Florida Stone Fruit – A Taste of Summer in the Spring: Production and Challenges

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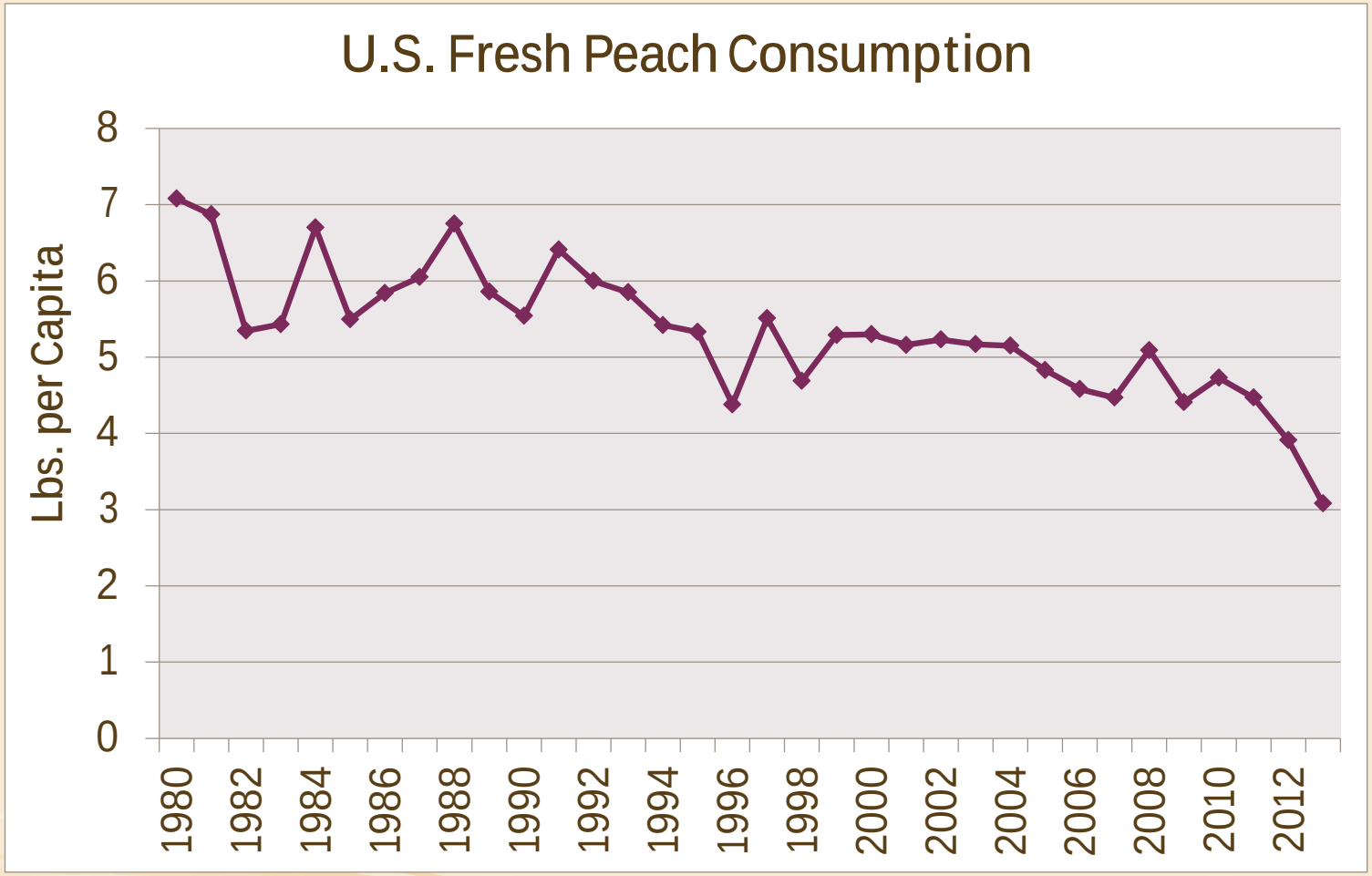
UNIVERSITY of FLORIDA

