



#UNIDOS
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GREENING

Situation and mitigation of HLB in Florida

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May 22, 2018

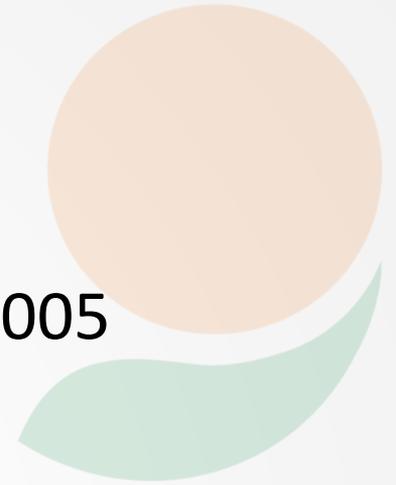
II International Symposium on the Management of
Citrus Greening Disease

Fundecitrus
Araraquara, SP



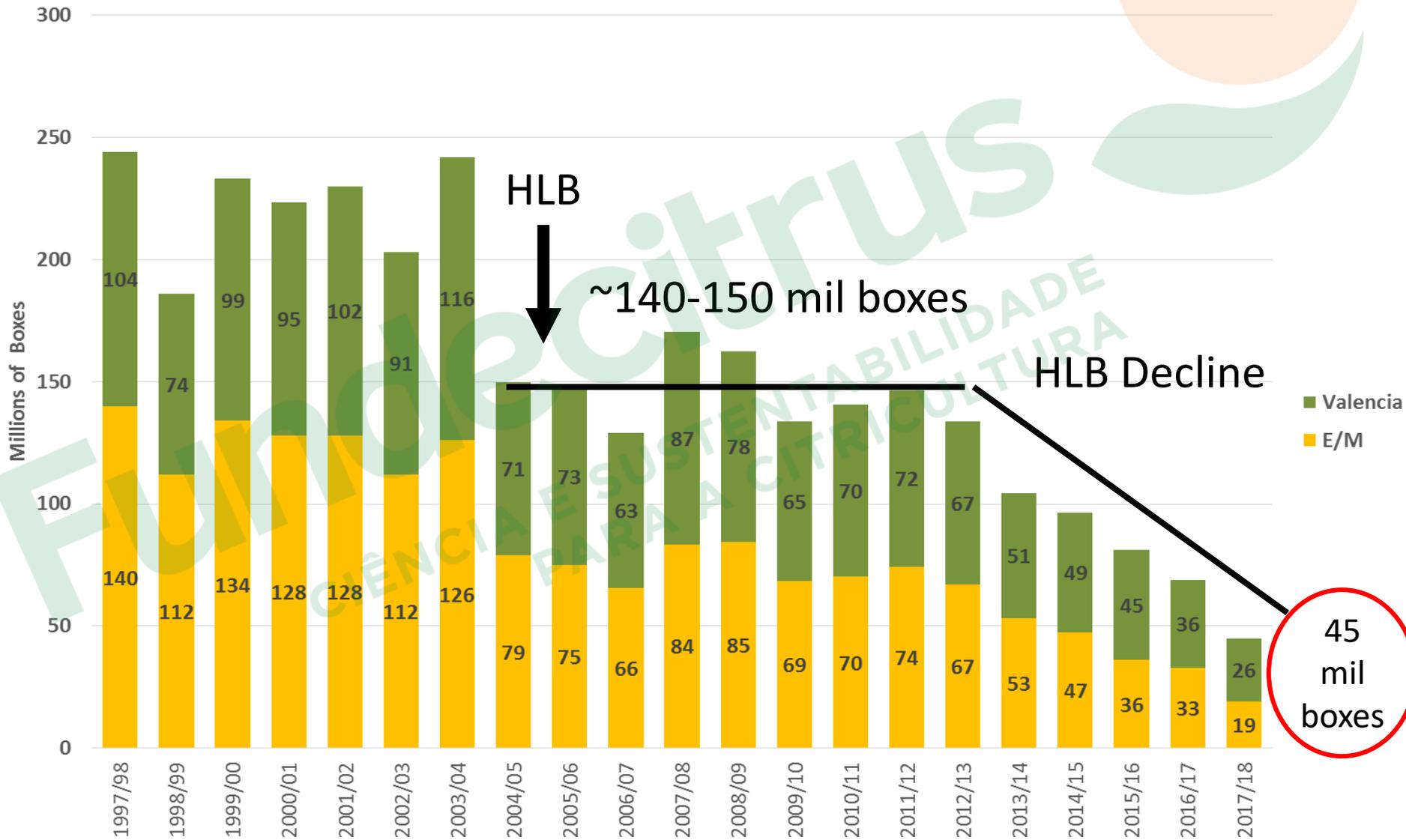
Topics for discussion

- Current status of production with HLB since 2005
- Unique nutritional challenges of HLB trees
- Strategies to reduce psyllid transmission in new plantings
 - Metalized Reflective Mulch
 - The Tree Defender



Fundecitrus
CIÊNCIA E SUSTENTABILIDADE
PARA A CITRICULTURA

What happened to production after HLB?



What happened to root systems to cause such yield loss?

