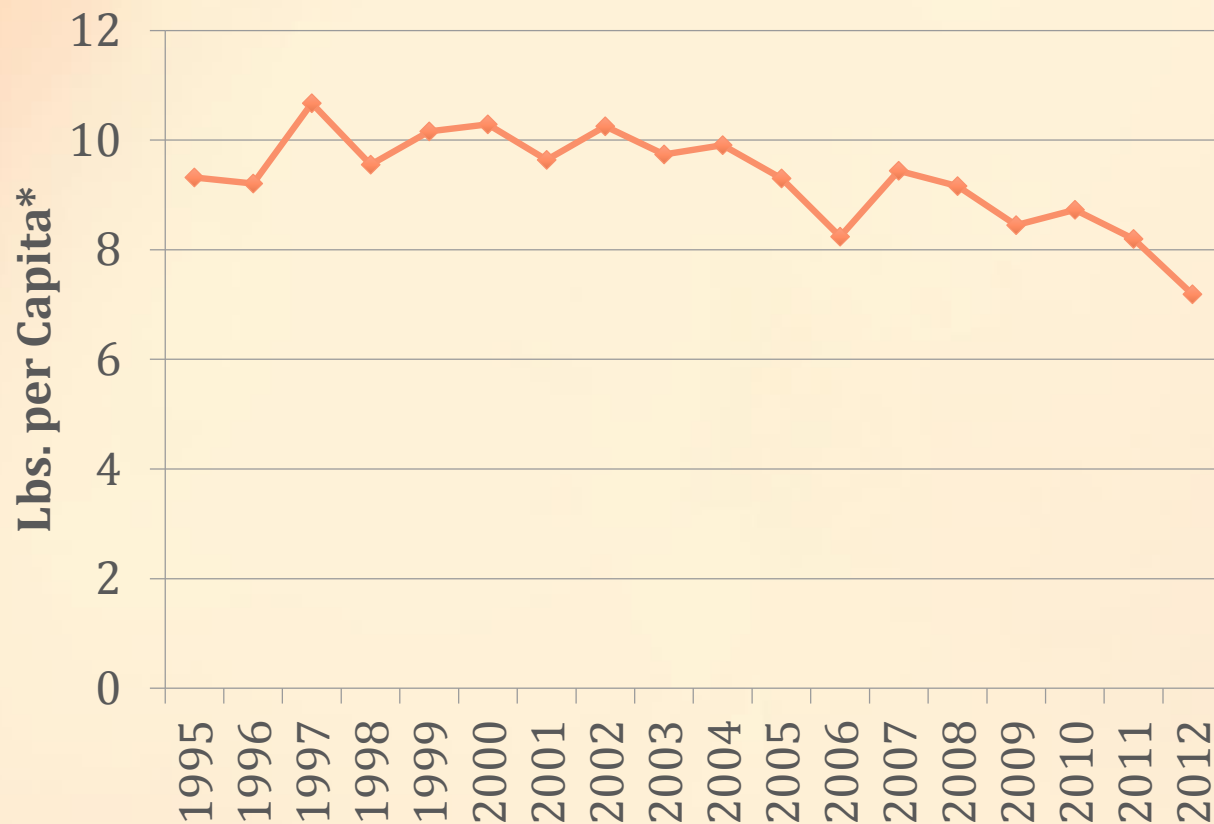




# Peach Production in Florida

Tripti Vashisth and Mercy Olmstead  
Assistant Professor  
CREC UF



- U.S. consumption has stayed relatively flat and is declining.

\*All categories (fresh, canned, dried, frozen)

<http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1377>

# Domestic Consumption

- Other produce categories increase
  - Consumers want finger foods
    - “Lunchbox Apples”
    - Baby carrots, bagged apples, blueberries, pre-cut fruit bowls
- FRUIT QUALITY
  - Consumers want sweet fruit, with characteristic peach flavor
    - 12-16% Soluble Solids Content (SSC, a.k.a. Brix)
    - >13°Brix = threshold for flavor development?
      - Need more research on peach fruit quality!



# Peaches vs. Nectarines

- Peaches = Nectarines!
  - What's different about them?
  - The “fuzz” is one gene difference in the skin
    - Nectarine = recessive for the gene
    - Naturally occurring
- Nectarines tend to be:
  - Smaller
  - More blush on skin
  - Sweeter



# Peach Flesh Types

- Melting flesh focus
  - Juicy
  - Shipping problems
  - Short shelf-life
- Non-melting flesh genes introduced
  - Firmer, tree-ripe
  - Shipping is easier
  - Longer lasting fruit at home
  - Consumer bias (firm=unripe)?
    - Need education on new textures



# What are Florida Peaches?

- Texture
  - Dr. Wayne Sherman brought in non-melting flesh gene
    - Bred fruit that were not rubbery
    - Brought in *HONEY* gene
- Low-chill
  - Peaches are a temperate crop
    - “Up north” vs. FL
    - 100-400 chill units

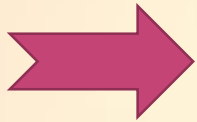


‘UFBest’



