# Strategies to reduce fruit drop

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# What can I do now to reduce fruit drop?

- 1. Invest in tree canopy!
- 2. Improve water availability
  - Irrigate, small and frequent doses of irrigation
  - Improve water use efficiency
- 3. Gibberellic acid treatment





#### Trees with dense canopy, drop less fruit



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## Number of loose fruit increases overtime especially in severe trees





## Fruit that drop are smaller than the ones that retain on tree!



 Severely symptomatic trees have smaller fruit on average than mild trees

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#### Fruit size differences appear very early in season



## Fruit growth and development

- Fruit size is driven by water availability
- March-May are usually dry





## Higher water deficit in severely HLB symptomatic trees





### Water deficit is a concern!

- Water deficit can impact fruit growth
- Abscisicacid, a plant hormone related to drought stress, is found in loose fruit
- The signal for ABA arises weeks and months before the actual drop takes place
- HLB-affected trees have small rootbiomass, therefore, water uptake is limited
- Improving water availability and use throughout the growing season can help



## Water availability and use efficiency

- Small and frequent doses of water
- NOT more water, same amount of water
- Use of soil moisture sensor
- Use of mulch can keep reduce evaporation
- Particle film may improve water use efficiency



## Gibberellic acid (GA)

- A plant growth regulator labeled for use on citrus for improving fruit set and juice yield, and delaying harvest
- GA application close to harvest can reverse or keep the fruit green
- GA application close to harvest does not reduce HLBssociated fruit drop
- GA can increase fruit size
- GA can suppress flowering



## **GA trial**

- Originally allower suppression study to reduce potential of PFD
- Valencia
- GAapplied during Fall (September to Januar)
  - Progibb with surfactant
  - 5 fl oz per acre or 10fl oz per acre
  - 7 application regimes evaluated
  - All applications started in September and ended in November, December, or January



## GA reduced and delayed flowering

No reduction in yield with reduction in flower number!



## **Better yield with 5 GA applications!**



#### 4 year average

	pounds/tree	Standard deviation	
Control	176 b	61	0.06
GA	228 a	56	0.00

#### Extrapolation to boxes per acre

	Average
Control	293
GA	380



#### GAimproved fruit retention and size





## GA trees did maintain canopy density





## Effect of GA is 'holistic'

- Fall GA application reduced and delayed flowering
  - Conserves carbohydrates
  - Improves source to sink ratio
  - Leafy inflorescence
  - Late flower set and retain more fruit
  - Reduces competition for carbohydrates
- GA causes more vegetative growth, better source to sink
- Aids growing fruit
- Reduces preharvest fruit drop
- Possibly, improves plant defense response





## GA treatment in November-December seems promising!



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## **GA** application summary

- All the GA work is on 'Valencia'
- 5 GA application can improve yield
  - Sep-Jan
  - 10 fl oz per acre per application
  - Until run off
- Fewer than 5 may be effective
  - Nov-Dec for Valencia
  - Late August-Late September for Hamlin
- Fruit color can be a concern for fresh market fruit



### Take home message

- Increasedoxidative stress and hormone imbalance results in increased drop
- Water deficit seems to be associated with fruit drop
- Good caretaking, early in the season, during fruit growth
- GA application does hold great potential for improving yield and possibly slowing down the tree decline
- Spoon feeding tree with water and nutrients
- Good canopy= less fruit drop and more yield



## Thank you!

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CITRUS INITIATIVE

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