Domestic Consumption

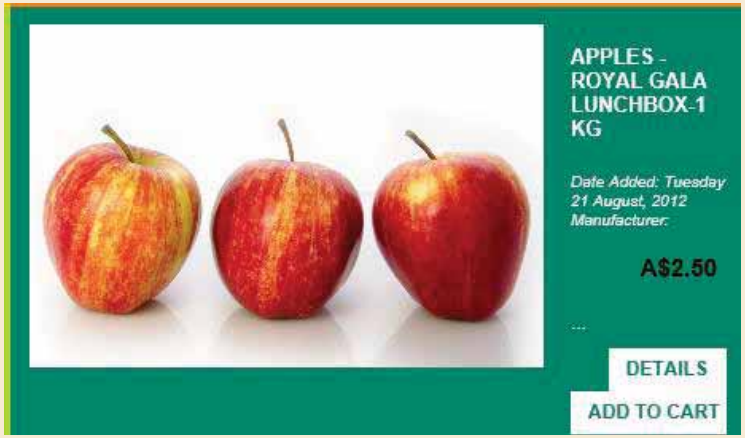


USDA-ERS, 2014

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

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

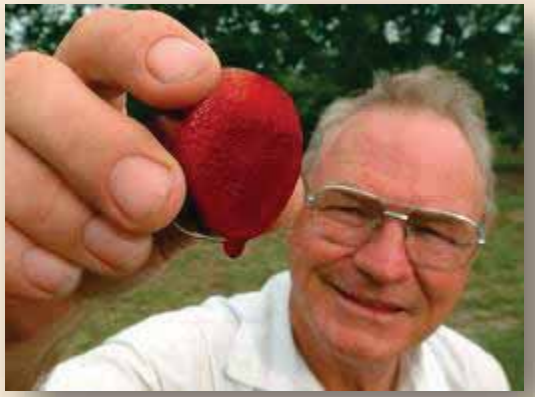
- Peaches = Nectarines!
  - What's different about them?
  - The "fuzz" is one gene difference in the skin
    - Nectarine = recessive for the gene
    - Naturally occurring
- Nectarines tend to be:
  - Smaller
  - More blush on skin
  - Sweeter

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’

Choosing a Site

- Chill Unit Accumulation
- Soil Type
- Irrigation/Fertigation

Choosing a Variety

- Melting/Non-melting
- Market Window

Take a Soil Sample!

- Pre-plant adjustments
- pH (~ 6.5)
- No wet feet!

Planting the Orchard

- Clean cultivation
- Pest/disease management

Peach Orchard Establishment

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

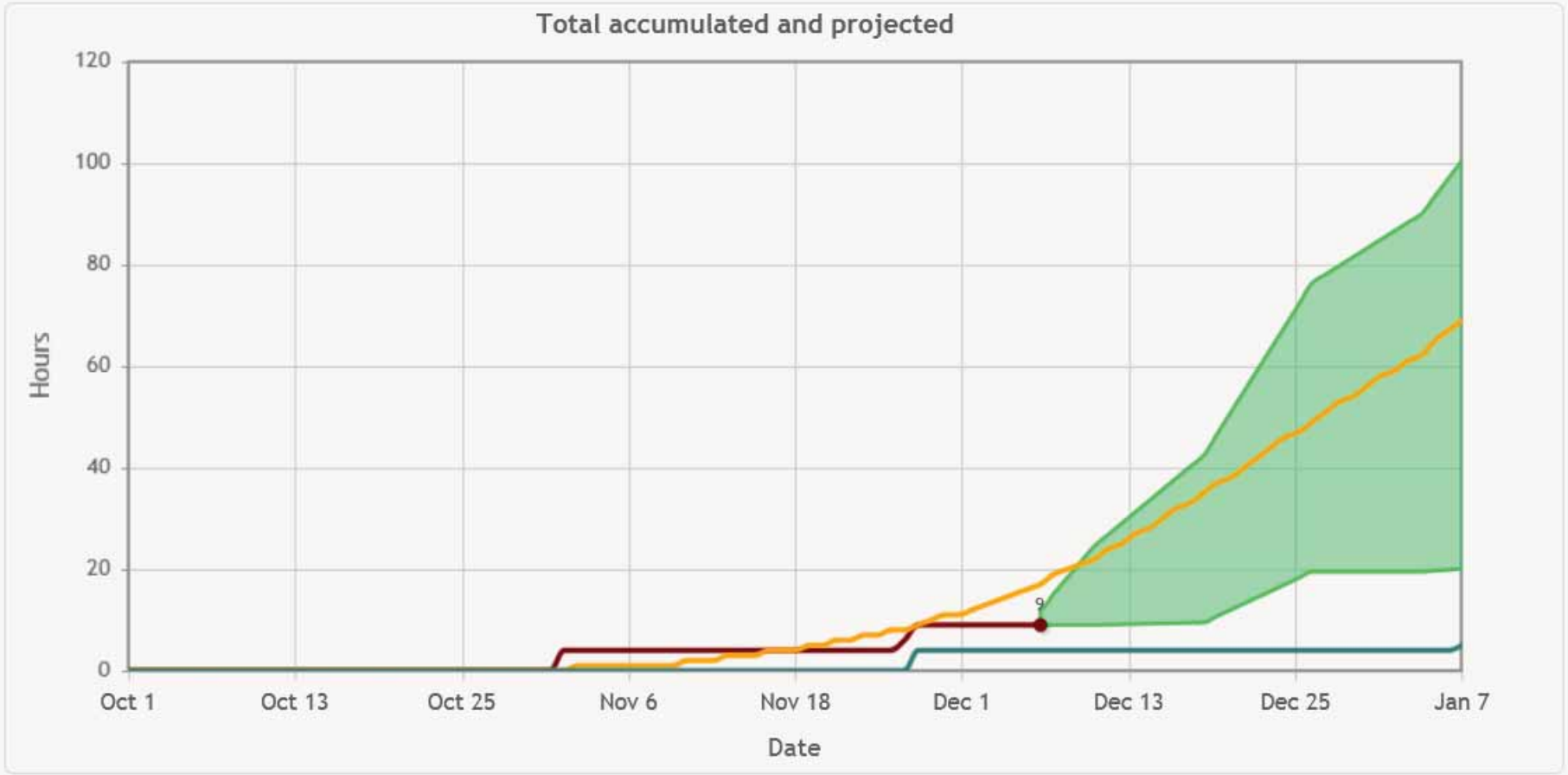
Map | Total Accumulated and Projected | Accumulated by Period