# What to Grow?

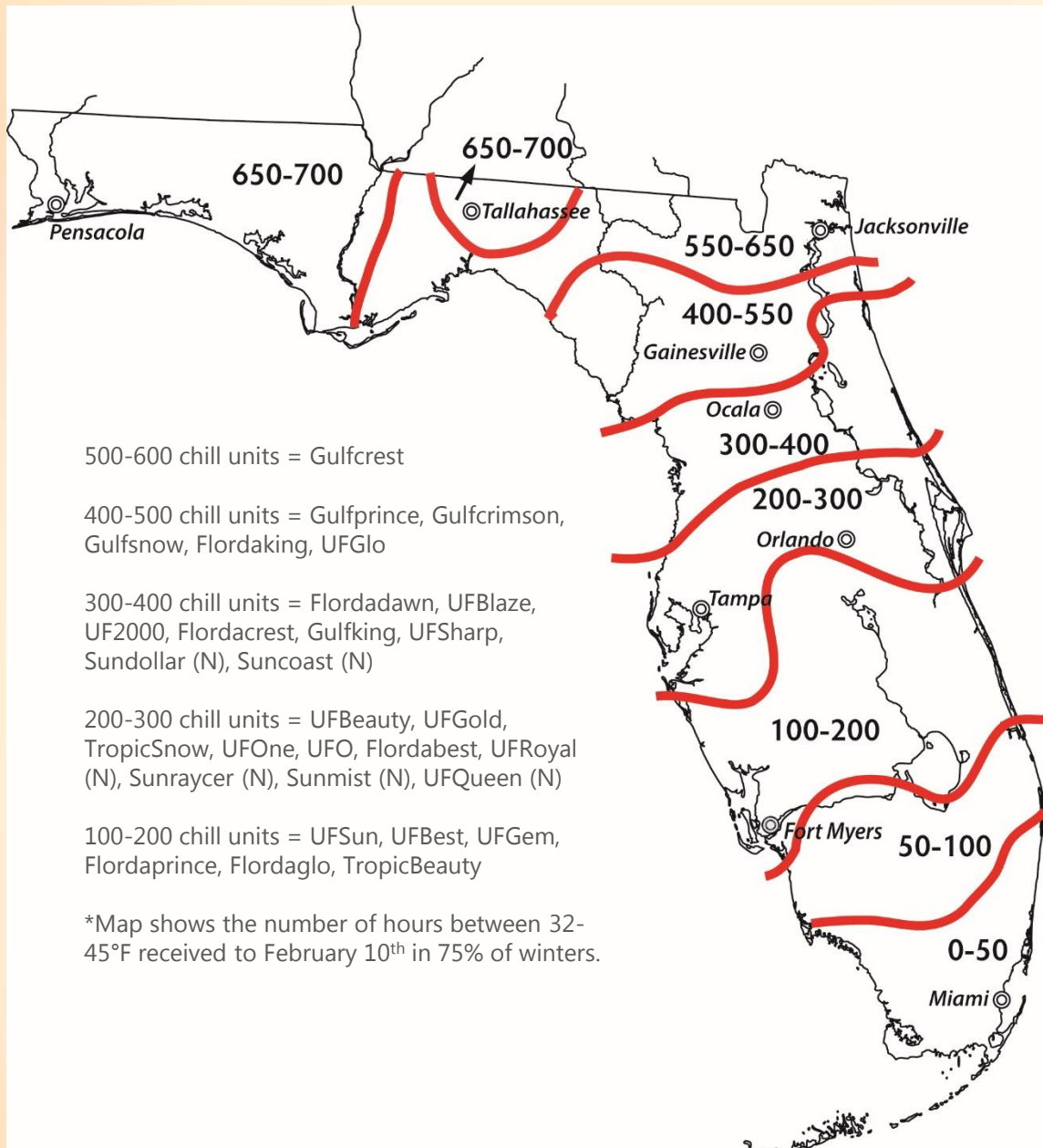
- Peaches, nectarines, and plums
- All need a certain amount of “chill units” even though low-chill varieties have been developed



## How is a unit of chill defined?

- Unit Definition
  - One unit = 1 hour between 37°F and 48°F (Ideal range)
  - Accumulated over a 24 hour period
- Resources
  - AgroClimate; <http://agroclimate.org>
  - Chill Unit Accumulation for past two weeks

# Chill Units and Stone Fruit Varieties

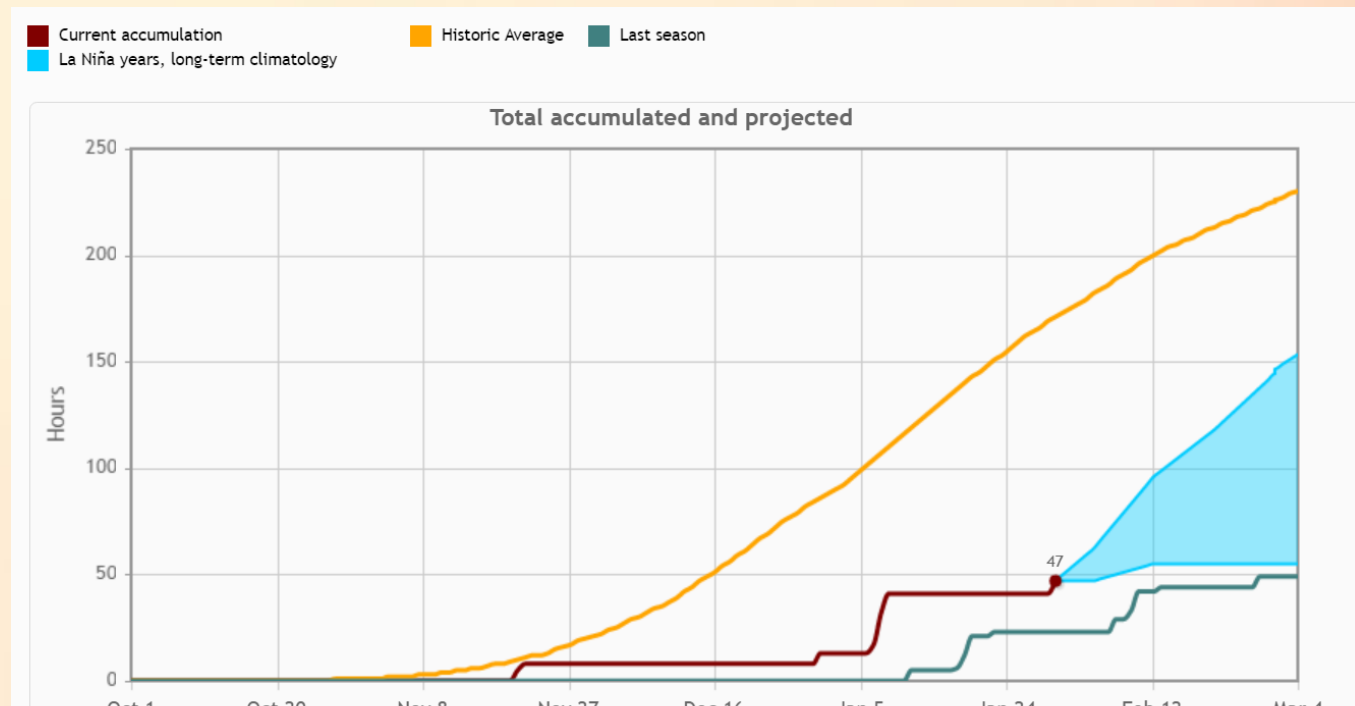


- Plant varieties that are 75% of the total chill unit accumulation to get consistent cropping.