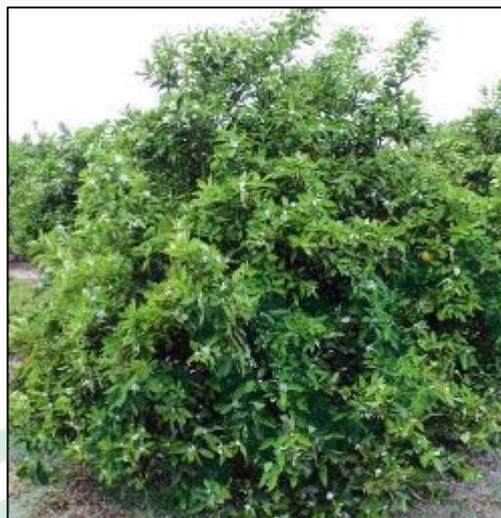
Healthy



Healthy roots



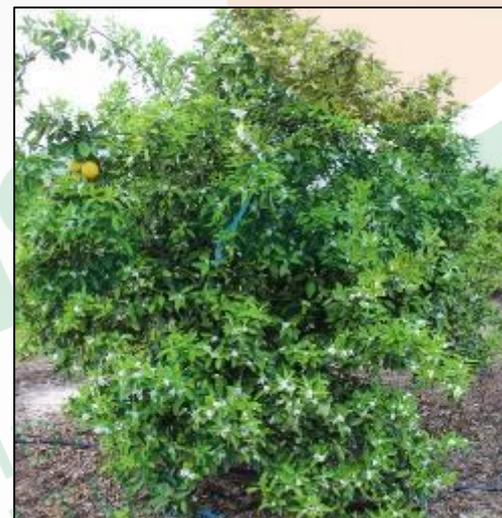
Symptomless
Infected



30-50% root loss



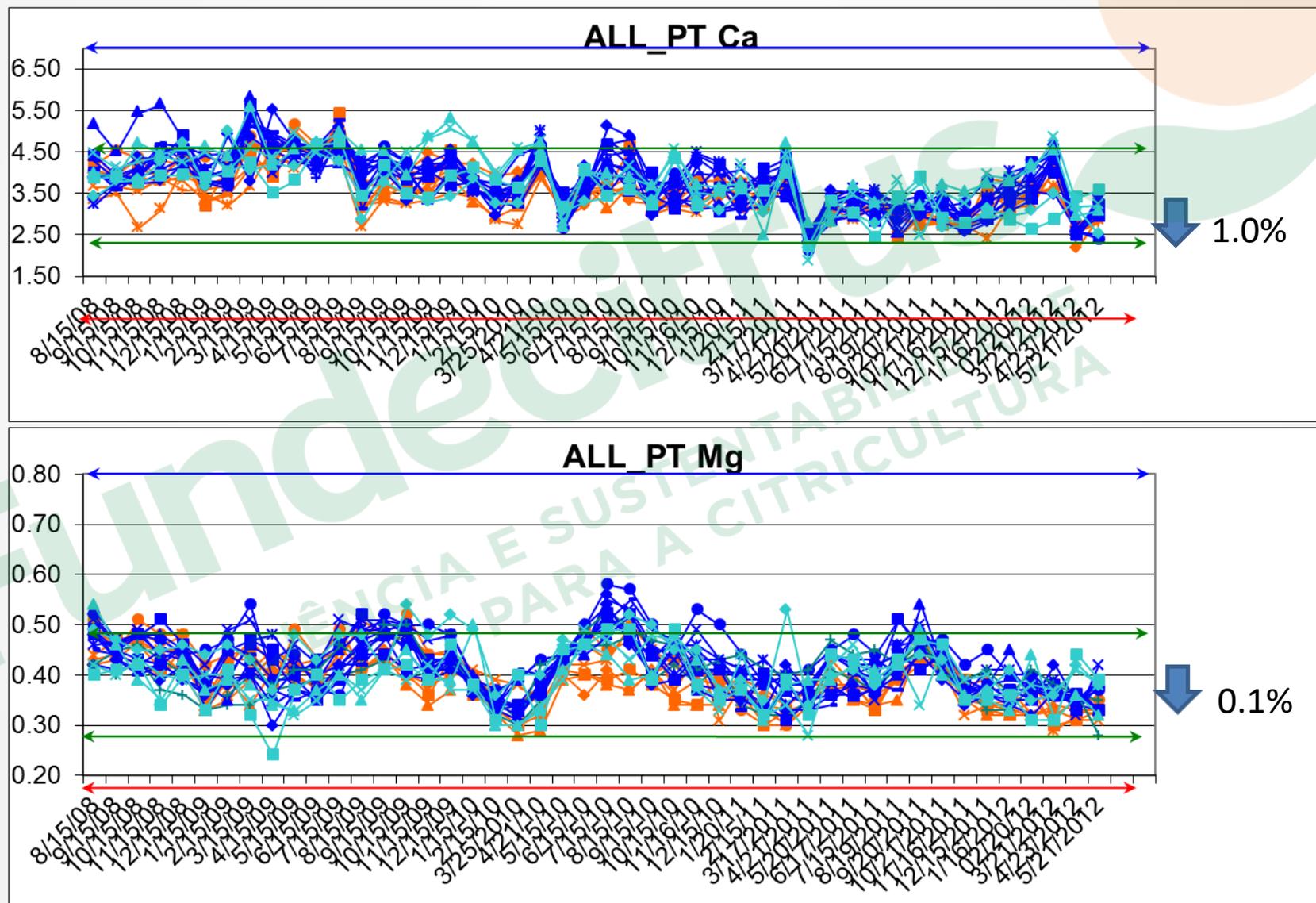
Thinning



70-80% root loss



Impact of HLB root damage: decline in foliar Ca and Mg over 4 yr period when HLB incidence increased (Data Bill Barber – Lykes Citrus)



What happened with nutrition?

- In 2008 FL growers began “enhanced **foliar** nutritional programs” as an alternative to removal of HLB trees
- Visual response to increased fertilizer applications but **no control** of HLB damage or yield loss
- End result: **inoculum in the form of infected trees and psyllids spread the disease rapidly**
- By 2012, 100% of groves infected
- Tree and psyllid infection approaching 100%

In 2012 we discovered that HLB decline and fruit drop was greater under high soil pH and/or bicarbonate in irrigation water

Low liming history - Soil pH 6.4

High liming history – Soil pH 7.2



Fruit drop minimal



Fruit drop resulted in early harvest

Management of soil/water quality stresses

- Balanced, lower and more frequent application of water and nutrients to compensate for the lower density root system
- Reduce soil pH/bicarbonate stress to sustain root function in nutrient uptake and root longevity
- Water conditioning: Inject sulfuric acid (40%) or urea-sulfuric (N-phuric) acid (15%) to reduce irrigation water bicarbonates
- Soil conditioning: broadcast sulfur in wetted zone to reduce soil pH