Temperature: 32-45 °F - Collier County (FL)

Period [Oct 1, 2014 - Dec 7, 2014]:		
	This season	9 Hours
	Last season	4 Hours
	Historic average	17 Hours

Download csv file

Current accumulation
Neutral years, long-term climatology
Historic Average
Last season

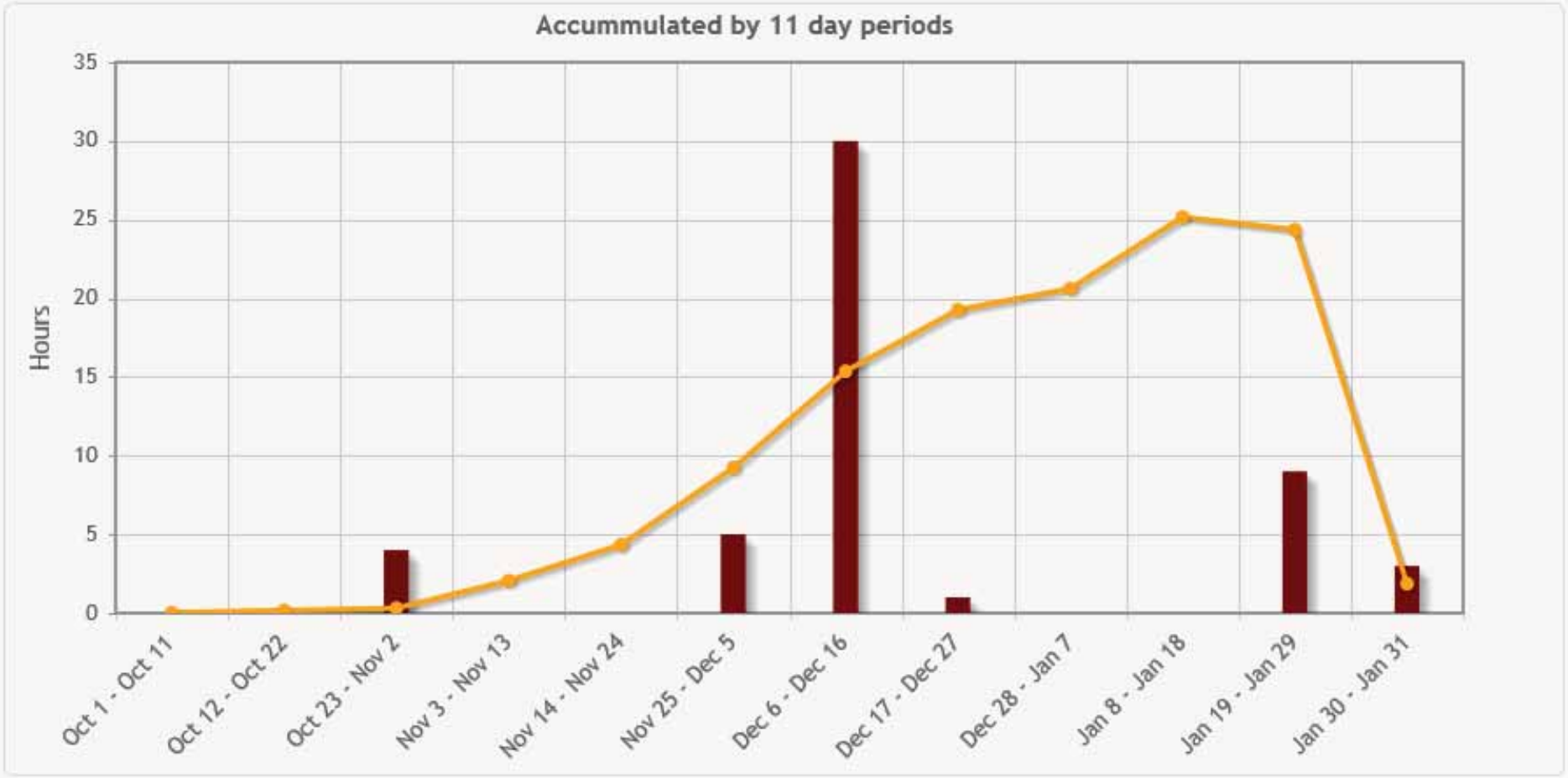


Map | Total Accumulated and Projected | Accumulated by Period

Temperature: 32-45 °F - Collier County (FL)

Period [Oct 1, 2014 - Jan 31, 2015]:		
	This season	52 Hours
	Last season	43 Hours
	Historic average	123 Hours

Current accumulation Historic Average



Historical Chill Unit Accumulation

**Based on hours below 45°F received to Feb. 10th in 75% of the winters

Chill Unit Models

Standard Model

- <45°F

32-45°F Model

- Most common; Agroclimate

Utah Chill Model

- Add or subtract units based on ideal range

2013-14 Chill Accumulation

October 1, 2013 – February 28th, 2014

Model	Citra	Fort Pierce	Lake Alfred
Standard Chill (<45°F)	417	97	85
AgroClimate (32-45°F)	382	72*	144
Utah Chill Model	-1027	-1828	-474
Historical Average (FAWN)	368	224*	209

