# Fruit Size, Yield and Quality in HLB Infected Trees

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#### Introduction

- Greening causes fruit to be small, misshapen, lopsided, develop an off flavor and abscise prematurely
- Groves can become unproductive in as little as 2-4 years (Keet al. 1988)
- Yield can be reduced by 10 to 80% depending on percent of canopy affected (Bassaneziet al. 2006)
- Need data for Florida



#### **Experimental Sites**

- **2007/08**
- 9-year-old 'Valencia' on Carrizo
- First HLB trees identified Dec. 2006
- Jan. 2008, 74 trees with visible symptoms, 6 PCR +
- Fruit harvested April 2008

2008/09

- 'Hamlin' on Swingle near Felda
  - Harvested Dec 2008
  - Canopies ~40%
    symptomatic
- 'Hamlin' on Swingle near Lorida
  - Harvested Feb 2009
  - Canopies ~20%
    symtomatic UF FLORIDA

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#### Felda trees: Healthy ↑ andHLB+ ↓



Lorida trees: ←Healthy and HLB + ↓

#### Methods 2007/08

- Trees hand harvested April 9-11, 2008
  - 5 healthy (symptomless) trees
  - 6 PCR+
- Fruit sized by hand based on fresh fruit size standards
  - <125, 125, 100, 80, and 64s</p>
- Fresh weight by size and total FW were recorded
- 125-size fruit were sorted into symptomatic and asymptomatic





#### Methods 2008/09

- 10 HLB and 10 healthy trees harvested at each site
- Fruit sized and counted on an autoline fruit sizer
- 1 sack of small fruit and 1 sack of "average" fruit sampled from each tree
  - °Brix, acid, ratio and color
- Yield per tree estimated based on fruit size to weight relationship
- Measured tree height and two canopy widths to calculate canopy volume



## Results 2007/08 - Dover

Total fresh weight and fresh weight by size category per tree for 'Valencia' fruit from healthy trees and trees infected with HLB.

	Fruit yield (lbs fresh weight) per tree								
	Total	<125	125	100	80	64			
Healthy	450.12	0	62.61	229.85	150.55	7.10			
HLB infected	336.47	8.25	152.93	142.86	32.30	0.13			
P=	0.0692	N/A	0.0147	0.0612	0.0008	0.0586			

- HLB reduced total yield by ~25% (1 box)
  - HLB trees were smaller so how much loss was due to canopy size?
- 125-size fruit on infected trees were 35% symptomatic



#### Results 2007/08 - Dover

 50-60% of total yield was 125 or smaller fruit on infected trees compared to healthy trees





## Results 2008/09 - Felda





#### Results 2008/09 - Felda

		°Brix	Acid	Ratio	Color	Juice Yield (ml/fruit)
HLB	Small	9.25 c	0.95 a	9.87 b	34.38 c	29.45 d
	Average	10.98 a	0.70 b	15.65 a	35.47 b	75.49 b
Healthy	Small	10.37 b	0.67 bc	15.73 a	36.11 a	47.05 c
	Average	9.58 c	0.64 c	14.97 a	36.32 a	92.75 a

- HLB juice quality changes are most affected by high acid
- Color is affected in both symptomatic and asymptomatic HLB fruit



## Results 2008/09 – Lorida





#### Significance to Processors/Packers

- Most HLB fruit can be removed by sizing
- Due to smaller fruit size total juice volume produced will be less from greening trees
   – Is juice yield / Ib of fruit different?
- Potential off-flavors in greening fruit
- For fresh fruit ~5% of fruit is lost due to small size, another 10-15% is lost due to symptoms (poor fruit quality)



#### **Significance to Growers**

- HLB infected trees appear to have good yields at least 1 year after known infection
  - Yield does not appear to be consistently affected until >25% symptomatic
- <u>All</u> fruit from HLB trees show some quality changes
- It does not appear that treatments to improve tree healthy influence size or quality changes due to HLB
  - Do they maintain yield? Time will tell...



#### Conclusions

- Fruit size distribution looks to be a good indicator for identifying HLB, but not early
- Data can be used to develop better economic models to determine best grove management strategies (purely from an economics standpoint)
- Processors and packers can eliminate the fruit from the processing/packing stream
- How much of the yield changes are due to poor growth and smaller canopies vs. true yield reduction (bloom, fruit set)?

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#### **Questions?**

