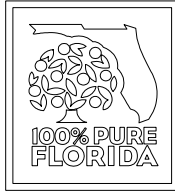


Factors Influencing Quality of Early Season Citrus



Mohamed Ismail and Haoting Dou
Florida Department of Citrus, Lake Alfred, FL
August 21, 2003

Citrus Grown Around the World

- Citrus is number one fruit crop.
- Grown in over 100 countries.
- Florida is second in orange production.
- Florida is first in grapefruit production.



Citrus Growing Areas:

- Subtropical and tropical regions
 - Hot rainy summers
 - Warm winter nights
- Desert and Mediterranean Regions
 - Hot dry summers
 - Cool-wet winters
 - Cold winter nights



Citrus Fruit Characteristics

- | | |
|-----------------------------|----------------------------|
| ■ Tropical and Sub-Tropical | ■ Desert and Mediterranean |
| ■ Yellow to Green | ■ Excellent color |
| ■ Thin peel | ■ Thick peel |
| ■ High sugar | ■ Lower sugar |
| ■ Low acid | ■ Higher acid |
| ■ High juice content | ■ Lower juice content |



Early Season Florida Citrus

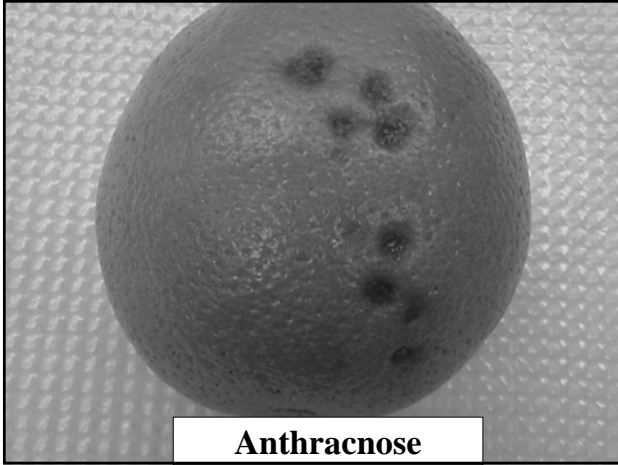
Green color is the major cause of low pack-out

- Matures early (Aug - Sept)
- Peel is green and easily injured.
- Requires longer degreening.
- Susceptible to decay.
- Subject to disorders.
- Short shelf life.



Early Season Diseases and Disorders





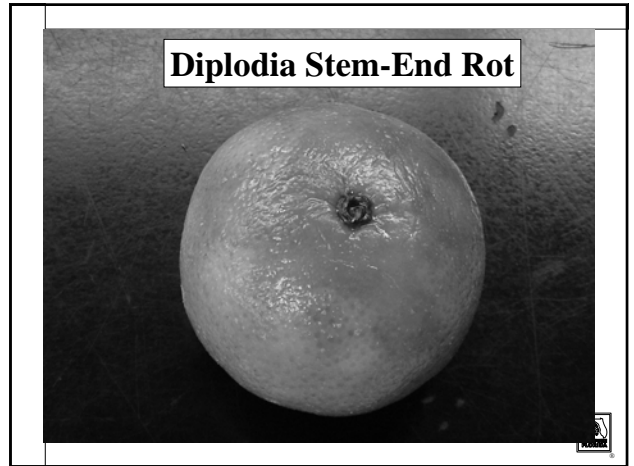
Anthracnose



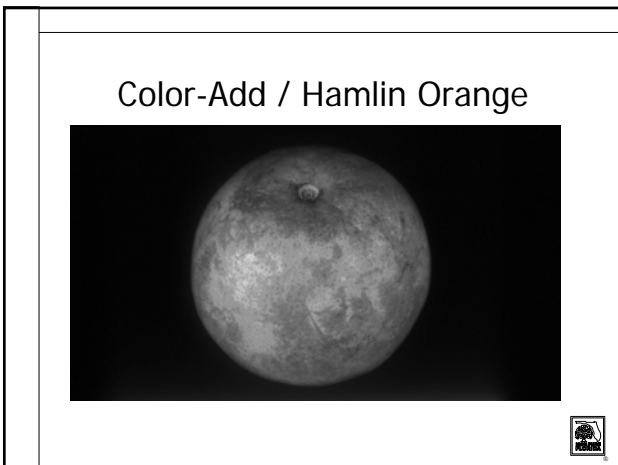
Advanced Anthracnose



Diplodia Stem-End Rot



Diplodia Stem-End Rot



Pitting

In the life cycle of citrus fruit, quality begins at:

- Harvest
- Packing
- Bloom
- Shipping



Important Preharvest Care

- Proper control of diseases and insects (melanose, greasy spot, *Alternaria* and rust mites).
- Hedge and top/prune: deadwood is primary source of *Diplodia* inoculum.
- Reduce nitrogen fertilizers.
- Apply preharvest fungicides.
- Avoid excessive irrigation prior to harvest.