**Sebring, FL is closest station*

Choosing A Peach Variety

- 75% of historical average in chill unit accumulation
  - 250 seasonal accumulation
    - ~187 units
    - TropicBeauty, UFSun, UFBest, UFGem
- Tree growth habit
  - Planting density

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

FlordaPrince vs. TropicBeauty

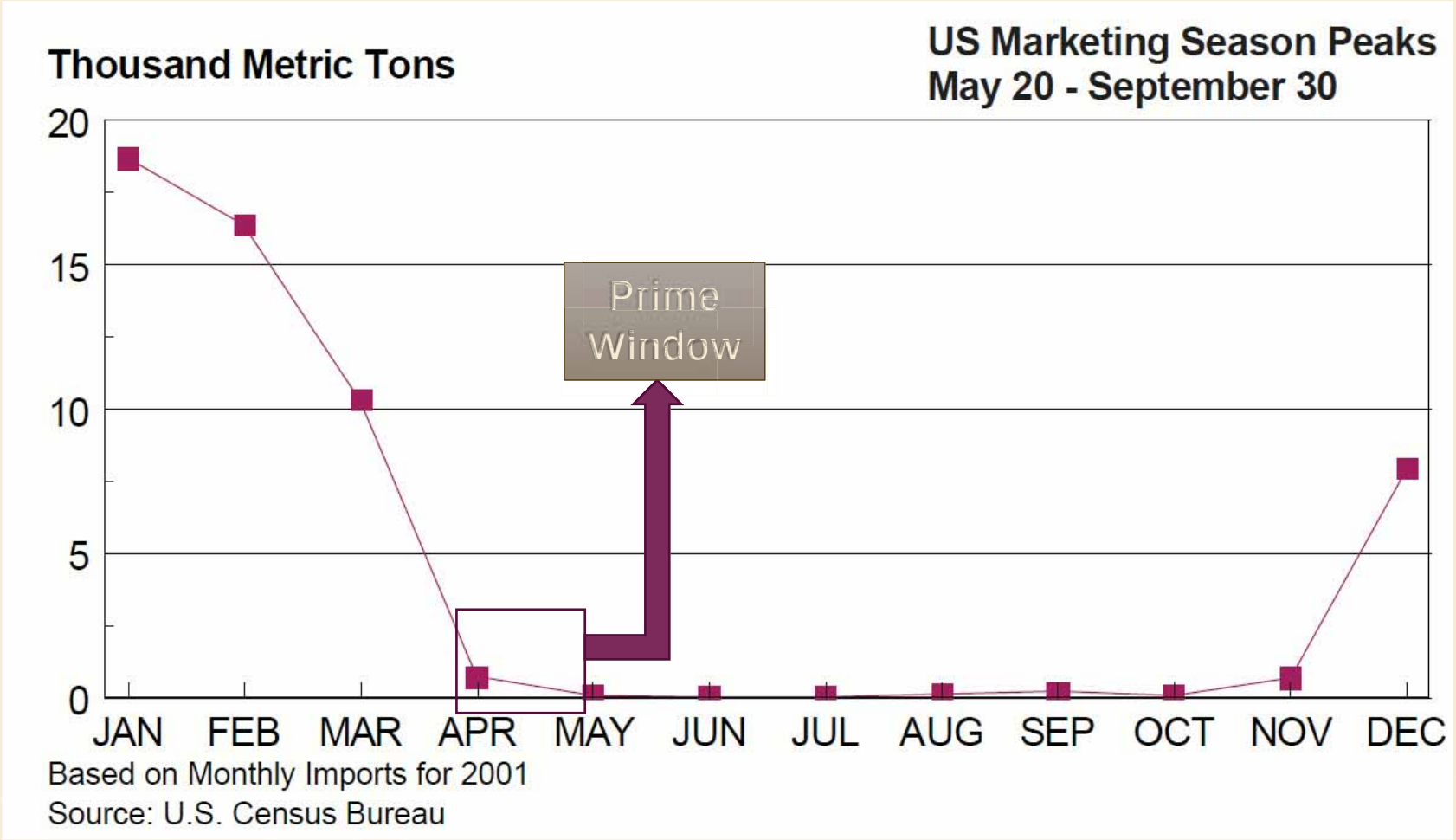
Upright Growth

Semi-spreading Growth

Peach Flesh Types

- Melting texture
  - Juicy
  - Prone to chilling injury (mealiness)
  - Shipping problems
  - Short shelf-life
- Non-melting texture
  - Firmer, tree-ripe
  - Shipping is easier
  - Longer lasting on shelf
  - Consumer bias (firm=unripe)?
    - Need education

Marketing Florida Peaches



UFSun

- Non-melting texture
- 100-150 chill units
- Fruit developmental period (FDP) = 80-85 days
- 50-60% red skin with darker red stripes
- Clingstone with yellow flesh
- Trees are highly vigorous with semi-spreading growth

TropicBeauty

- Melting texture
- Requires ~150 chill units
- FDP = 89 days
- Good flavor
- Yellow background
- Good for local markets