# Chill Hour Requirements

- Peaches need appropriate chill hours to flower and produce commercial yield
- Accumulation of chill hours is one of the biggest challenge for peach production in central and south Florida



# Potential Solutions

- Low chill peaches
- Hydrogen Cyanamide
  - Tropic Beauty on Floridaguard; 4 year old trees
  - HCN (1%) on December 24, 2015



# 17 days post HCN application

HCN



Control



# Cultural Practices

# Planting & Training Systems

- Soil type:
  - Sandy, well-drained soil
  - Ideal pH: 6.5-7.0
- Orchard site may need beds
  - Poor site drainage
  - Should be at least 18" high to facilitate drainage
- Weed-free strip to reduce competition
- Tree guards can be useful for herbicide application



*Hastings, FL*



# Tree Guards



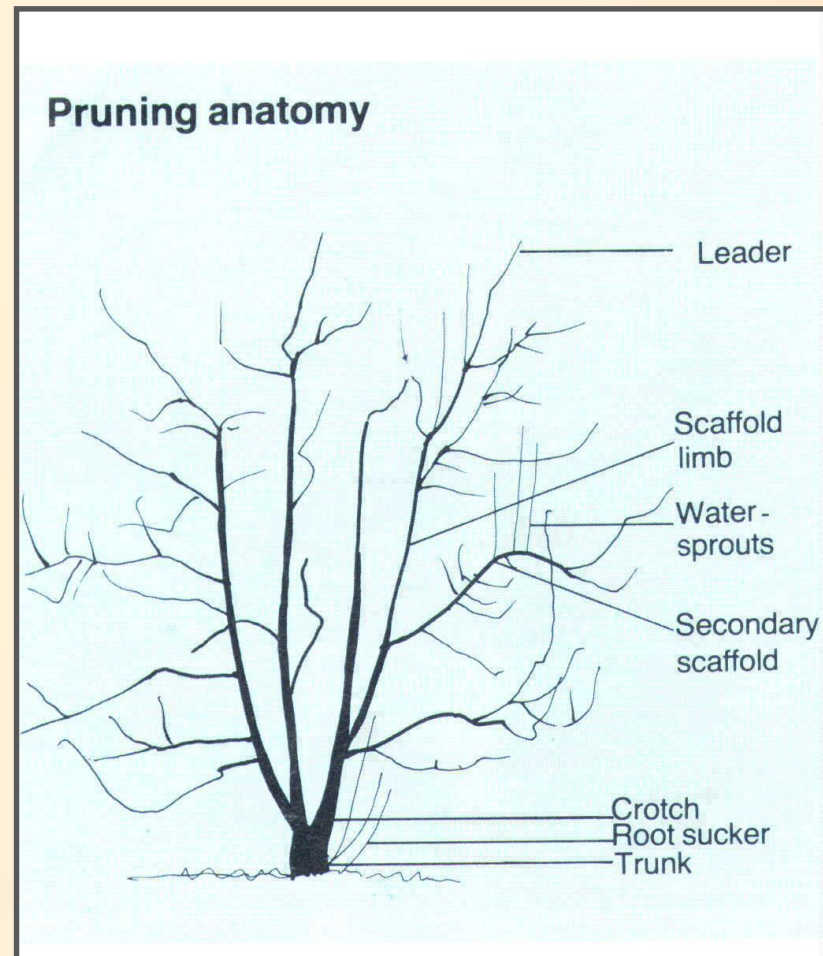


# Tree Densities

Spacing Between Trees	Spacing Between Rows	Total Trees/Acre
15	25	116
15	20	145
10	20	218
10	15	290

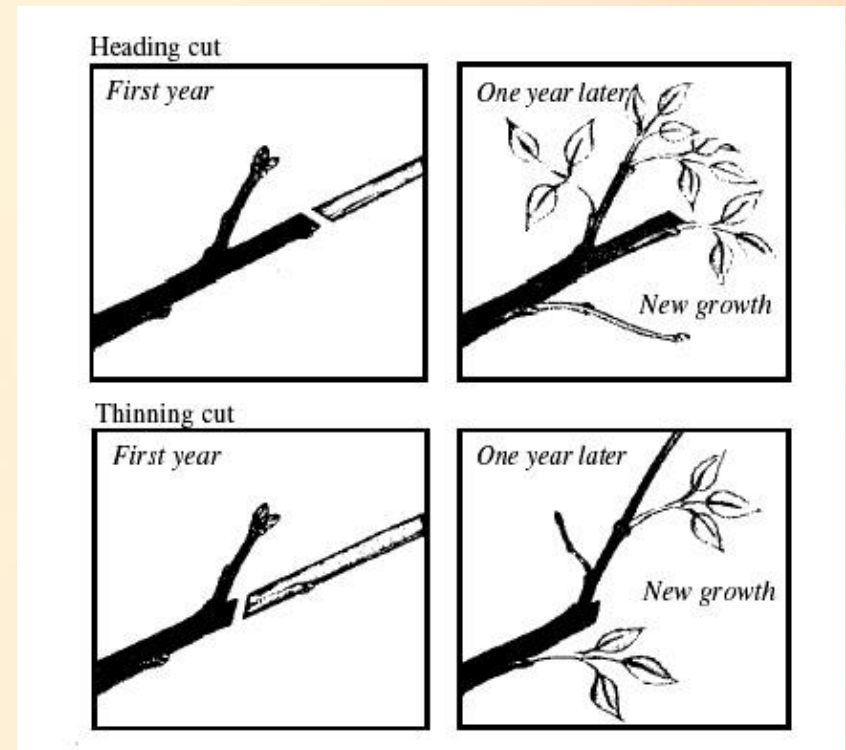
- Take 43,560 (sq. ft. for 1 acre) and divide by spacing between trees
- Then divide by spacing between rows
- 15 x 25 is standard for citrus groves
- 15 x 20 standard for new orchard plantings

# Terminology



# Types of Pruning Cuts

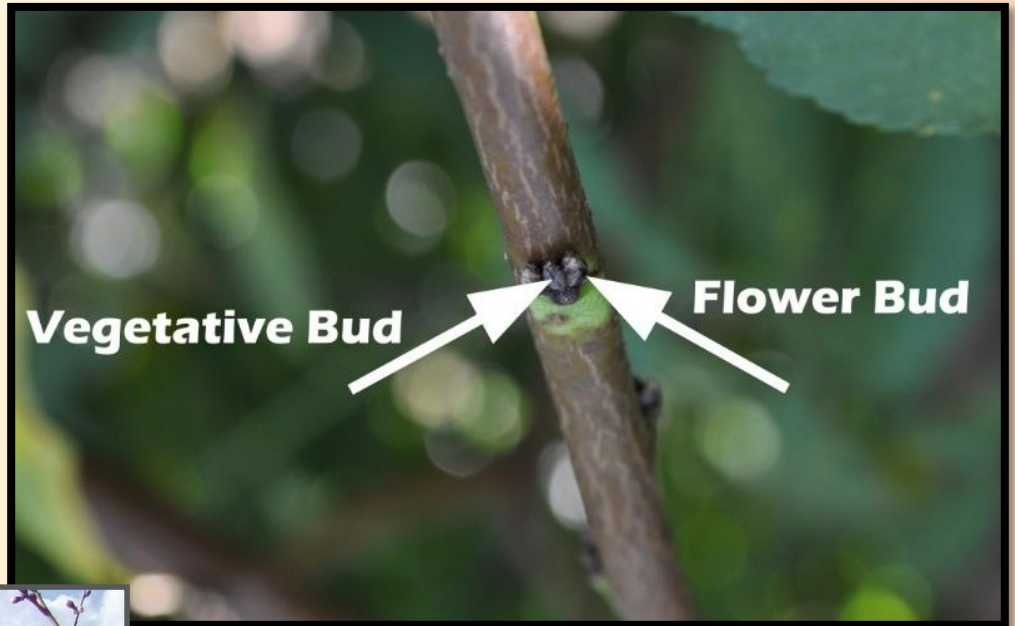
- Heading Cuts
  - Invigorate the tree
  - Increase branching by causing lateral bud break
- Thinning Cuts
  - Reduce branch number
  - Encourage apical shoot elongation



