

Growing Fruits and Berries

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Growing Fruits and Berries: Secrets to Success

Before Planting

- Deciding which fruits to grow
- Selecting varieties
- Selecting the site
- Preparing the soil



Growing Fruits and Berries: Secrets to Success

After Planting

- Providing water and nutrients
- Pruning
- Pest and disease management



Plan for these before planting!

Growing Fruits and Berries: A labor of love!

- **Long term relationship that takes work!**
- **Some fruits require more care**
 - More pest issues
 - More pruning
- **Some more reliable**
 - Less likely to bloom too early
 - Better adapted to climate



What Are the Possibilities?

Tree Fruit

- Figs (E)*
- Asian Persimmon (E)*
- Pears & Asian Pears (M)*
- Plums (M)
- Apples (M/D)
- Peaches (D)
- Nectarines (D)

Grapes and Berries

- Blueberries (E)*
- Blackberries (E)*
- Strawberries (E)*
- Muscadines (M)*

E = Easy, M = Moderate, D = Difficult
* = Best choices for organic production



Forbidden Fruit

Not adapted to NC:

- **Apricots**
- **Cherries**
- **Grapes** - except muscadine
- **Citrus** - except in containers
 - Mandarin (Satsuma & Tangerines) and Kumquats are hardiest but still need winter protection here
- **Bananas**
 - Would have to protect stem through winter to get fruit



Worth a try??

- **Raspberries** - will be short lived
- **Hardy Kiwifruit**
 - Vigorous vines
 - need male and female
- **Pomegranate**
 - set few fruit in SE
 - Hardy zone 7b



Hardy Kiwifruit

Less Common Fruits

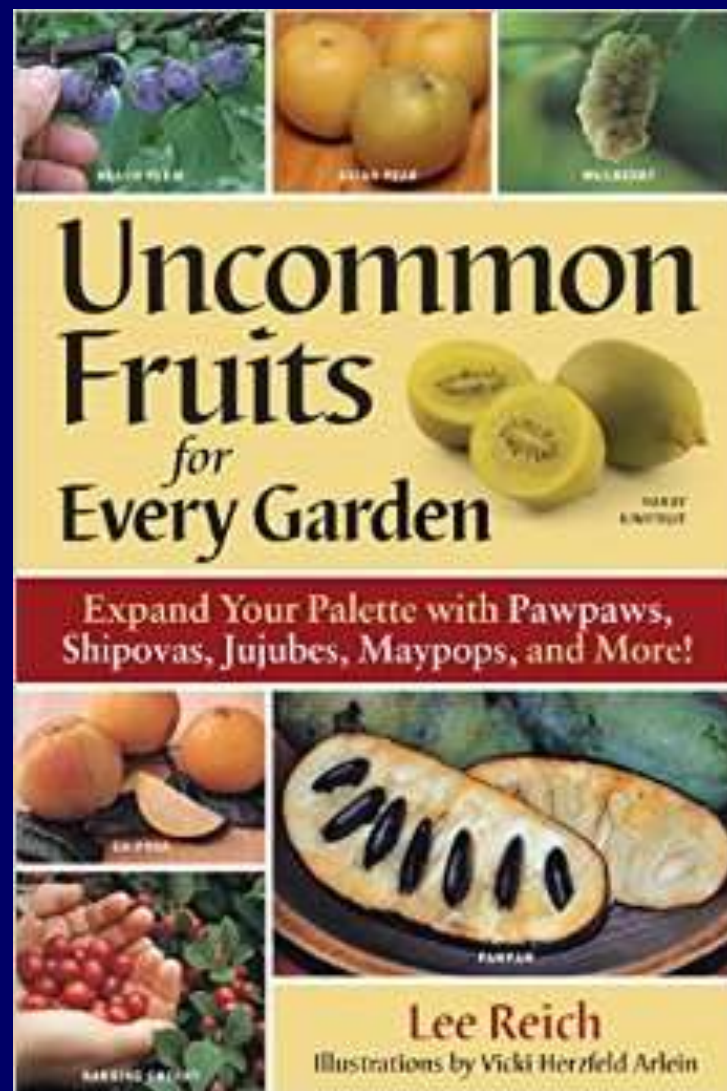
- **Pawpaw**, *Asimina triloba*
 - Rich, moist soil
 - Part sun
 - Deer resistant!
- **Serviceberry**, *Amelanchier*
 - Moist, well drained soil
 - Sun – pt. shade
 - Rust can be a problem
- **Both are native small trees**
- **Challenge:** harvest fruit before wildlife gets it!



Less Common Fruits

- Elderberry
 - Grow native species, large shrub
- Mulberry
 - Grow native species, large tree
- Jujube
 - Very drought tolerant, small tree

Challenge: Finding plants



Selecting Varieties

- Named selections, such as 'Premier' Blueberry
- **Extremely important to select varieties recommended for our region**
 - Chill hours
 - Disease resistant
- **Need more than one named variety for pollination of some fruits**



Varieties and Chilling Hours

- **Chilling Hours**
Number of hours
between 32° - 45
°F needed to
develop flower
and leaf buds
- Central NC
averages
800-1000



Choose Adapted Varieties

- Low chill varieties (200-600) will break dormancy too early – blossoms likely frost killed
- High chill varieties (over 1200) will not receive adequate chilling most years to develop flower buds



Pollination

Need Cross Pollination*

- Apples and Pears
- Plums
- Muscadines
- Blueberries
- Persimmon



Self Fruitful

- Peaches and Nectarines
- Strawberries
- Blackberries
- Figs

* Some varieties may be self fruitful though higher yields result from cross pollination

Fruits result from flowers;
Fruits contain seeds;
Bees make it possible!



Protect Pollinators!

- Flowers are pollinated by honeybees and native bees
- Bees are very sensitive to insecticides, even organic products
- Never apply insecticides when fruit trees are in bloom



Orchard Mason Bees

What to Grow?