UFBeauty

- Non-melting texture
- 200 chill units
- FDP=82 days
- Yellow flesh with clingstone pit
- Red skin over 90% of fruit with medium large size
- Trees are highly vigorous with semi-spreading nature

Flordaprince

- Melting texture
- 150 chill units
- Good flavor, local markets
- Early ripening (last week of April)
- FDP = 78 days
- Upright, semi-vigorous growth

Cultural Practices

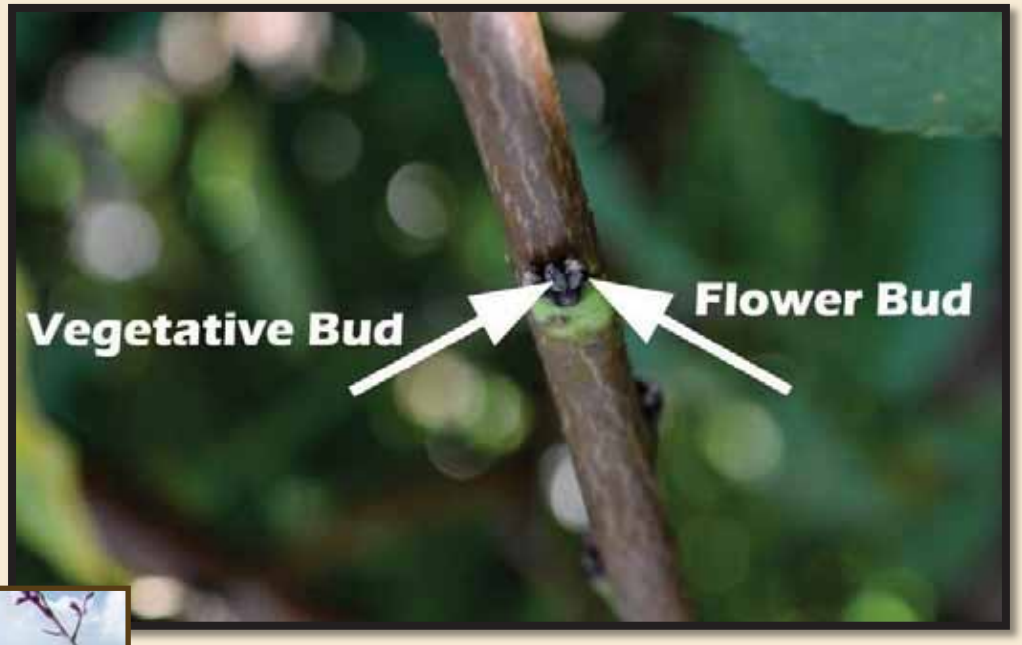
Planting & Training Systems

Hastings, FL

- 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

Tree Guards

Peach Growth



Blind Wood

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

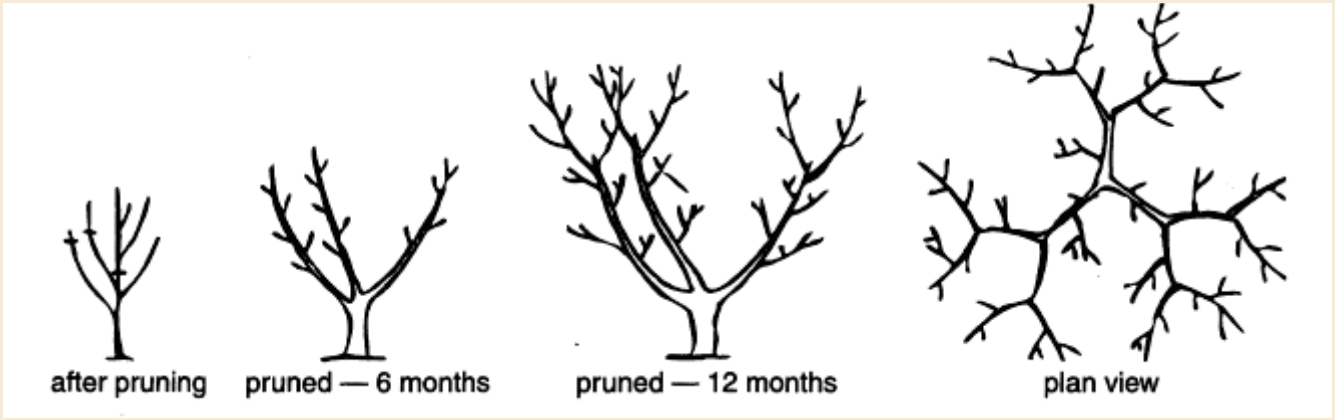
- More prevalent with fast, vigorous growth

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):

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Perpendicular-V High Density