# Pruning Principles for Orchards

- Pruning:
  - Develops strong tree structure
  - Thins buds to achieve yields of high quality fruit
  - Balances cropload with vegetative growth
    - Especially important with short fruit developmental period in Florida (78 days vs. 120 days; temperate climates)
    - Development of good-sized fruiting wood vs. blind wood

# Peach Growth





# Blind Wood



**Blind Wood** = No leaves to support current season's fruit, no buds to produce future shoots

- More prevalent with fast, vigorous growth





Good balance with crop and canopy

Not thinned

Tree on left has ideal cropload and canopy growth

Tree on right has heavy cropload, poor canopy

Thinning and pruning are important for cropload management



# Pruning Principles for Orchards

- Remove diseased or dead limbs
- In Florida, two pruning periods:
  - Winter
  - Summer

*UF2000;  
Botryosphaeria*



# Pruning Principles for Orchards

- Reduces canopy temperature by increasing air flow (directly)
  - Can reduce incidence of doubling fruit



# Open Vase Training System

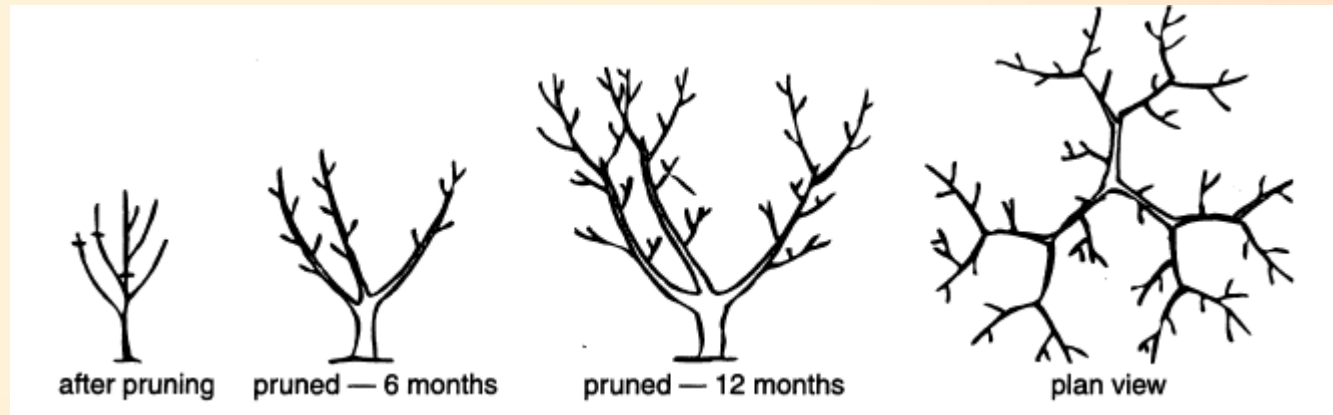
- Traditional System
  - In other locations –6-8 years for trees to fill in spaces
  - Florida = ideal growing conditions with 7-8 feet of growth per year
- Trees trained to 3-4 scaffolds
  - Cover each quadrant to optimize light interception
- Tree height set at 8 feet
  - Optimize activities without use of ladders





# Open vase

- Pruning young trees:



Year 1



Year 2

# Before & After (Winter):





# Before & After (Spring):







# FlordaPrince vs. TropicBeauty



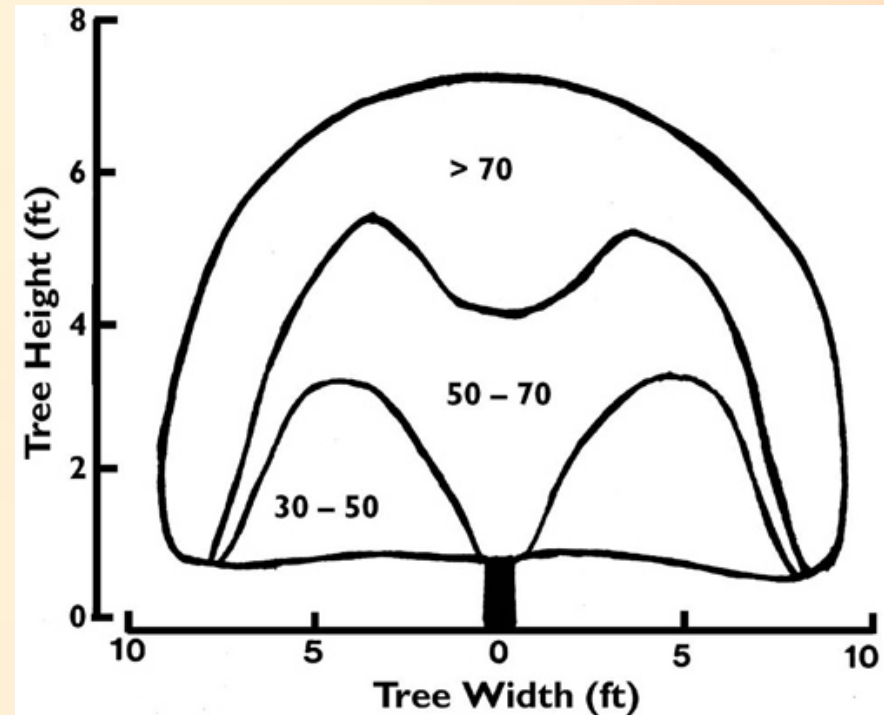
Upright Growth



Semi-spreading Growth

# Open Vase Training System

- Mature trees must be managed to optimize sunlight interception
- Avoid sunburn!!
  - Leave a few upright shoots in canopy center during summer pruning