Must also consider site conditions:

- Sun/shade
- Soil drainage
- Soil pH
- Available space – especially if 2+ varieties needed for pollination



Site Selection: Sunlight

- **At least 8hrs day**
- The **sugars** stored in fruits are created in the leaf by the process of photosynthesis
- Sunlight is the energy source for photosynthesis



More sunlight =
more fruits + sweeter fruits

Site Selection

Essential for Success:

- Good Drainage!!!
- **Correct pH** – soil test!
 - Blueberries – acid 4.5 - 5.8
 - Strawberries – 5.5 – 6.5
 - Others 6.0 – 6.5



Avoid areas where water stands after rainfall

Site Preparation

- Lime increases pH – makes soil less acidic
- IF lime needed to raise pH, **MUST incorporate BEFORE PLANTING**
- Also true for phosphorus



Soil Testing

- Only way to get accurate recommendation for lime (based on pH) and nutrients
- \$4 per sample, Dec-March
- No charge April-Nov
- **SOIL TEST BEFORE YOU PLANT!**



Collect several samples
from planting area

Soil Testing

- Boxes and forms available tonight
- To submit before March 31, mail to NCDA – Raleigh, with \$4/box fee

Spring Soil Test Drive:

- Or bring completed samples to Extension between March 1 – April 7 and we will deliver week of April 10
- Samples from Chatham County, submitted by resident/land owner

Site Preparation

- Incorporate 2-4" layer of compost into top 6-10"
- Mounded bed, 6"-12" high, 4' wide
- No weeds or grass in the bed





After Planting: Nutrients and Water

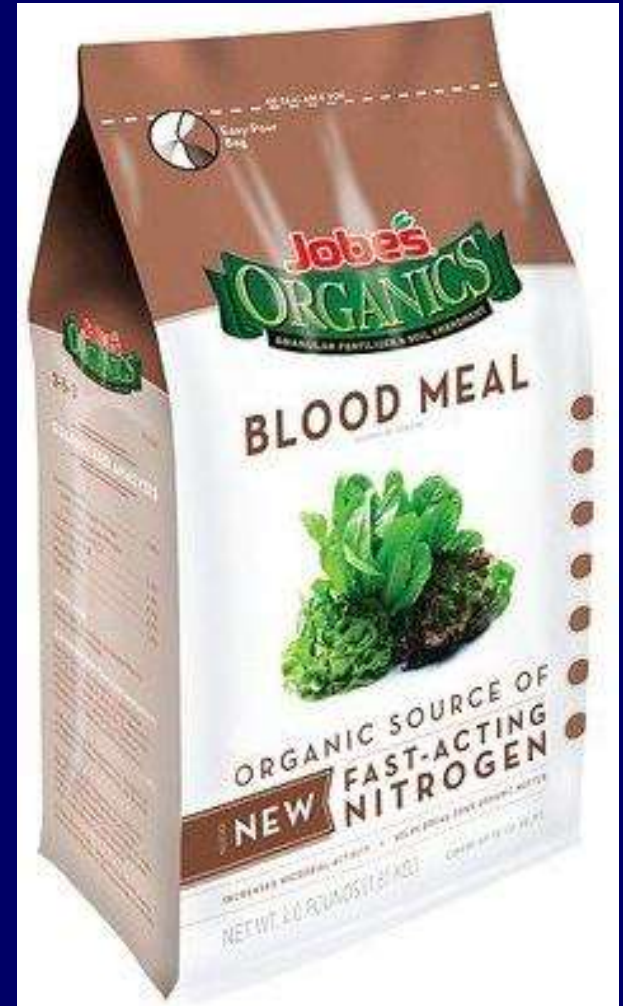
- **Fruits = 80% water** - Regular watering is essential for high yields. ~ 1" per week during growing season
- Drip irrigation or soaker hoses (short term) ideal



After Planting:

Nutrients and Water

- Incorporate lime and nutrients before planting based on soil test recommendations
 - Soil test every 3-4 years to monitor nutrient levels
- Most fruits need annual nitrogen applications in spring
 - Blood meal, 12-0-0 – organic N source



Training and Pruning

Essential for health and productivity

- **Training** = establishment of initial framework during first 3-5 years
- **Pruning** = annual pruning to maintain shape

Essential tools
(top-bottom):
Pruners, loppers, folding
hand saw



Training and Pruning

Pruning needs vary

- Strawberries = none!
- Figs, blueberries, blackberries = little
- Pears, plums = moderate
- Apples, peaches, muscadines = A lot!



Support Structures

Some fruits need support structures:

- Muscadines
- Blackberries
- Kiwifruit
- Construct structure before planting



Managing Pests

Most feasible to grow organically:

- Figs
- Blueberries
- Muscadine Grapes
- Blackberries
- Strawberries
- Pears
- Persimmon



Pest Management

To minimize pest problems:

- Choose disease resistant varieties whenever available
- Provide optimum growing conditions – Water and nutrients, soil pH
- Correct site selection (sun, good drainage)



Cedar Apple Rust

Some varieties resistant; Remove all red cedar within ½ mile

Pest Management

To minimize pest problems:

- Prune for good light and air penetration
- Sanitation!!!
 - Collect and destroy diseased leaves, stems, fruit
 - Always remove 'mummies'
 - Keep ripe fruit picked

Remove
mummy
fruit!



Pest Management

- Spray schedules usually necessary for apples, peaches/nectarines, and plums
- **Timing based on development stage**
 - Begin at petal fall and continue every few weeks to harvest
- Follow all label directions when applying any pesticide (organic or synthetic)



Codling Moth larvae
– Adult moths lay eggs in small developing fruits

Protect Pollinators

Never apply insecticides
when fruit trees are in
bloom



Pest Control Wildlife

- Deer
 - Electric fence, OR
 - 8'+ all the way to ground
- Birds
 - Netting
- Squirrels
 - Good luck!
 - Plant extra