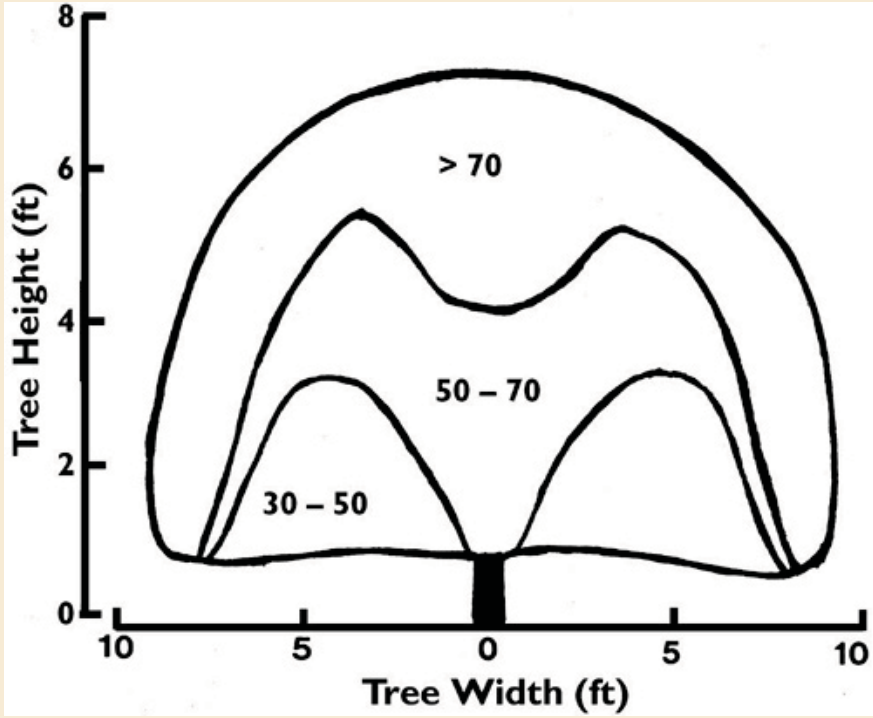
FlordaPrince vs. TropicBeauty

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



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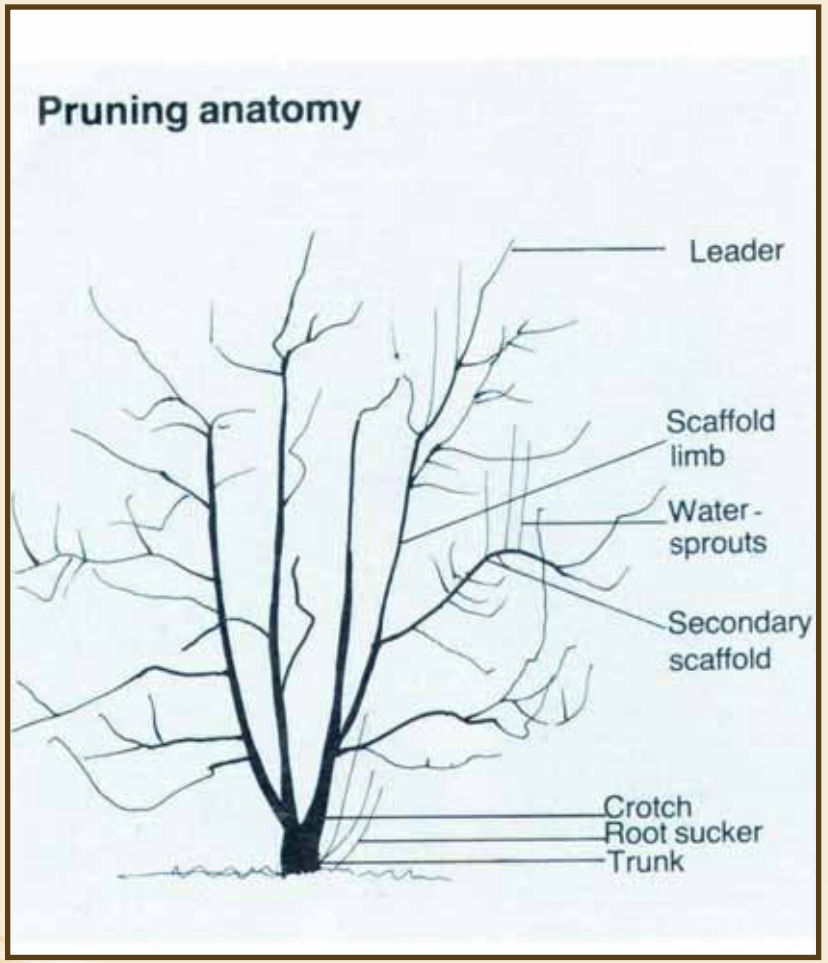
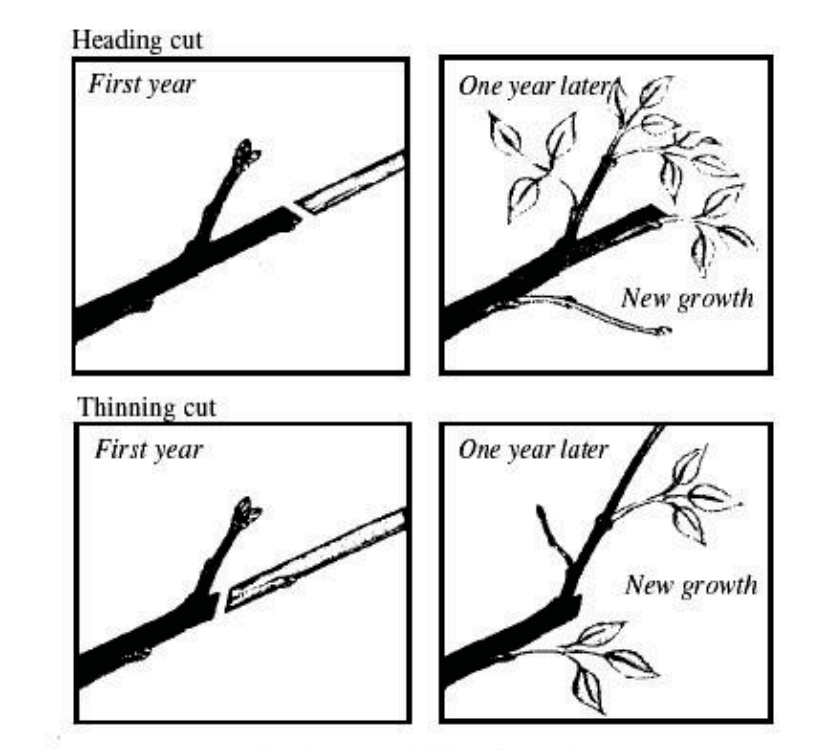
Pruning Terminology