# Pruning Techniques

- Remove watersprouts
  - Vigorous, upright growth
    - Fruit produced is of poor quality
    - Wide internode spacing
    - Shading for lower branches
- Prune out diseased or dead wood
  - Peach Tree Short Life
    - Unexplained shoot dieback



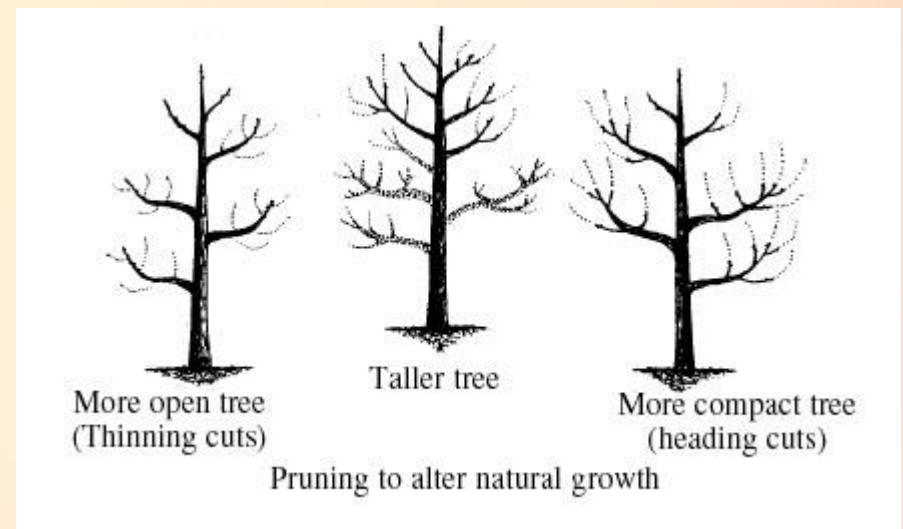
# Pruning Techniques

- Remove limbs or branches that cross
  - These increase shade
  - Can cause mechanical damage on fruit
- Thin canopy
  - Fruit buds require light to develop
    - Excessive shade = higher proportion of vegetative buds
  - Reducing fruiting wood helps to reduce thinning costs



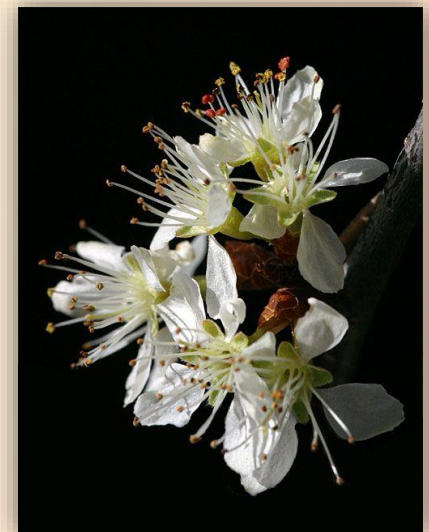
# Pruning Summary

- Prune to maintain productive tree
- Heading cuts can result in thinner fruiting wood
- Thinning cuts should be the majority of those made in each season.



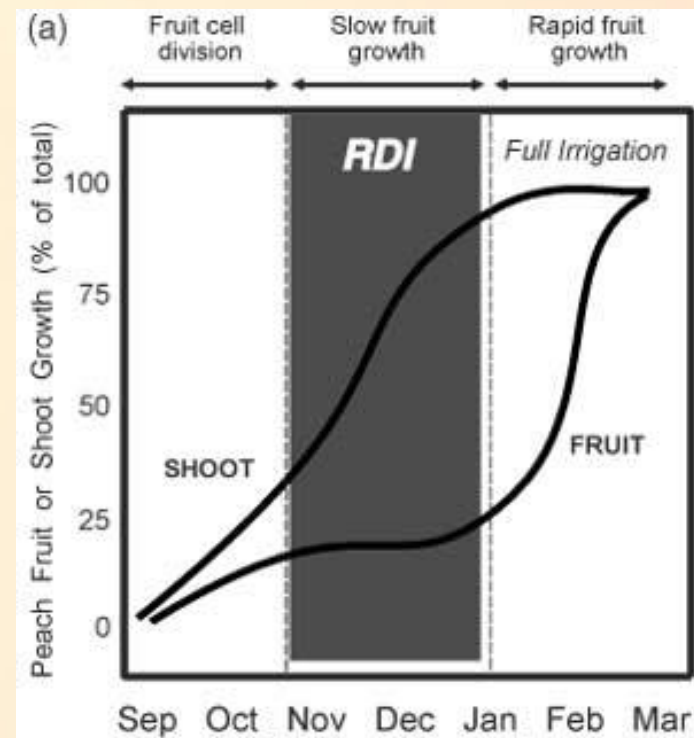
# Peach/Plum Flowering

- Peaches and Nectarines do not need pollinizers
  - They are self-fertile
  - Do not need hives to pollinate
    - Native populations set adequate fruit
- Plums need pollinizers
  - All three varieties can work as pollinizers
    - 'Gulfrose'
    - 'Gulfblaze'
    - 'Gulfbeauty'



# Fruit Growth

- Peaches, nectarines and plums have double sigmoidal growth



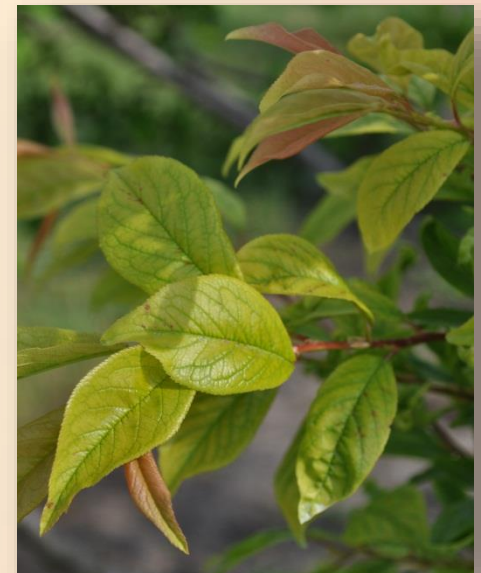
# Fruit Thinning

- Peaches and nectarines must be thinned to get large fruit size
  - Plums only thinned if too heavy for branch
- Should be thinned before pit hardening
  - Otherwise, won't make difference in fruit size
- Thin to at least 6" between each fruit



