# **Citrus Greening Research**



#### **Michael E. Rogers**

University of Florida, IFAS Citrus Research & Education Center Lake Alfred, FL



# 2005 Prediction: The Florida citrus Industry will be gone in 10 years!



We've learned more about HLB in the past 11 years than in the previous 100+ years HLB has been causing losses in worldwide citrus production



# Hanging on in the short-term

## Improved psyllid control programs

- Improvements in psyllid control
  - More efficient use of insecticides
  - area-wide control of psyllids (CHMAs)
  - Young tree protection









# Hanging on in the short-term Better Management of Tree Health Improving root health







# Hanging on in the short-term Better Tree Health Practices – Improving root health (bicarbonate management)



# 2015 – 2.5 yrs after soil acidification (Hardee Co.)



Jim Graham, UF/IFAS/CREC

> trus Research and ucation Center

UF FLOP

# Hanging on in the short-term Better Tree Health Practices – More efficient use of fertilizers

Slow-release fertilizers (soil) vs. foliar nutrition



Typical fruit from young HLB-infected (3 years) LB8-9 SugarBelle<sup>™</sup> trees treated with controlled release fertilizer containing extra manganese and boron, and Tiger-Sul micros.

UF/IFAS/CREC Plant Improvement Program

Typical fruit from young HLB-infected (3 years) LB8-9 SugarBelle<sup>™</sup> trees with standard fertilization regime.



# Hanging on in the short-term

### New HLB Tolerant Varieties

We don't have true resistant varieties...YET
Can grow new varieties with greater success under improved management programs





Sugar Belle<sup>®</sup> near Vero Beach, HLB+ >8 years !







2013

2014

Valencia/HBPxCleopatra 46x20-04-48 4/4.5-year old resets in high HLB/blight pressure area



# Hanging on in the short-term

#### Therapeutic treatments

- Bactericides
  - Research led by USDA
  - Bob Shatters presentation @ 10:15AM today
- Thermal therapy
  - Using heat to kill the bacteria in the tree (above ground)
  - Demonstrated regeneration of new phloem in citrus trees



## Thermal Therapy – Steam Treatment



#### Reza Ehsani, UF/IFAS/CREC







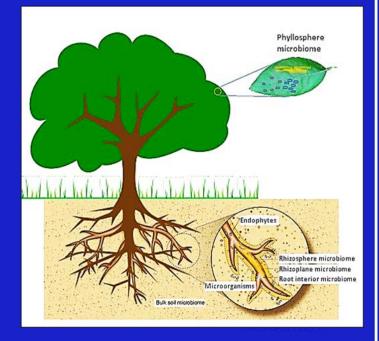
## **Research for the future**



# **Research for the Future**

## Examples of current research

- RNAi
  - Antimicrobial peptides in citrus to kill HLB bacterium
  - Psyllids incapable of transmitting HLB pathogen
- Citrus Mircobiome
  - Effects of micro-organisms on citrus tree health



## **Research for the Future**

#### Resistant Varieties

- Genetic engineering

- Transgenic citrus
- Citrus plants expressing spinach and mustard defense genes are extremely promising as a cure for HLB!





#### Improving citrus with genetically modified biotechnology

Page 10

Plus...

2015 Citrus Expo Wrapup

www.CitrusIndustry.net | AgNet Media

#### **ALSO IN THIS ISSUE:**

- Bactericide strategies for HLB
- Psyllid insecticide resistance
- Peach defoliation pointers
- ▶ Farm labor management classes





## **Research for the Future**

#### Resistant Varieties

- Genetic engineering
  - Transgenic citrus
  - Citrus plants expressing spinach and mustard defense genes are extremely promising as a cure for HLB!
- Consumer acceptance
  Education is needed!



#### The Washington Post

New study confirms that 80 percent of Americans support labeling of foods containing DNA

#### By Ilya Somin May 27

Last year, I wrote about an Oklahoma State University survey indicating that over 80 percent of Americans support "mandatory labels on foods containing DNA." A new study written by economists Brandon McFadden and Jayson Lusk (who also helped author the OSU survey) similarly finds that 80% of the public support labeling of foods containing DNA (though in this case the question does not clearly indicate whether the labeling should be mandatory or not). Katherine Mangu-Ward has some additional discussion of the study here.

Obviously, such DNA labels would be absurd. Nearly all food contains DNA, and there is no good reason to warn consumers about its presence. As McFadden and Lusk and explain, the survey answers on this subject are an indication of widespread scientific ignorance, proving that many of the



# **Research for the Future**

#### Resistant Varieties

- Gene Editing CRISPR
- Turning off genes responsible for the disease response in plants
  - Not adding anything to the plant
- Grapefruit resistance to citrus canker
  - Dr. Nian Wang
- Resistance to HLB underway
- No deregulation needed!!!
  - Not considered a GMO



# Hanging on in the short term

- Using the knowledge we've gained it's possible to grow citrus as a rotational crop until long-term solutions are available
  - Economically viable to replant on a 10-12 year cycle
  - Not easy...requires a change in mentality
  - Profit margins reduced
  - Yields and fruit quality will present challenges
     over the next 10-15 years
     UF FLORIT

rus Research and

## **Opportunities abound!!!**

- Funding agencies have and continue to focus on preharvest solutions to HLB
  - Very limited funding avenue exists for postharvest research efforts
    - The missing link "from the grove to the glass"



# Tropicana Professorship for Citrus Innovation

#### Dr. Yu Wang

 flavoromics platform for monitoring and improving food quality through preand post- harvest



 Health benefits of citrus and citrus byproducts