Netting to keep birds
out of strawberries

Requirements and Considerations for Commonly Cultivated Fruits



Blueberries

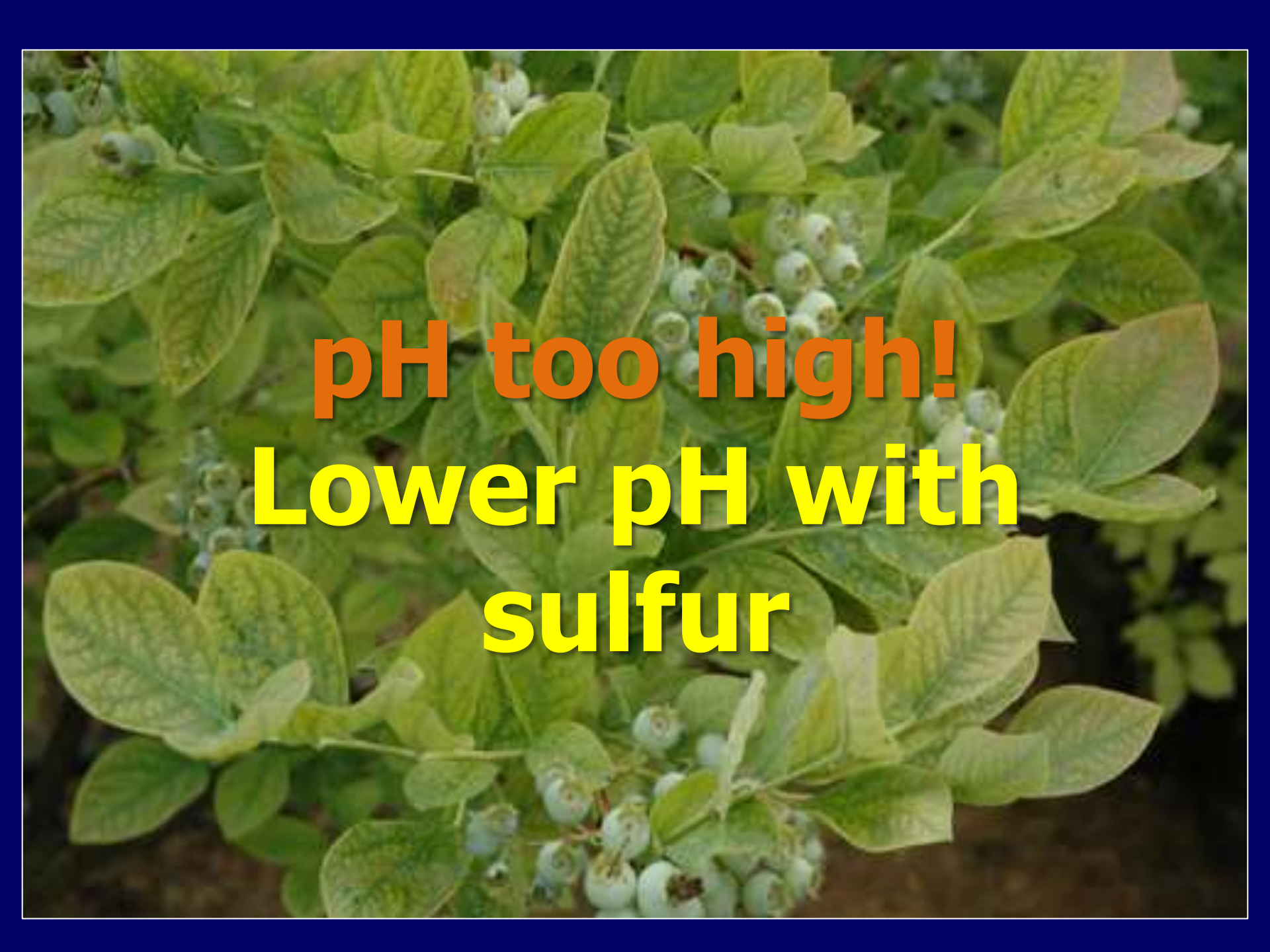
- One of the easiest fruits to grow organically
- Native to SE USA
- Begin producing in 3 years, remain productive 20+ years
- Tolerate part shade but yields will be lower



Blueberries

- Require Acidic Soil:
pH 4.0 – 5.5
 - Soil test before planting!
- Grow in mounded beds for drainage
- Amend with pine bark soil conditioner
 - pH of commercial compost too high



A close-up photograph of a blueberry plant. The image shows several clusters of small, white, bell-shaped flowers hanging from the branches. The leaves are green, oval-shaped, and have a slightly waxy texture. The background is a solid dark blue color.

pH too high!
**Lower pH with
sulfur**

Blueberry Types



Southern Highbush

- 6' – 8'
- Earlier yield – harvest late May – June
- Smoother texture, smaller seeds
- Need ideal conditions
- Pick every 5-7 days

Rabbiteye

- 12' – 15'
- Harvest June – July
- Tougher – more drought tolerant
- **Recommended for Piedmont gardens**
- Pick every 10 days

Rabbiteye Blueberry Varieties for Central NC

Early season*:

- Climax, Premier

Early to mid:

- Columbus, Ira, Yadkin

Mid to late:

- Powderblue, Onslow

Plant more than one variety for cross pollination and extended yield!

* Early blooming, may lose some blooms to frost



Pink Lemonade

New variety with pink fruits!

Rabbiteye Blueberries

- Large bushes – space 6' apart in rows
- Rows 12'-15' apart
- Mulch for weed control
- Remove flower buds 1st year
- Prune in winter – remove oldest canes



Blackberries

- Easy to grow in
 - Full sun
 - Well drained soil
- pH 5.8 – 6.8 ideal, tolerant of wider range
- Self fruitful
- **Later blooming** – frost rarely an issue



Blackberries

- Produce fruit in 2nd year, remain productive 5-15 years
- Remove wild blackberries growing within 600' (harbor insects and diseases)



Blackberry Varieties

Erect

- Early ripening (late May-June)
- Upright plants require minimal support

Recommended thornless varieties:

- Early: Arapaho, Natchez
- Mid: Apache, Ouachita
- Late: Navaho



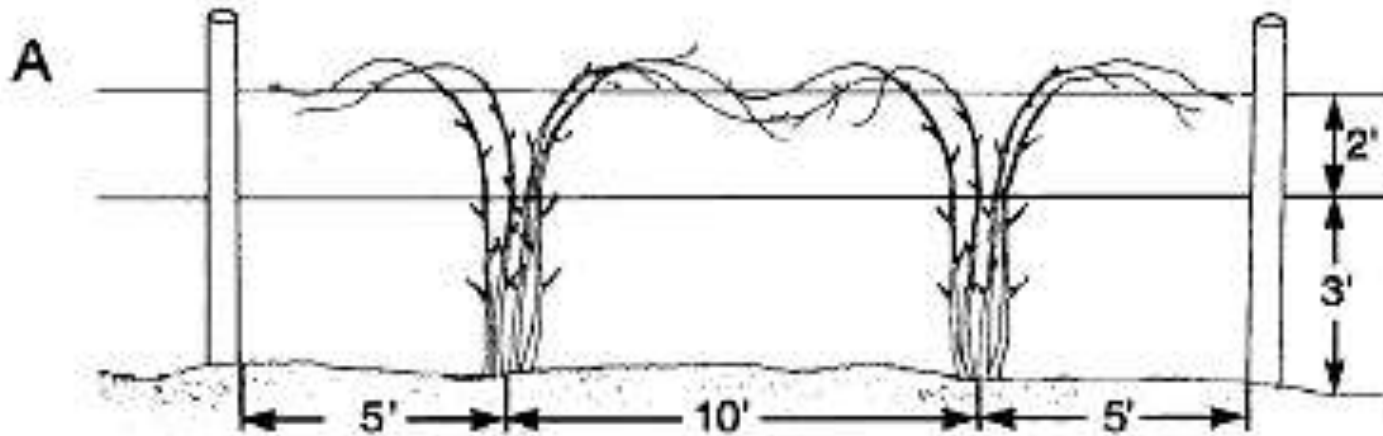
Blackberry Varieties

Semitrailing

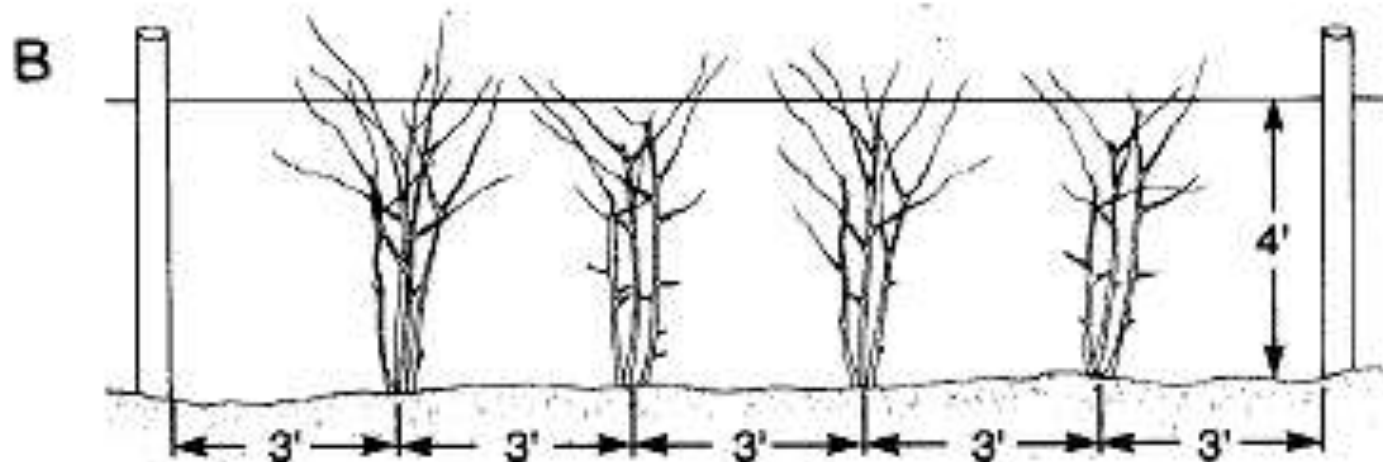
- Need support
- **Thornless!**
- Later ripening (late June)
- **Recommended varieties:** Chester, Triple Crown



Training Blackberries



Semi-trailing varieties = 2 wire support

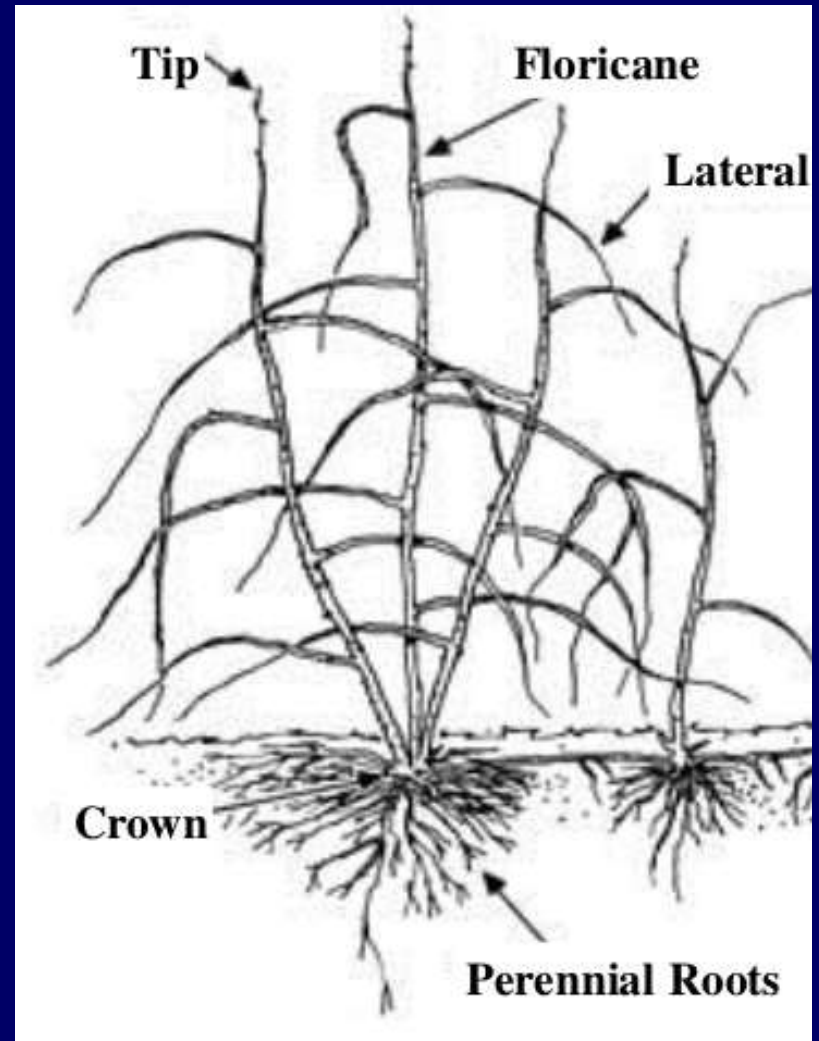


Erect varieties = 1 wire support

Pruning Blackberries

Bear fruit on 2 yr old canes

- 1st year new canes grow from crown, branch during first growing season
- 2nd year canes develop flower buds on side branches (laterals)
- Canes die after fruiting
- Canes are cut out after fruiting



Raspberries

- Grown similar to blackberries, but not as tough or heat tolerant
- Need well drained, rich soils; afternoon shade
- pH 6.3-6.5
- Short lived, 3-5 years



Raspberries

- Varieties:
 - Southland
 - Dormanred – flavor?
 - Mandarin – hard to find
 - **Heritage, Autumn Bliss, Cherokee, Nantahala** - tip bearing varieties, ripen in fall, generally not recommended