# Fertilization

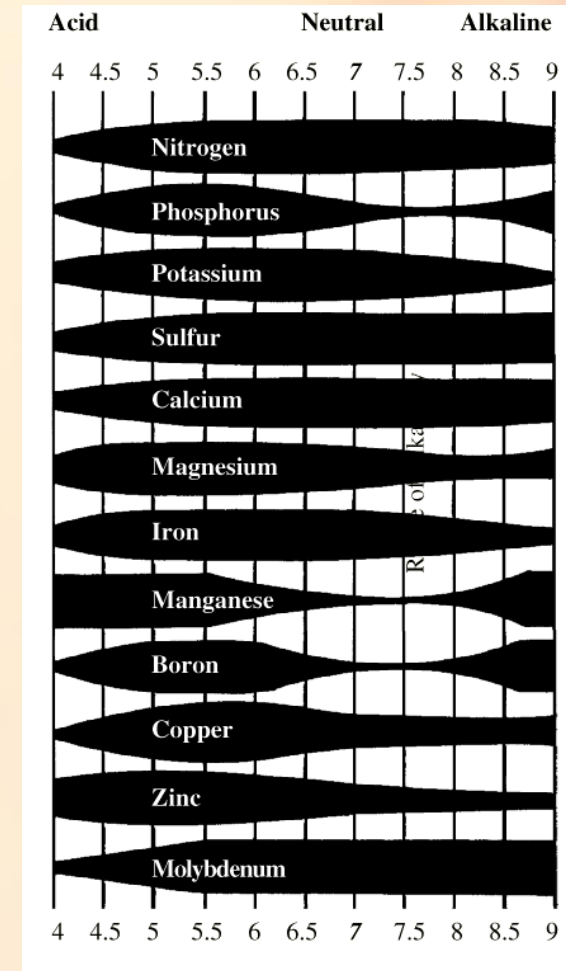
- Use a balanced 10-10-10 fertilizer
  - 1<sup>st</sup> year: 11-12 lbs N/ac
  - 2<sup>nd</sup> year: 26-39 lbs N/ac
  - 3<sup>rd</sup> year: 80-110 lbs N/ac
- Sandy soils: 12-4-8 fertilizer
  - Minimizes potassium and phosphorus leaching
- Zinc deficiency shows up readily in sandy soils with higher pH
  - Plums more sensitive to it
  - Yellowing leaves, green veins, short internodes





# Impact of pH on Nutrients

- pH affects nutrient availability
  - The thicker the bar, the more available the nutrient
- Solutions with high pH water?
  - Acidify the water source
  - Monitor soil pH and acidify as necessary
  - Apply fertilizers with sulfur to bring pH down



# Frost Protection

- Overhead sprinklers
  - Heat lost from the trees is replaced by heat released by water as it turns to ice
  - Water needs to be continuously applied
    - More damage could occur if not continuously applied
  - 1 lb. of water releases 144 BTUs
  - Not recommended when wind speed is over 10 mph.



# Frost Protection

Dry Leaf Temperature (°F)	Wind Speed (mph)					
	0 - 1	2 - 4	5 - 8	10 - 14	18 - 22	30
	Acre-inches per hour needed for freeze protection					
27	0.10	0.10	0.10	0.10	0.20	0.20
26	0.10	0.10	0.14	0.20	0.40	0.60
24	0.10	0.16	0.30	0.40	0.80	1.60
22	0.12	0.24	0.50	0.60	1.20	1.80
20	0.16	0.30	0.60	0.80	1.60	2.40
18	0.20	0.40	0.70	1.00	2.00	3.00
15	0.26	0.50	0.90	1.30	2.60	4.00
11	0.34	0.70	1.20	1.70	3.40	5.00

# Peach Bud Hardiness

Bud Development Stage	1	2	3	4	5	6	7
10% bud kill	18	21	23	25	26	27	28
90% bud kill	1	5	9	15	21	24	25



## PEACHES

Critical Temperatures for Blossom Buds\*

Bud Development Stage	1	2	3	4	5	6	7
Old Standard Temp. <sup>1</sup>	23	---	---	25	---	27	30
Avg. Temp. for 10% Kill <sup>2</sup>	18	21	23	25	26	27	28
Avg. Temp. for 90% Kill <sup>2</sup>	1	5	9	15	21	24	25
Average Date (Prosser) <sup>3</sup>	3/7	3/16	3/19	3/29	4/3	4/11	4/18

\*For Elberta.

<sup>1</sup>Critical temperatures as previously published.

<sup>2</sup>Average temperatures found by research at the WSU Research and Extension Center, Prosser, to result in 10% and 90% bud kill.

<sup>3</sup>Average date for this stage at the WSU Research & Extension Center.

# Organic Production

- Many dooryard growers will not have access to fungicides, insecticides
- Organic production option
- National Sustainable Agriculture Information Service has a resource for organic and low-spray production:
  - <http://www.attra.org/attra-pub/peach.html>



# Peach Diseases and Pests

# 2014 Pest Management Guide

- <http://www.ent.uga.edu/peach/PeachGuide.pdf>

## 2014 SOUTHEASTERN PEACH, NECTARINE AND PLUM PEST MANAGEMENT AND CULTURE GUIDE

Senior Editors: Dan Horton, Phil Brannen, Bob Bellinger, David Lockwood and David Ritchie

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Insect Management – Dan Horton, Donn Johnson and Bob Bellinger  
Weed Management – Wayne Mitchem and David Lockwood

Vertebrate Management – David Lockwood  
Culture – David Lockwood  
Pesticide Stewardship and Safety – Bob Bellinger

### Contributors:

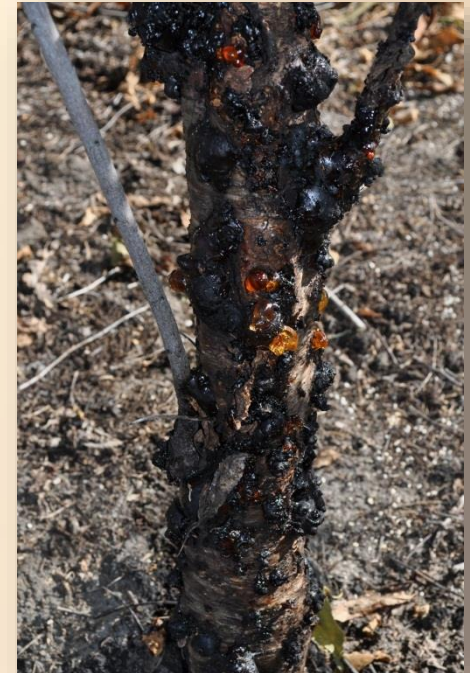
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# Peach Diseases