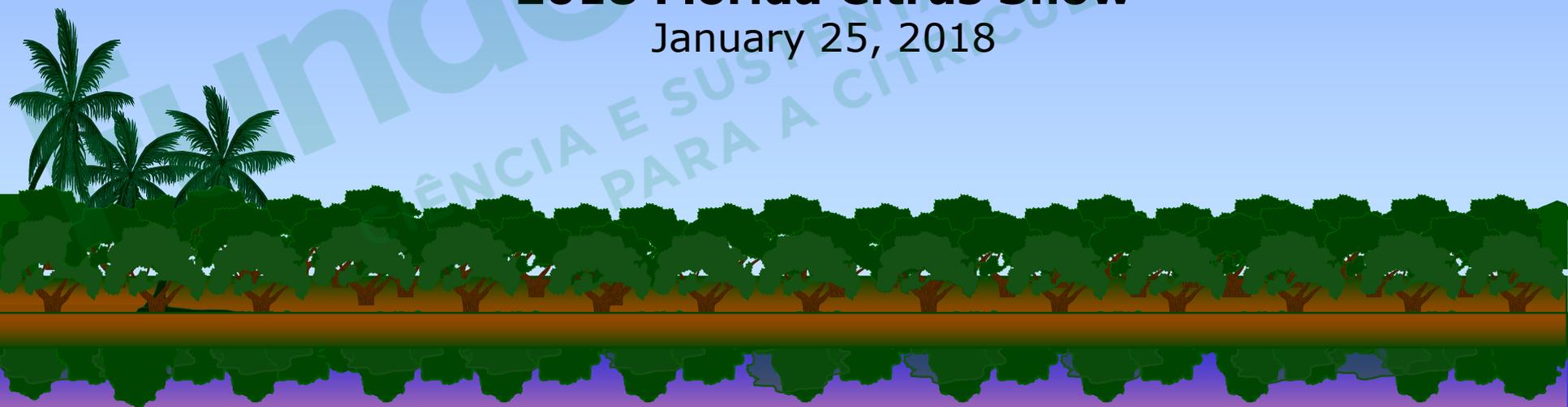
Metalized Reflective Mulch: More Fruit with Less Psyllids

Robert C. Adair, Jr.
Executive Director

Florida Research Center for Agricultural Sustainability, Inc.