Strawberries

- pH 5.5 - 6.5
- Excellent drainage to prevent root rot
 - Raised beds
- Full Sun
- Produce fruit in 1 year, remain productive 2-4 years



Strawberry Varieties for NC

- **Junebearers** – actually bear in May:
 - ‘**Sweet Charlie**’, ‘**Apollo**’ – anthracnose tolerant
 - ‘Earliglow’, ‘Galletta’, ‘Jewel’
- **Everbearing**: ‘Tribute’, ‘Tristar’
 - Lower production in summer



Anthracnose
fungal disease

Strawberries

- **Can be challenging**
 - Frost damage
 - Disease problems
 - Birds! Netting can help
- Shallow root systems
 - **Not drought tolerant!**
 - Easily burned by too much fertilizer



Frost Damage

Strawberries

- Frost Protection
 - Floating Row Cover/
Frost Protection Cloth
- Irrigation
 - Used in commercial production
 - Must run continuously until temps above 32 degrees
 - Low rates, $\frac{1}{4}$ " per hour



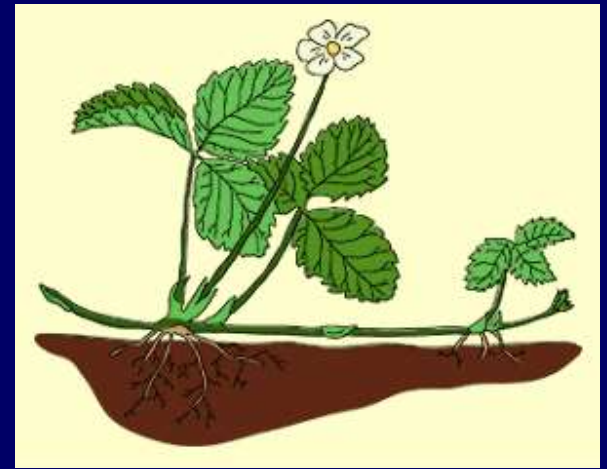
Strawberries

- Grown in matted row system
- Make rows/beds 18" wide, with 18" between rows
- Plant single plants early spring (March), in rows 36"-42" apart



Matted Rows

- Plants produce runners in summer
- Peg down around mother plant to make a matted row
- Propagate new plants from runners – start new bed after 3 years



Muscadine Grapes

- Native to southern US!
- **Muscadine** (purple - black skin varieties)
- **Scuppernong** (bronze skin varieties)
- Easy if properly trained
- **Sun, well drained soil, pH 6.5**



Muscadines

- Produce fruit in 3 years, remain productive 15-20 years
- Drought tolerant once established
- Ripen August – October
- Few problems
 - Japanese Beetles
 - Powdery Mildew

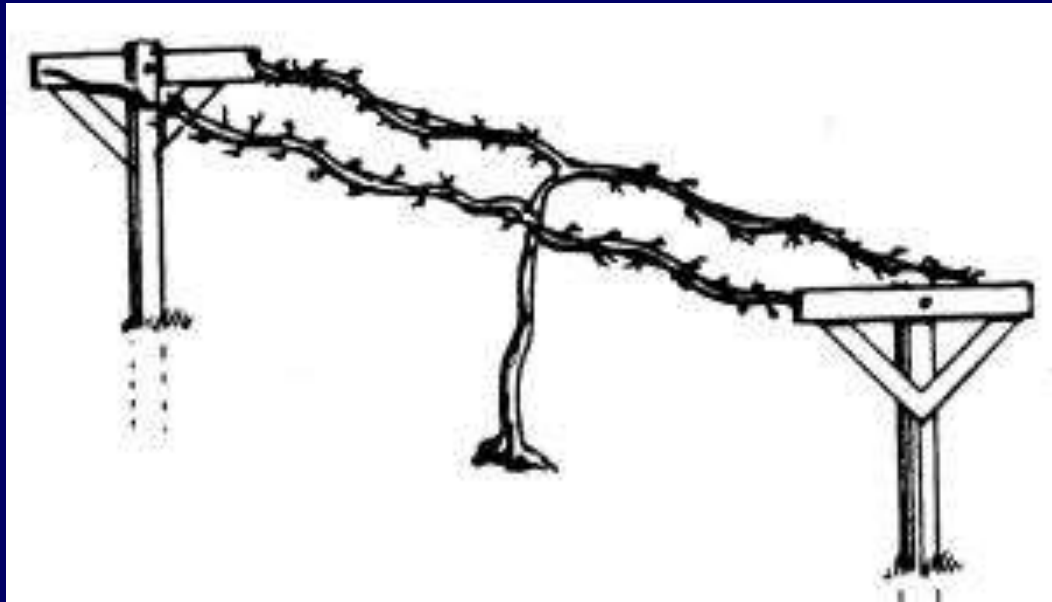


Russeting caused by P.M.
infection earlier in the
season

Muscadine - Training

Double wire system - resembles a clothesline

- Pergolas and arches don't work!
- Space plants 15' - 20' apart, wire 5' – 6' above ground



Muscadine Varieties

- Some are perfect flowered (male and female parts) = self fruitful
- Others are female only = need perfect flowered variety for pollination
- Other characteristics:
 - Skin color (bronze/black)
 - Early, mid, late season cultivars
 - Fruit size



Top: Female
Center: Perfect
Bottom: Male

Recommended Varieties

Cultivar	Color/sex	Fresh/wine
Carlos	Bronze	Wine
Nesbitt	Black	Fresh
Noble	Black/female	Fresh/wine
Triumph	Bronze	Fresh
Regale	Black	Fresh
Magnolia	Bronze	Fresh/wine
Supreme©	Black	Fresh
Doreen	Bronze	Fresh/wine
Fry	Bronze/female	Fresh
Tara	Bronze	Fresh
Summit	Bronze/female	Fresh
Granny Val©	Bronze	Fresh
Scarlett	Red/female	Fresh



Muscadines

- Require annual pruning
- Best time: Dec-Feb
- Majority of previous season's growth removed