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

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

Pruning Techniques

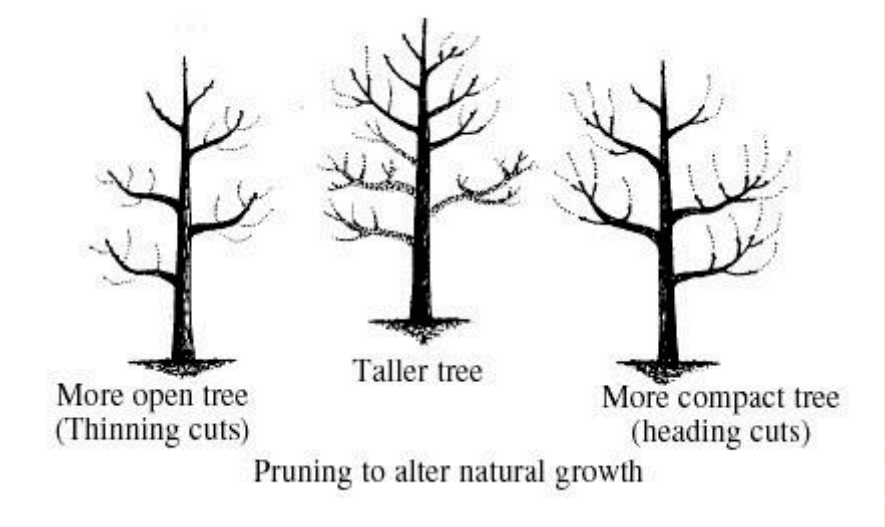
- Remove watersprouts
  - Vigorous, upright growth
    - Fruit produced is of poor quality
    - Wide internode spacing
    - Shading for lower branches
- Prune out diseased or dead wood
  - Peach Tree Short Life
    - Unexplained shoot dieback

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.