Harvesting: Do's and Don'ts

- Allow sufficient color break at harvest to minimize degreening.
- Do not harvest after heavy rain to minimize mechanical injury and oil spotting.
- Clipping may be desirable in specialty varieties.
- Do not pick fruit off the ground.



Drenching and Cooling

- Helps reduce Stem-End Rot.
- Maintain pH at 6.5-7 and 50-100 ppm free chlorine in drench mix.
- Maintain proper conc. of TBZ or Imazalil
- Cool fruit to 50°F if packing is delayed beyond 24 hours.



Degreening Parameters

- | | |
|-------------------|---------------------|
| ■ Temperature | 85°F |
| ■ R. Humidity | 90 – 96% |
| ■ Ethylene | 5 ppm |
| ■ Air Circulation | 10 cfm/box capacity |
| ■ Air Exchange | One /hr. |
| ■ Time | ??? |



Degreening Problems

- Increased decay due to high Ethylene conc. and longer degreening time.
- Weight loss and shriveling due to low R.H.
- Inefficient degreening due to inadequate ventilation/high CO₂ levels.

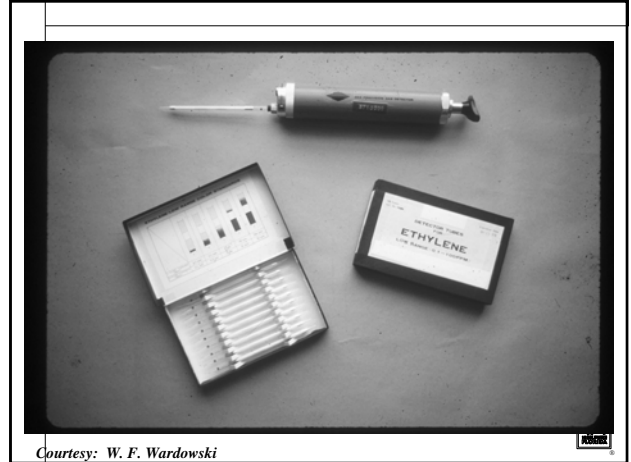
Solution:

Monitor DG parameters and and keep records





Courtesy: W. Grierson



Courtesy: W. F. Wardowski



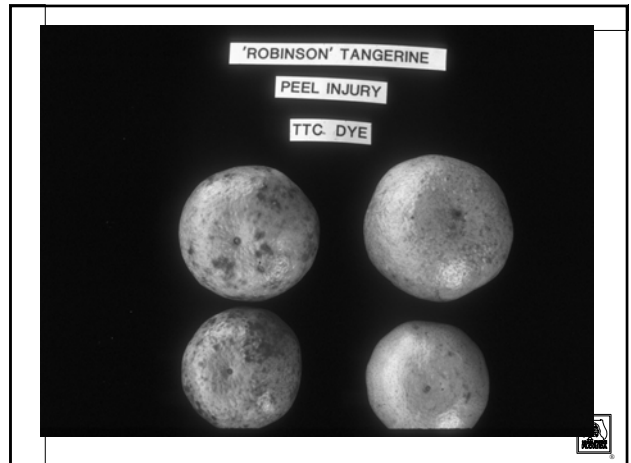
Packinghouse Operations:

- Measures to reduce decay
 - Minimize mechanical injury
 - Condition brush beds and minimize brushing time.
 - Assess injury to fruit on packing line.
 - Apply TBZ and Imazalil.
 - Maintain dryer temperature below 140°F



Packinghouse Operations

- Measures to reduce peel disorder
 - Apply Carnauba or Polyethylene wax for better gas exchange.
 - Refrigerate immediately after packing.
 - Oranges and Specialty fruit at 40°F.
 - Grapefruit at 45 – 55°F.
 - Minimize degreening time.



Non Fungicidal Measures to Reduce Decay (G.E. Brown. 1988)

- Lower inoculum level in the grove.
 - Minimize deadwood (pruning).
 - Good production practices.
- Good Sanitation in the Packinghouse.
 - Reduces green and blue mold and Sour Rot.
 - Disinfect Packinghouse equipment.
 - Minimize injury to fruit.
- Refrigerate to delay senescence and reduce decay.



Less Degreening is Better

- Peel is more mature.
- Less decay.
- Less peel disorders.
- Better tasting fruit.
- Longer shelf life.
- Satisfied consumer.
- Better grower returns.



Quality Control Rule of Thumb

**Do not pick citrus until
degreening can be
successfully achieved in
48 hours or less**