Annual Pruning,
BEFORE, above
AFTER, below



Tree Fruit for Central NC

Easier

Persimmons

Figs

Pears

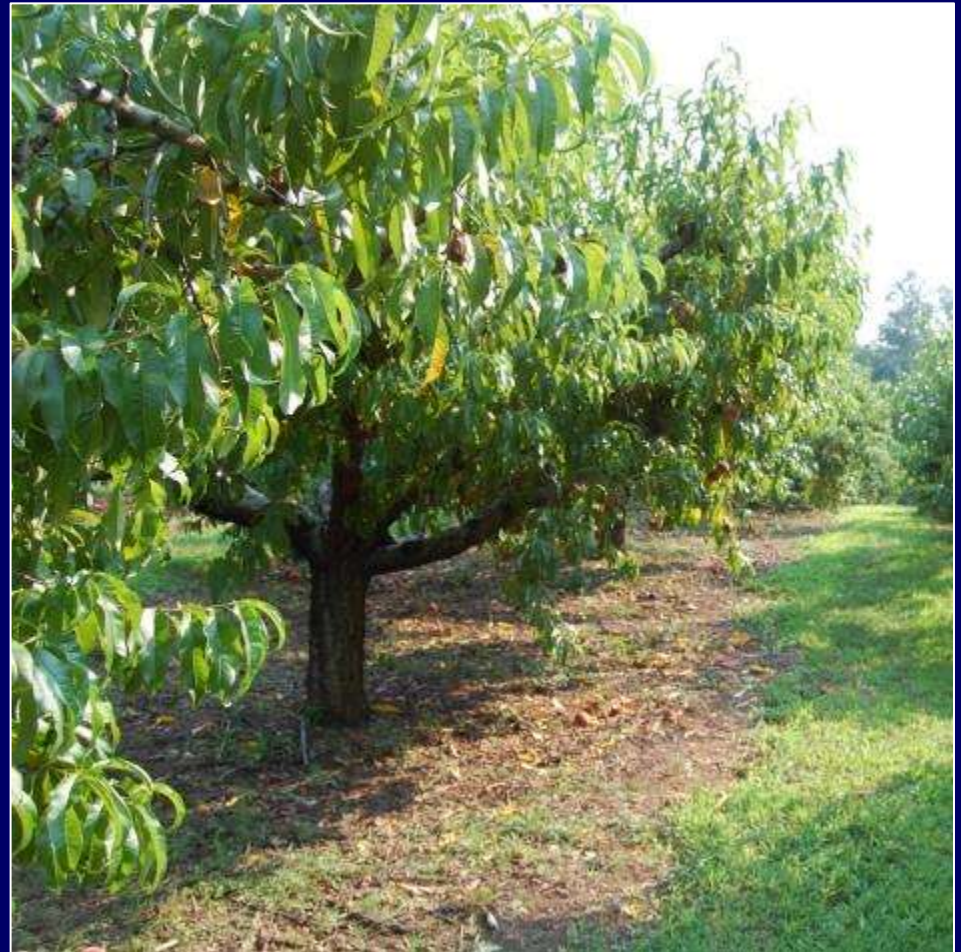
Plums

Apples

Peaches

Nectarines

**More
Challenging**



Tree Fruit

- Most are budded or grafted
- **Rootstock** = chosen for disease mgmt or size mgmt
- **Scion** = desirable variety
- If scion dies, just left with rootstock
- Shoots from below **graft union** are rootstock



Tree Fruit

- Most need to be pruned each year
- Heavy pruning in winter
- Lighter pruning in summer
- Pruning methods depend on species



Peaches are trained to have
an open center

Asian Persimmon

- Easy, productive
- Sun, well drained soil
- Target pH ~ 6.0
- Space 12'-15' apart, grow 10'-20' tall
- Begin bearing 3-5 years, live 10-20 years
- Bear in fall
- Minimal pruning



Asian Persimmon

- Self fruitful, but cross pollination recommended (2 varieties)
- Varieties are classed as astringent (must be completely soft before edible) and nonastringent
- **Recommended varieties:** Jiro, Hanagosho, Fuyu - all are non astringent



Figs

- Easy, long-lived
- Self Fruitful
- Not grafted (easy to root from cuttings)
- Grown as a large bush
 - Little to no pruning except to remove broken or rubbing branches



Figs

- Sun, well drained soil, pH ~ 6
- Space 10' apart
- **Main problem – cold injury**
 - Top growth may be killed back in harsh winters but new sprouts arise from the base



Fig Varieties

- **Celeste** – considered best for fresh eating
 - Bears in June/July
- **Brown Turkey**
 - Bears in June
 - Better for preserves
 - aka Texas Everbearing
- May take 3-4 years to bear



Brown Turkey



Celeste



Image source:

<http://www.centuryfarmorchards.com/descripts/figs.html>

Plums

- Sun, well drained soil
- Target pH 6.5
- Relatively short lived, 10 – 20 years, begin bearing in 4-5 years
- Tend to bloom very early - frost often damages blossoms



Plums

- Brown rot a problem – spray with fungicides
- Two varieties give better fruit set
- **Recommended Varieties:**
 - Methley - tend to bloom early
 - Auburn varieties: AU Amber, AU Homeside, AU Roadside, AU Producer
 - Morris
 - Frontier



Pears

- Full sun, well drained soil
- Target pH 6.5
- **Take 5-9 years to bear** (earlier on dwarfing rootstock), live 35+ years
- Space 20' apart
- **Often set too many fruit** – breaks limbs; thin to one fruit per cluster to prevent



Pear Varieties

- Plant 2 different varieties for best fruit set
- **Fireblight resistant!**

Recommended:

- Moonglow, Orient, Magness – dessert pears

Heirloom:

- **Seckel** – aka Sugar Pear, fire blight an issue
- **Keiffer** - for canning



Fireblight

Bacterial disease

Infects in
spring, new
growth appears
burned, tips curl
over

Prune out all
infected
branches 12"
below
symptoms



Asian Pears

- Crisper and juicier than regular pears
- Culture similar
- Fireblight main problem
- Varieties:
 - Shinseiki, Hosui, Kosui



Apples

- More challenging – more pesticides sprays needed
 - Insecticide applications just after petal fall and 2 weeks later critical
- Need more than one variety for pollination
- Rootstock has tremendous effect on size and bearing age (3 to 6 years)



Red skin varieties may not color well in the piedmont

Modern Apple Varieties for Central NC

Fireblight resistant:

- Red Delicious*
- Empire*
- Priscilla*
- Liberty*

Less resistant:

- Golden Delicious
- Gala
- Braeburn
- Fuji
- Granny Smith*

*** Also resistant to cedar-apple rust**



Cedar-Apple Rust

On eastern red cedar



<http://www.ces.ncsu.edu/fletcher/programs/apple/plantpath/CARfact.html>

Cedar-Apple Rust

on apple leaves



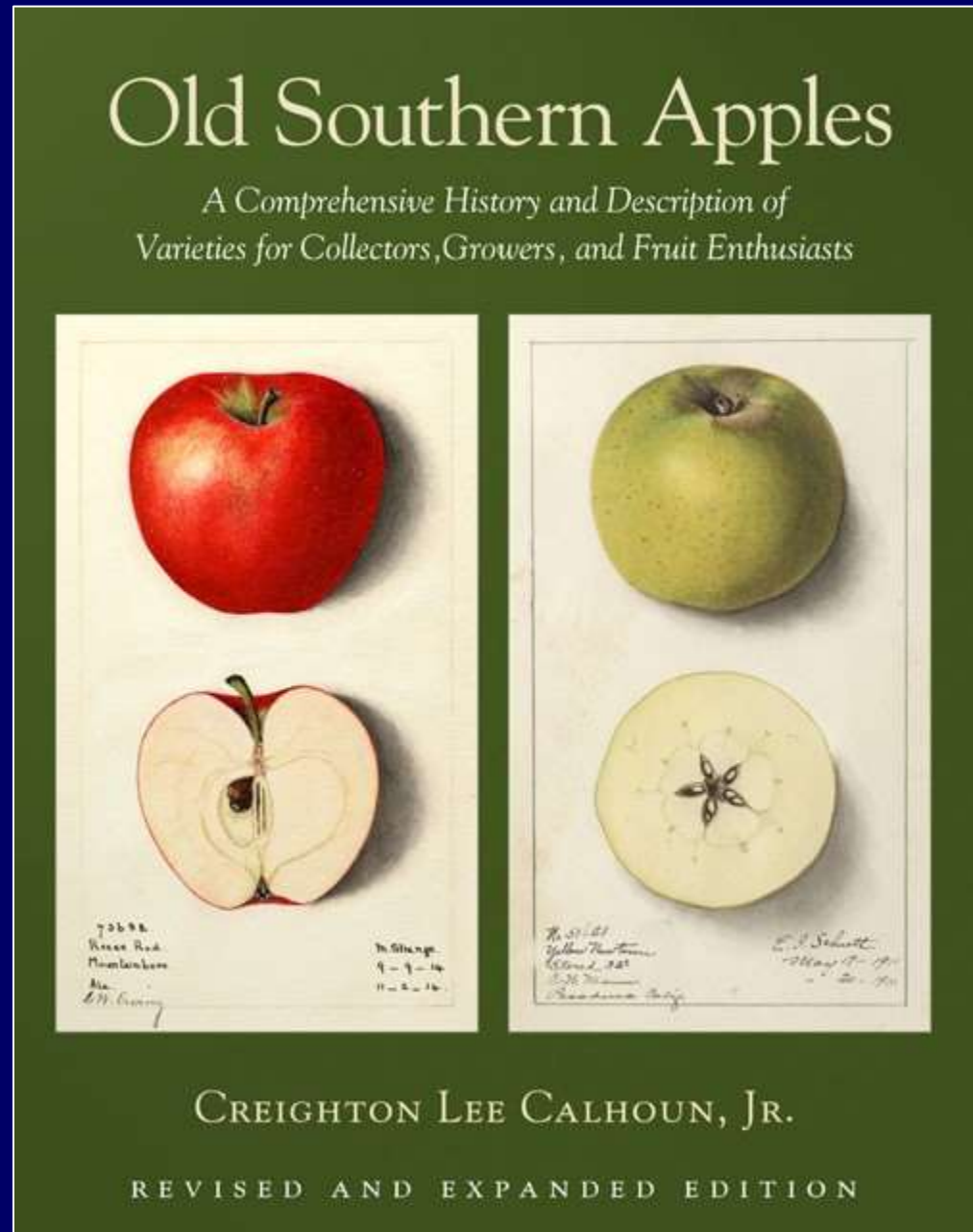
Heirloom Varieties

Disease resistant varieties for central NC

- Aunt Rachel – Chatham Co Variety
- Red Rebel
- Arkansas Black
- Blacktwig
- Limbertwig

Source:

Century Farm Orchards,
Reidsville, NC



Fruit Thinning

- Must Thin Fruit for Optimal Fruit Quality & Tree Structure
- Only Need :
 - 20% apple blossoms
 - 15% peach blossoms
- Thin Early For Optimal Size



Proper Fruit Thinning

Excessive
Fruit



Peaches and Nectarines

- Most challenging
- Sun, well drained soil essential
- Spray program necessary
- Start bearing in 2 – 4 years
- Tend to be short lived (~15 years)