2018 Florida Citrus Show

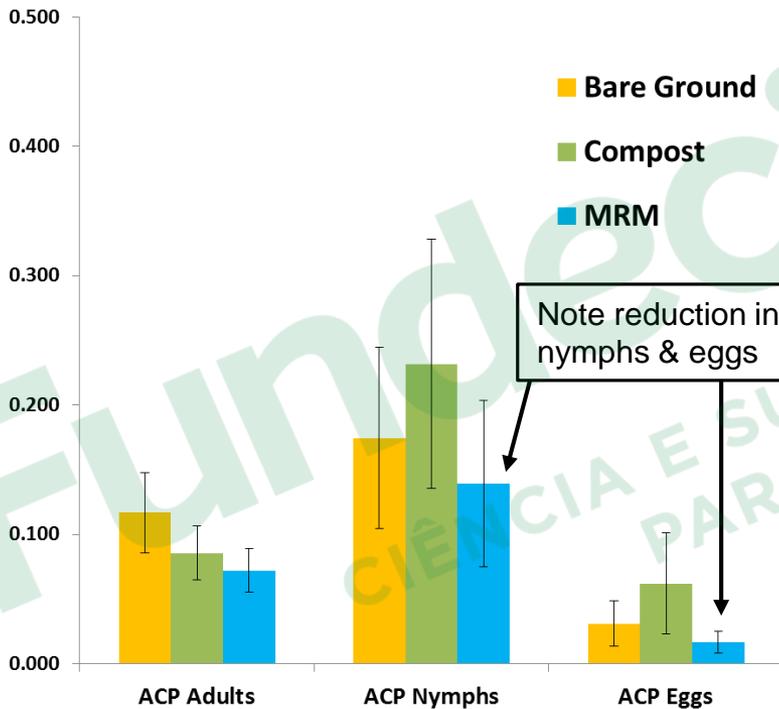
January 25, 2018



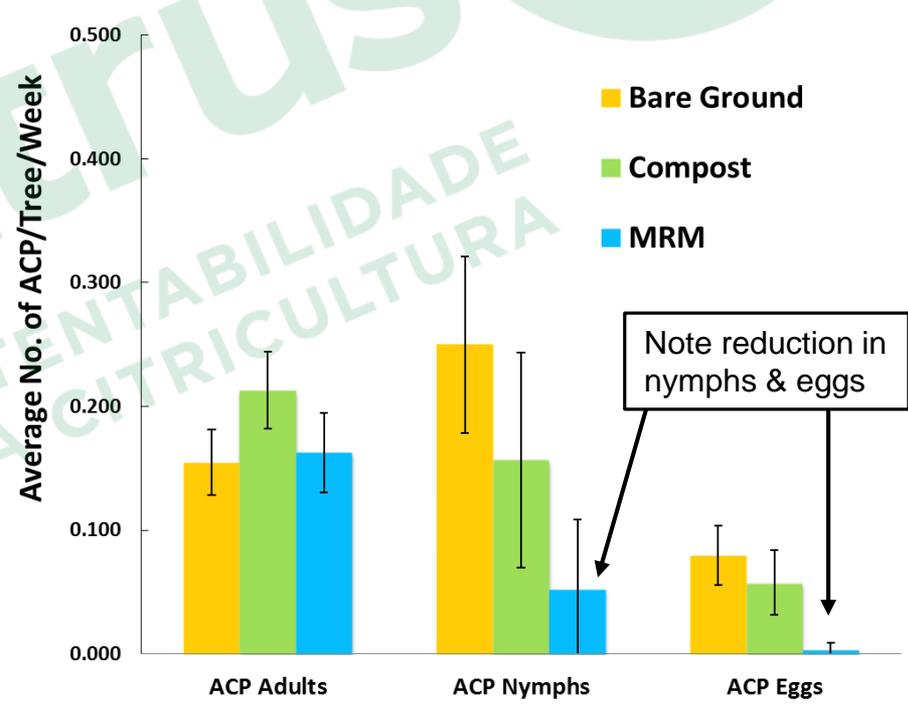


Average no. of ACP per tree (\pm S.E.) based on weekly scouting for 2016 and 2017

Average Number of ACP (\pm S.E.) For Each Life Stage