- *Botryosphaeria dothidea*  
(Fungal Gummosis)
  - Amber colored sap hardens and provides entry for pests and diseases
    - Flordaguard rootstock is highly susceptible
  - Fungicide applications to trunk early (yrs. 1-3) can help to control
    - White latex paint + mildicide is another option
  - Potential rootstocks evaluated for susceptibility



# Peach Diseases

- Peach Scab
  - Common problem in SE U.S.
  - Caused by *Cladosporium carpophilum* Theum.
  - Spots on fruit, lesions on twigs
  - Controlled with fungicides or sulfur
    - Important to control shortly after fruit set and into early part of fruit growth
    - Can affect leaves as well
  - Organic options:
    - Sulfur
    - OxiDate
    - Serenade®





# Peach Diseases

- Bacterial Spot
  - Caused by *Xanthomonas pruni*
  - Indicated by yellow, chlorotic leaves, with lesions
    - Many recently-released UF varieties are tolerant or resistant
  - Nutrient stresses can exacerbate infection
  - Limited control with copper-based sprays (conventional and organic)
    - Beware of Cu toxicity
    - Leaves will drop and exhibit “shot hole”



# Peach Diseases

- Peach Leaf Rust
  - Caused by *Tranzschelia discolor*
  - Visible during the late summer/fall
  - Causes tree defoliation, early bloom in winter
  - Need to keep leaves on as long as possible
    - Growth, develop fruit buds for next season
  - Controlled with fungicides
    - Organic option: sulfur
    - Oxidate
    - Serenade®



Images: <http://ipmimages.com>

# Peach Leaf Rust



# Peach Diseases

- Peach Tree Short Life
  - Possible causes:
    - Cold damage and *Pseudomonas syringae*
    - Nematodes (ring nematode)
  - Growth is delayed in spring, shoot collapse often seen
  - “Sour sap”
  - Phloem, xylem usually dead
  - Sprout back from rootstock
- No known control





# Peach Diseases

- Brown Rot
  - Caused by *Monilinia fruticola*
  - Not as large a problem in Florida due to early harvest
  - Thrives in wet conditions (rain during fruit development)
    - Wet fruit over 10 hours enhances spore germination
  - Controlled with multiple fungicide applications
    - Organic option: sulfur + Surround WP™ (kaolin clay)
    - OxiDate
    - Serenade®



Image: G. England



Image: <http://ipmimages.com>

# Peach Insects

- White Peach Scale
- San Jose Scale
  - Important pest to control
  - Soft chemicals, easy to apply with *dormant* trees
    - Horticultural oils
    - Must be applied at larval stage to be effective
  - Can have up to 4 generations a year
    - Summer cover sprays important



# Peach Insects

- Plum Curculio
  - Resides in wild plum populations around state
  - Remove wild plum trees surrounding new orchard
  - Scout for strikes on fruit – will appear as crescent shaped marks
  - R. Mizell has trap for monitoring
- Controlled with insecticide
- Organic options:
  - Surround WP (Kaolin clay)





# Peach Insects

- Stinkbugs
  - Can cause 'catfacing' of fruit
- Scout for presence, then use control methods
- Control methods:
  - Target sprays between petal fall and shuck-fall
  - Clean row middles (avoid excessive weeds)
  - Carbaryl (Sevin®)
  - Organic options:
    - Trap cropping (direct stinkbugs to alternative crop)
      - Sunflower
      - Buckwheat
      - Sorghum



*Images, R. Mizell, M. Ross, M. Olmstead, UFL*

# Tedders Trap

- <http://ufinsect.ifas.ufl.edu/weevil-trapping.htm>
- Plum curculio (black)
- Stinkbugs (yellow)
- Easy to make or contact R. Mizell (RFMizell@ifas.ufl.edu)





# Peach Insects

- Lesser Peach Tree Borer
  - Affects scaffolds of trees
- Peach Tree Borer
  - Near soil line
- Controlled by insecticides
  - Before fruit set or after harvest
  - Interior white latex paint on trunk (not organically approved)
- New technique coming along for biocontrol
  - Entomopathogenic Nematodes
    - Spray on nematodes and it kills borer larvae
    - Spray on barrier gel to keep moist
      - Barricade Fire Gel
    - Method in development (SE U.S. scientists)



Images: <http://ipmimages.com>

# Peach Insects

- Caribbean Fruit Fly
- Important pest in S. Florida
- Control methods:
  - Scout using McPhail traps
  - Release parasitic wasps
  - Malathion sprays
  - Bait + spinosad (GF-120) can cause markings on peaches
    - Available in organic form (Entrust)



# Spotted Wing Drosophila

- Deposits eggs in and on ripening fruit
  - Large problem in Western U.S. orchards
  - Found in Florida
- Build traps to monitor
  - [http://ipm.wsu.edu/small/pdf/SWD\\_Bulletin\\_Eastern\\_WA\\_v1\\_04.pdf](http://ipm.wsu.edu/small/pdf/SWD_Bulletin_Eastern_WA_v1_04.pdf)



*Image: E. Beers, WSU*



*Trap with optional yellow sticky card inside.*

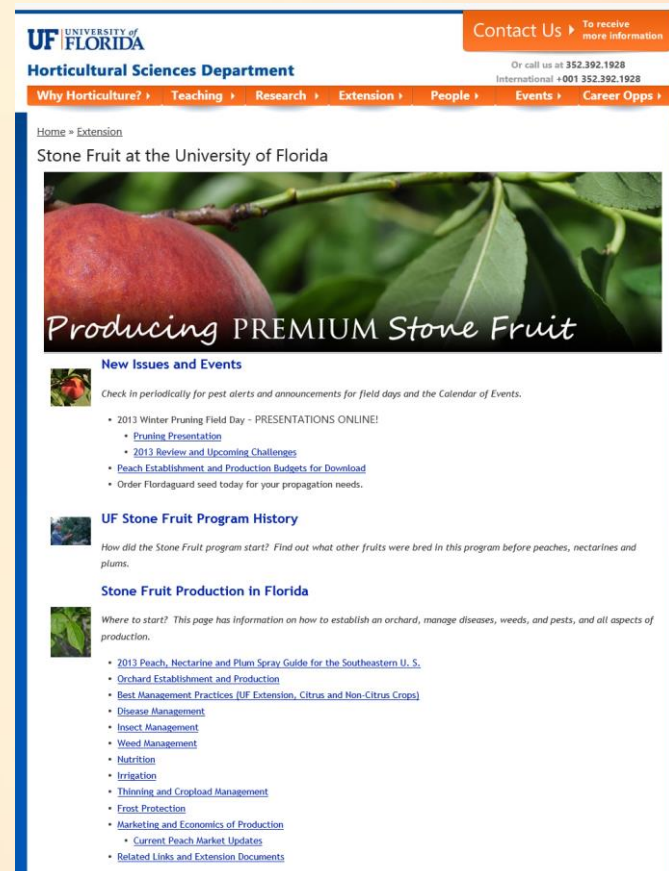
MONITOR

IDENTIFY

CONTROL

# Peach Website

- <http://hos.ufl.edu/extension/stonefruit>
- For more information:
  - Mercy Olmstead  
352-273-4772  
mercy1@ufl.edu