Peaches and Nectarines

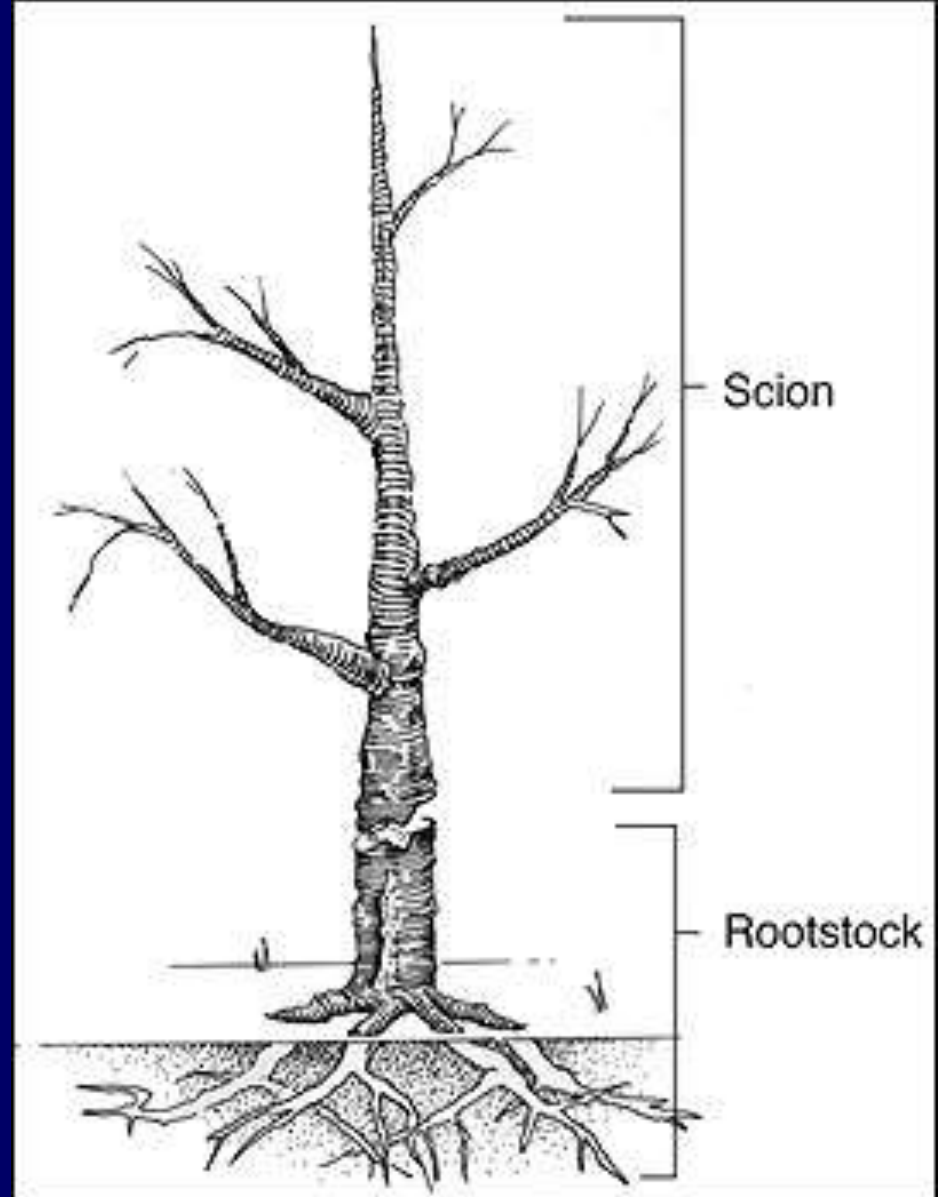
- Spacing 12' to 24' apart
- Challenging to find quality trees
- Cut back top, prune long roots at planting (if bare root)
- Plant graft union above soil level



Peach Rootstocks

All peaches are grafted – these rootstocks reduce **Peach Tree Short Life Syndrome** – major problem caused by nematodes

- Lovell
- Halford
- Nemaguard
- **Guardian** - Best for nematode resistance



Peaches and Nectarines

Problems – Many!

- Scale and aphids – dormant oil in winter
- **Fruit rot diseases** – regular spray program over entire season
- See Disease and Insect Management in the Home Orchard



**Brown Rot –
remove mummies!**

Choosing Peach Varieties

Consider:

- Chilling Hours
- Early – mid – late season
- Freestone or Cling (early)
- White or Yellow Flesh
- Bacterial Leaf Spot Resistance
- Many varieties part of NC Breeding program (NC Sandhills – town names)



Peach Varieties

Use Varieties to Space Out Harvest Season

Early-Mid

- Candor
- Pekin
- Clayton
- Norman

Mid-Late

- Ellerbe
- Winblo
- Biscoe
- Elberta

See **Growing Peaches in NC** for more
information on varieties

Evaluation

Thanks to Country Farm and Home, 101 S. Small St.,
Pittsboro, for donating our door prize!



Resources You Should Know About!

Chatham Gardener email list

- Sustainable gardening information
- Weekly email updates
- What to plant, pest alerts, timely tips
- Upcoming classes and events
- **To subscribe:**
 - <http://go.ncsu.edu/subscribeeg>



Chatham County Website

- News
- Upcoming events
- Staff directory
- Contact information
- More!

<http://chatham.ces.ncsu.edu>

The screenshot shows the homepage of the Chatham County Cooperative Extension website. At the top, there is a navigation bar with the NC State logo, the text "State University A&T State University", and the "COOPERATIVE EXTENSION" logo with the tagline "Empowering People - Providing Solutions". A search bar is located on the right with the placeholder text "Enter Your Keywords Here". Below the navigation bar, there is a large banner image featuring a collage of photos: two children, a woman reading a book, a watermelon, a young girl, and a sunflower. To the left of the banner, there is a sidebar with a list of topics: Growing Small Farms, 4-H Youth Development, Agriculture & Food (with sub-items: Animal Agriculture, Commercial Horticulture, Nursery & Turf, Farm Health & Safety, Field Crops, Food Safety & Processing, Local Foods, Pest Management, Specialty Crops), Community, Forest Resources, Health & Nutrition, Home & Family, Lawn & Garden, and Soil, Water & Air. The main content area is titled "FEATURED CONTENT" and features a "Gardening E-Newsletter" section with a description and a "READ THE REST" button. To the right of this section, there is a vertical list of links: Plant Sciences Initiative, Soil 101: Introduction to Soil - Online!, Gardening E-Newsletter, Food Processing and Manufacturing Initiative, and Soil Testing. Below the featured content, there is a "FEATURED EXTENSION VIDEO" section with two video thumbnails: "How to take a soil sample" and "Preparing Insect and Plant Disease Samples". At the bottom, there is a "NEWS" section with a "View All" link and an "EVENTS" section with a "View All" link. The footer includes the "Chatham County Center" logo, a "Horsekateer Members Win at" announcement, and a "Chatham Landscape Conference" announcement.

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Local Foods
Pest Management
Specialty Crops
Community
Forest Resources
Health & Nutrition
Home & Family
Lawn & Garden
Soil, Water & Air

FEATURED CONTENT

Gardening E-Newsletter
Subscribe to the Chatham Gardener E-Newsletter to receive timely updates on sustainable lawn, garden and landscape care for the central NC Piedmont. Managed by Chatham Extension horticulture agent, Charlotte Giles. See Chatham Gardener E-Newsletter

READ THE REST

Plant Sciences Initiative
Soil 101: Introduction to Soil - Online!
Gardening E-Newsletter
Food Processing and Manufacturing Initiative
Soil Testing

FEATURED EXTENSION VIDEO

How to take a soil sample
Preparing Insect and Plant Disease Samples

NEWS View All
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Chatham County Center

Horsekateer Members Win at

Chatham Landscape Conference

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These resources are brought to you by the Cooperative Extension System and your Local Institution. eXtension provides objective and research-based information and learning opportunities that help people improve their lives. eXtension is a critical part of the Cooperative Extension System and an educational partner with 75 land-grant universities in the United States.

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- <http://www.ces.ncsu.edu>

- **In Chatham County,**

- 919-542-8202

- charlotte_glen@ncsu.edu

- **Ask an Expert**

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