per Tree Based on Weekly Scouting from 1/4/16 to 12/28/16



Average Number of ACP (\pm S.E.) For Each Life Stage per Tree Based on Weekly Scouting from 1/3/17 to 12/27/17



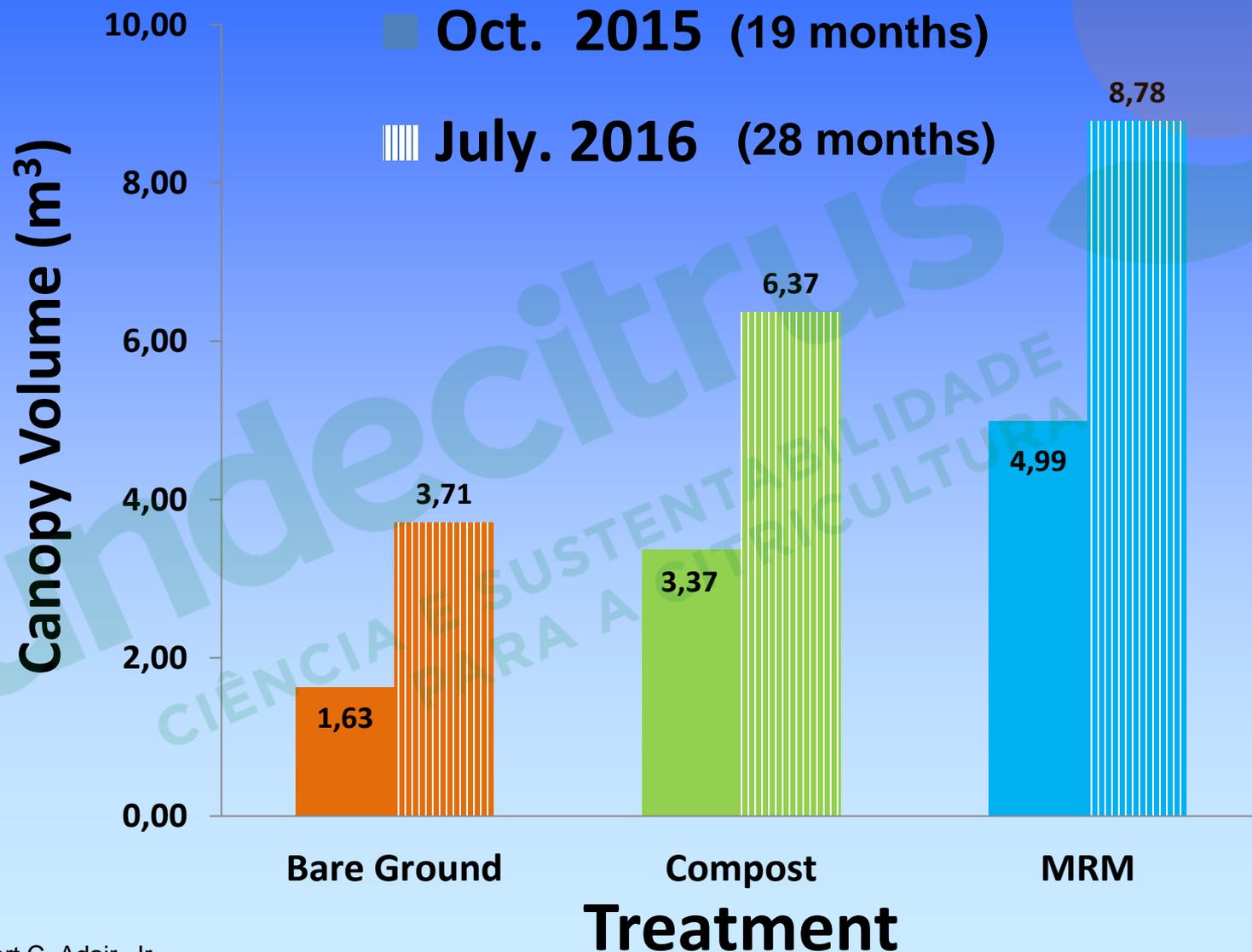
Relative HLB Incidence Based on PCR Analysis*