*Questions?*





# Peach Varieties

North Central Florida

# 'Gulf' Series

Cultivar	Release Date	Chill Units Req.	FDP	Flesh Type
Gulfprince	1999	400	110	Non-melting
Gulfcrimson	2009	400	95	Non-melting
Gulfking	2004	400	77	Non-melting
Gulfsnow	2012	400	110	Non-melting
Gulfcrest	2004	525	70	Non-melting

\*\*All of the 'Gulf' series of peaches released in cooperation with USDA-Byron, UFL, and UGA Stone Fruit Breeding Programs



# Nurseries for 'Gulf' Series

- Check the Florida Foundation Seed Producers Website for updated info!
- **Cumberland Valley Nurseries, Inc.**  
<http://fruittreefarm.com/>
- **Freedom Tree Farms, LLC**  
<http://www.freedomtreefarms.com/>
- **Vaughn Nursery**  
<http://www.vaughnnursery.com/>

# ‘UFGlo’

- Non-melting flesh (designated by “UF”, also means its patented)
- 400 chill units
- White flesh
- Trees are vigorous
- Clingstone
- Ripens early to mid-May



# ‘UFSharp’

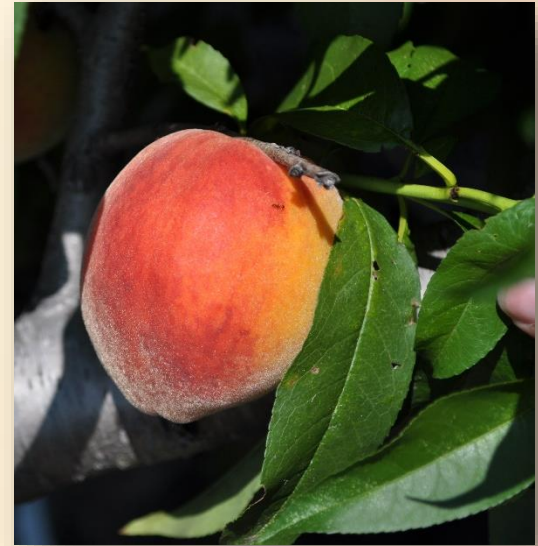


- Non-melting flesh
- 325 chill units
- FDP = 105 days
- Large size fruit, 70% red skin over yellow background
- Clingstone with yellow flesh
- Trees are vigorous with semi-spreading growth



# ‘UF2000’

- Non-melting flesh
- 300 chill units
- Fruit Developmental Period (FDP) = 95 days
- Large size fruit, 50-70% red skin over yellow background
- Clingstone with yellow flesh
- Trees are vigorous with semi-upright growth



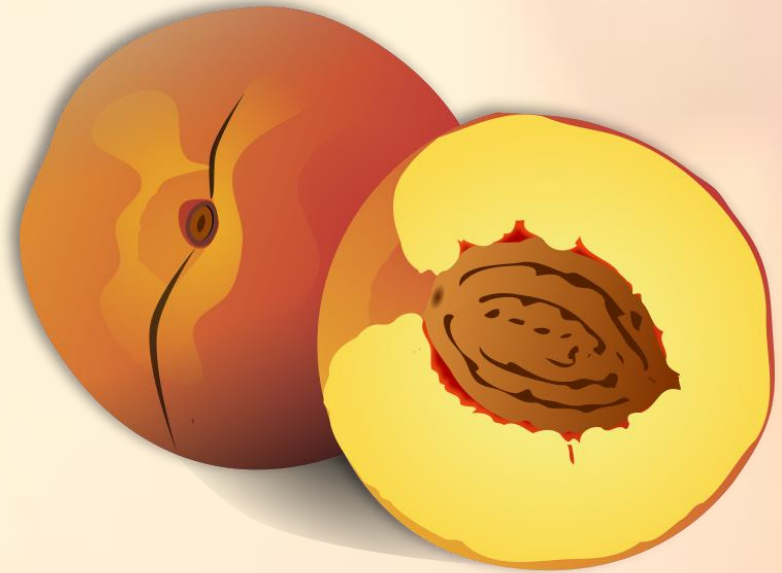
## ‘UFBlaze’

- Non-melting flesh
- 300 chill units
- FDP = 83 days
- Large size fruit, 80-90% red skin over bright orange background
- Clingstone with yellow flesh
- Trees are vigorous with semi-spreading growth



# ‘Flordawn’

- Melting flesh
- 300 chill units
- FDP = 60 days
- Extended period for bloom
  - Good to deal with frost events
- Fruit have 80% red blush over yellow background
- Semi-freestone with yellow flesh
- Trees are vigorous with semi-spreading growth



## ‘UFSun’

- Non-melting flesh
- 100-150 chill units
- Fruit Developmental Period (FDP) = 80-85 days
- Large size fruit, 50-60% red skin with darker red stripes
- Clingstone with yellow flesh
- Trees are highly vigorous with semi-spreading growth



# 'TropicBeauty'

- Melting flesh
- Requires ~150 chill units
- Good flavor
- Yellow background
- Good for local markets





# ‘Flordaprince’

- Melting flesh
- ~150 chill units required
- Green background
- Good flavor
- Good for local markets
- Early ripening (last week of April, early May)



# ‘FlordaGlo’

- Melting flesh
- 150 chill units
- FDP=78 days
- White flesh peach
- 40-50% red skin with white background



# ‘UFBest’

- Non-melting flesh
- 100-150 chill units
- Clingstone pits
- Ripens 1 week earlier than ‘UFSun’
  - Blooms before or with ‘UFSun’
- FDP = 85 days



# Nectarines

Central Florida

# 'Sunbest'

- 225 chill units
- FDP=83 days
- Red skin with yellow flesh
- Semi-freestone
- Ripens in early May
- Trees are of medium size, upright growth





# 'Sunraycer'

- 250 chill units
- FDP=85 days
- Melting flesh
- Semi-freestone
- Ripens in early-mid May
- Trees are of medium size, upright growth



# ‘UFRoyal’

- 250 chill units
- FDP=85 days
- Non-melting flesh
- Red skin with yellow flesh
- Clingstone
- Ripens in early May
- Trees are of medium size, semi-spreading growth