Pruning to alter natural growth

French and Appleton, Virginia Tech Cooperative Ext. #430-456

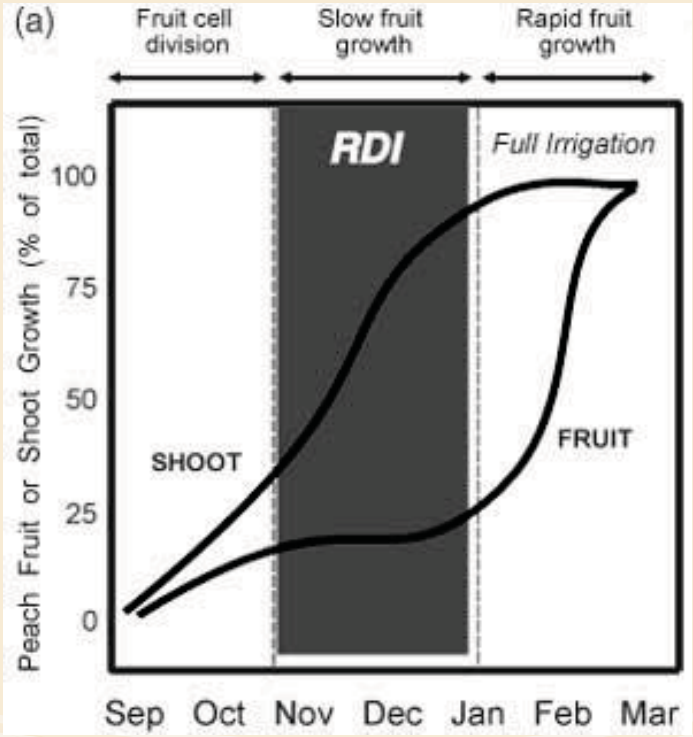
Peach/Plum Flowering

- 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

Tree on left has ideal cropload and canopy growth

Tree on right has heavy cropload, poor canopy

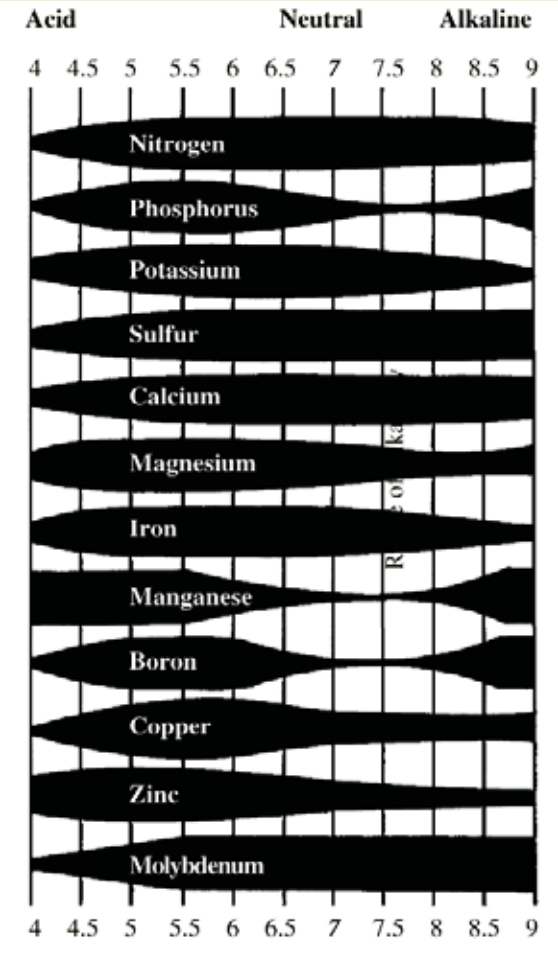
Thinning and pruning are important for cropload management

Fertilization

- Use a balanced 10-10-10 fertilizer
  - 1st year: 11-12 lbs N/ac
  - 2nd year: 26-39 lbs N/ac
  - 3rd 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

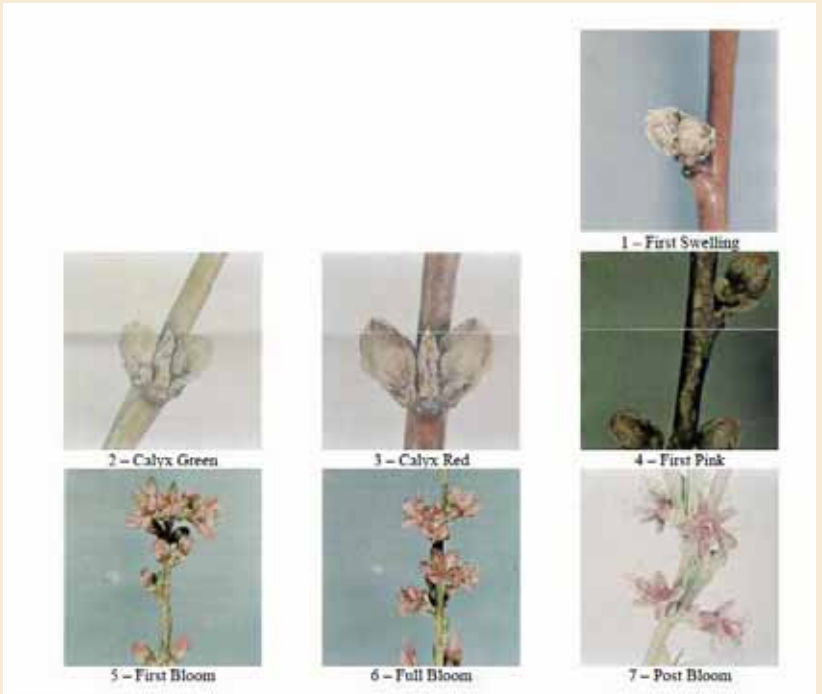
Impact of pH on Nutrients

- 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



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.[1]	23	---	---	25	---	27	30
Avg. Temp. for 10% Kill[2]	18	21	23	25	26	27	28
Avg. Temp. for 90% Kill[2]	1	5	9	15	21	24	25
Average Date (Prosser)[3]	3/7	3/16	3/19	3/29	4/3	4/11	4/18

*For Elberta.

[1]Critical temperatures as previously published.

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

[3]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

2015 Pest Management Guide

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

2015 SOUTHEASTERN PEACH, NECTARINE AND PLUM PEST MANAGEMENT AND CULTURE GUIDE

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

Section Editors:

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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, Dario Chavez and Juan Carlos Melgar
Pesticide Stewardship and Safety – Bob Bellinger and Milton Taylor

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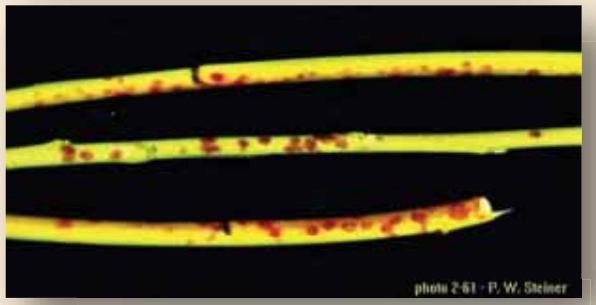
Design and Copy Editor: Terry All

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 carpophilium* 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®



Images: http://ipmimages.com

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”

Images: http://ipmimages.com

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

Image: http://ipmimages.com

Peach Diseases

- Brown Rot
  - Caused by *Monilinia fruiticola*
  - 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

Image: E. Beers, WSU

- 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

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

Lastly…

- Who is your consumer?

Farmers' Market

Big Box Store

Local Grocery Store


Questions?