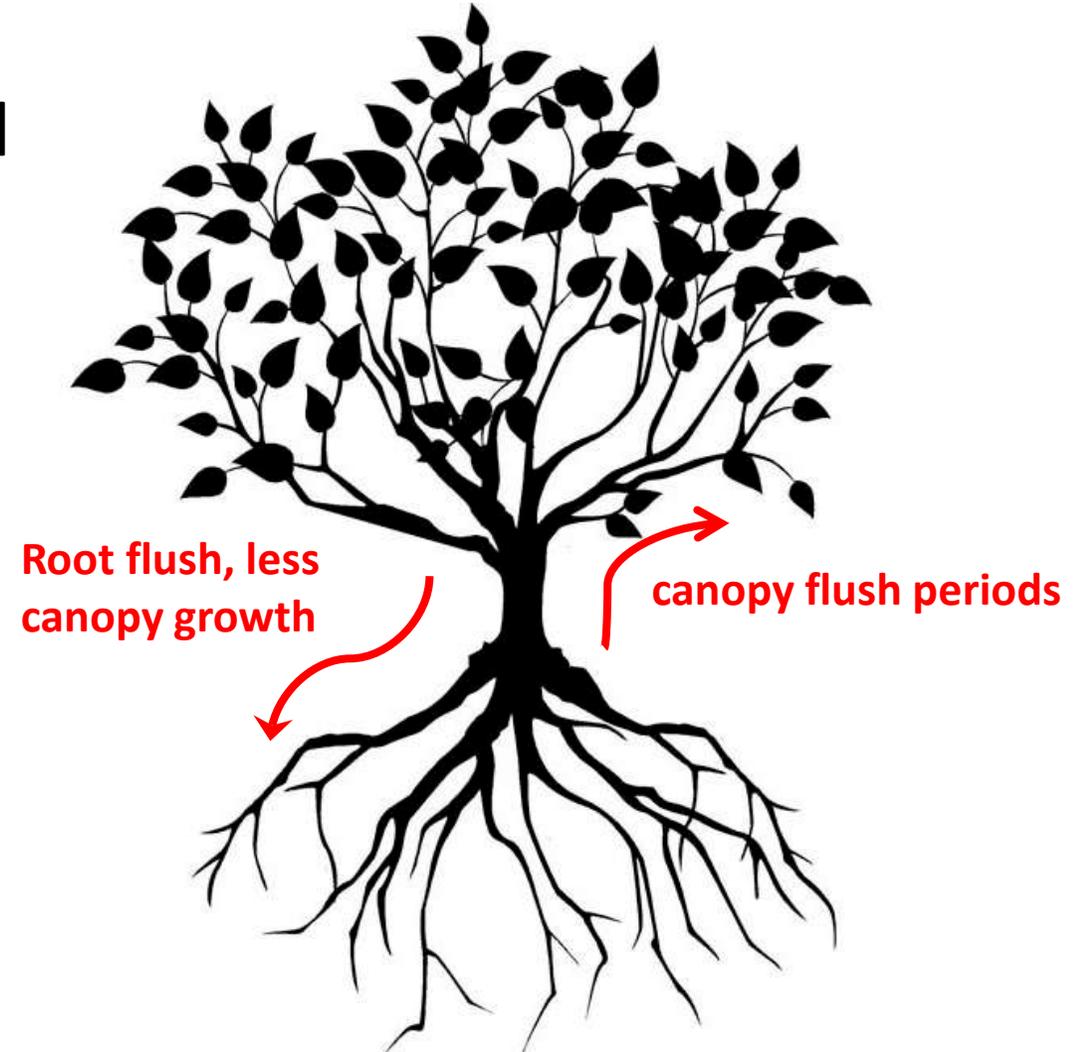
Less bacteria detected

No trees tested positive for HLB

Legend: % Trees positive (blue line with diamond), CT (pink line with square)

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

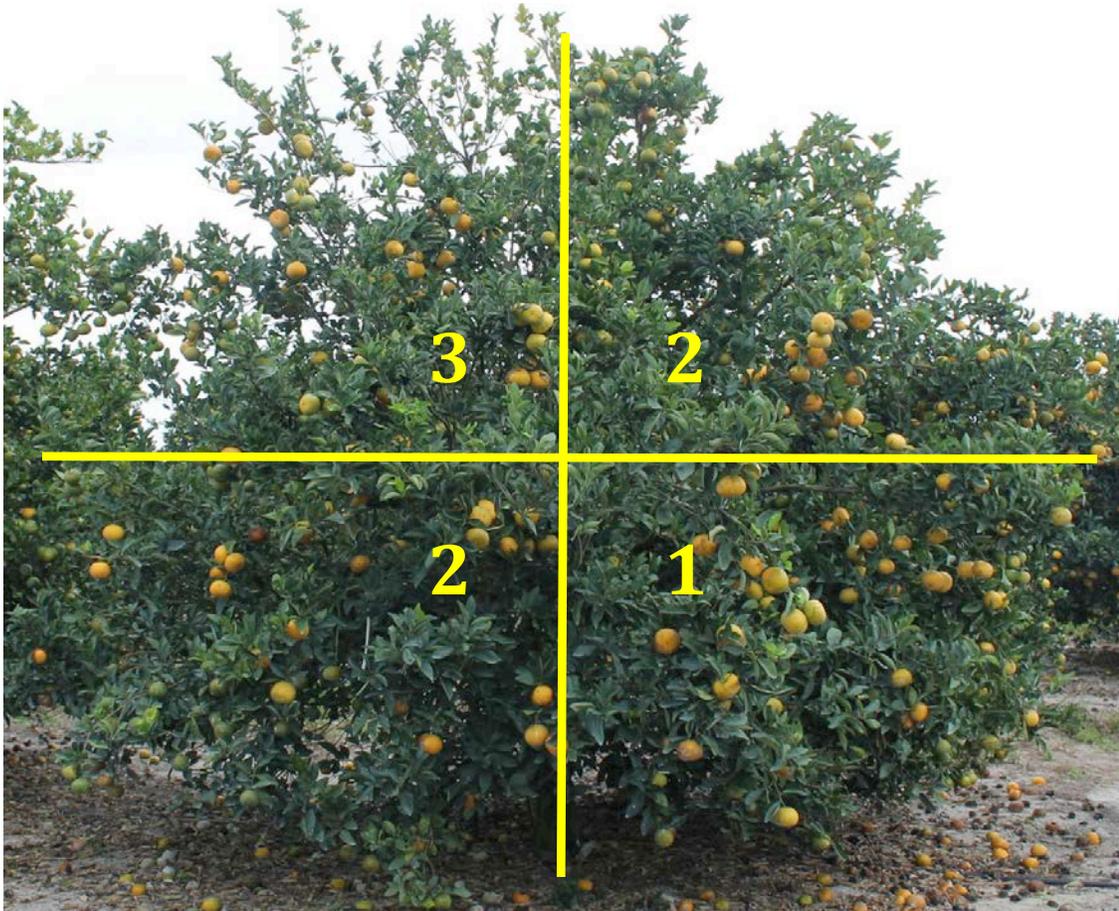


Evaluating changes in tree health over time is also important

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:
<http://bit.ly/1PQEPGT> or page 10 of
Citrus Industry Magazine





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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



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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