% HLB Positive Trees Based on Real-Time PCR Analysis* (n=20)

Sample Date:	02/14/2017	01/10/2018
Bare Ground	20%	100%
Compost	20%	100%
MRM	10%	85%

*Data: Courtesy of Dr. Ozgur Batuman SWFREC

Growth Increase by Canopy Volume



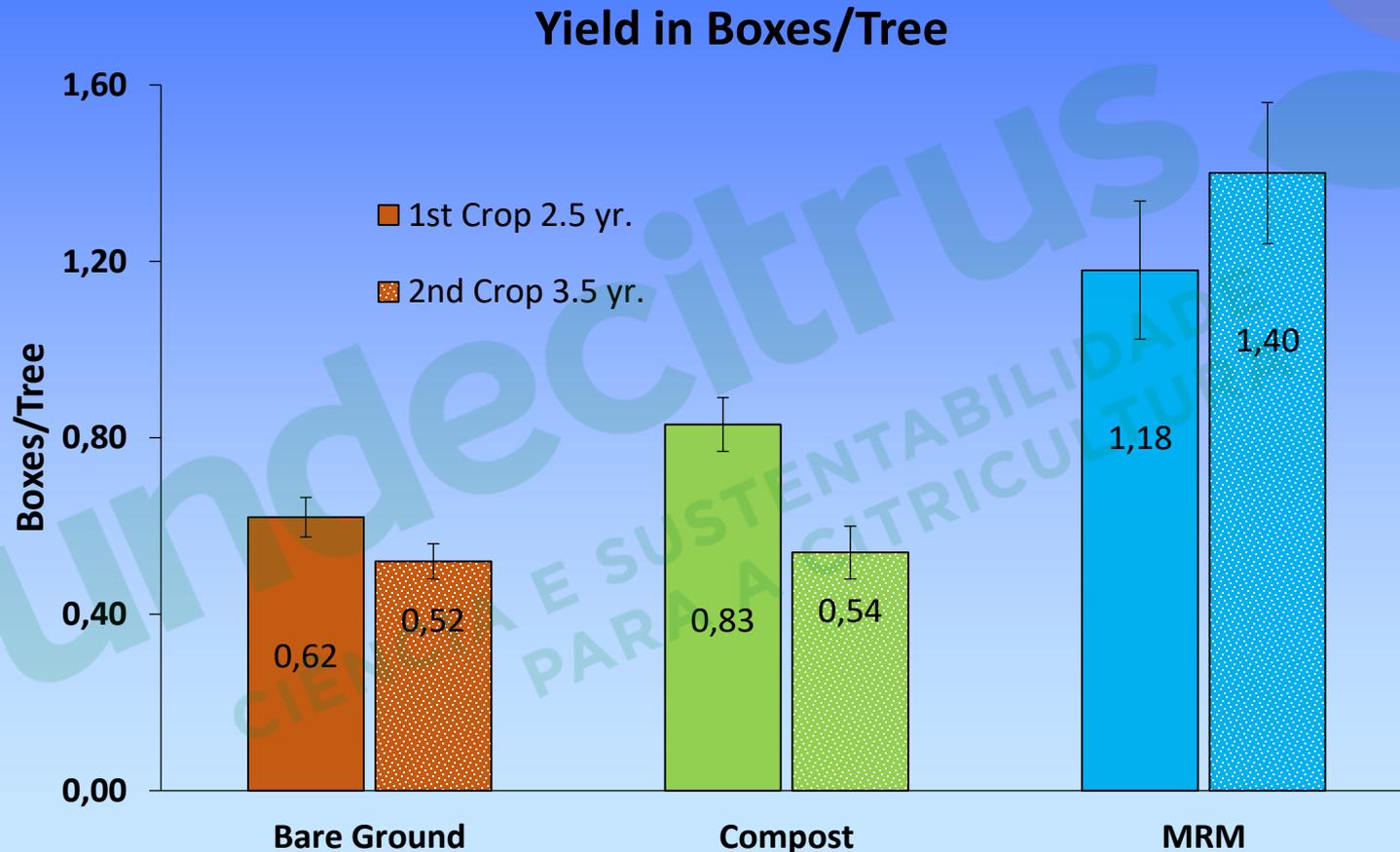
Tree Size at 2½ Years



Bare Ground

MRM

1st and 2nd Crop Yields



(80 reps/treatment)

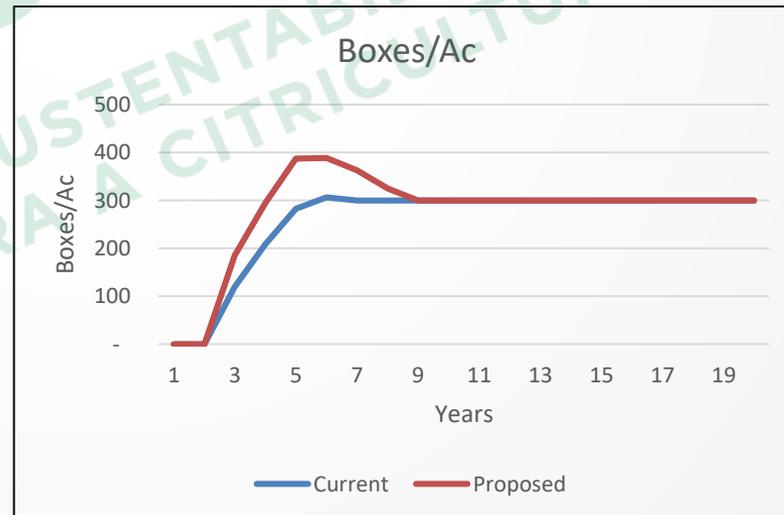
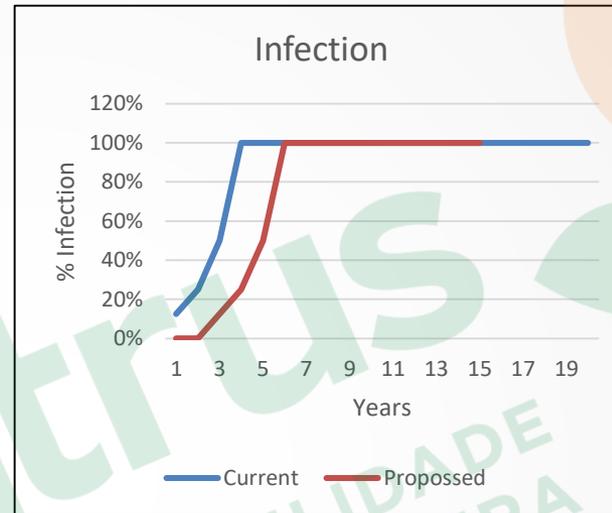


The Tree Defender

Delays the infection risk enabling the tree to produce fruit during the early years as opposed to getting infected before they reach full production stage.

The Tree Defender is durable and can be used for multiple years and for multiple plantings

Yield benefit results from infection delay



Economic advantage of The Tree Defender (TTD)

- A model was run with adjustments for various parameters such as variety, fruit quality, fruit value, cost of TTD, and years of protection to study different outcomes
- The model calculates that Valencia trees planted at 250 per acre protected with TTD for the first 2 seasons returns a profit of over \$3,000 per acre and an Internal Rate of Return (IRR) of 60.7%