

# Exploring Opportunities with Unusual Citrus for the Home Gardener and Hobbyist



# Today's Agenda

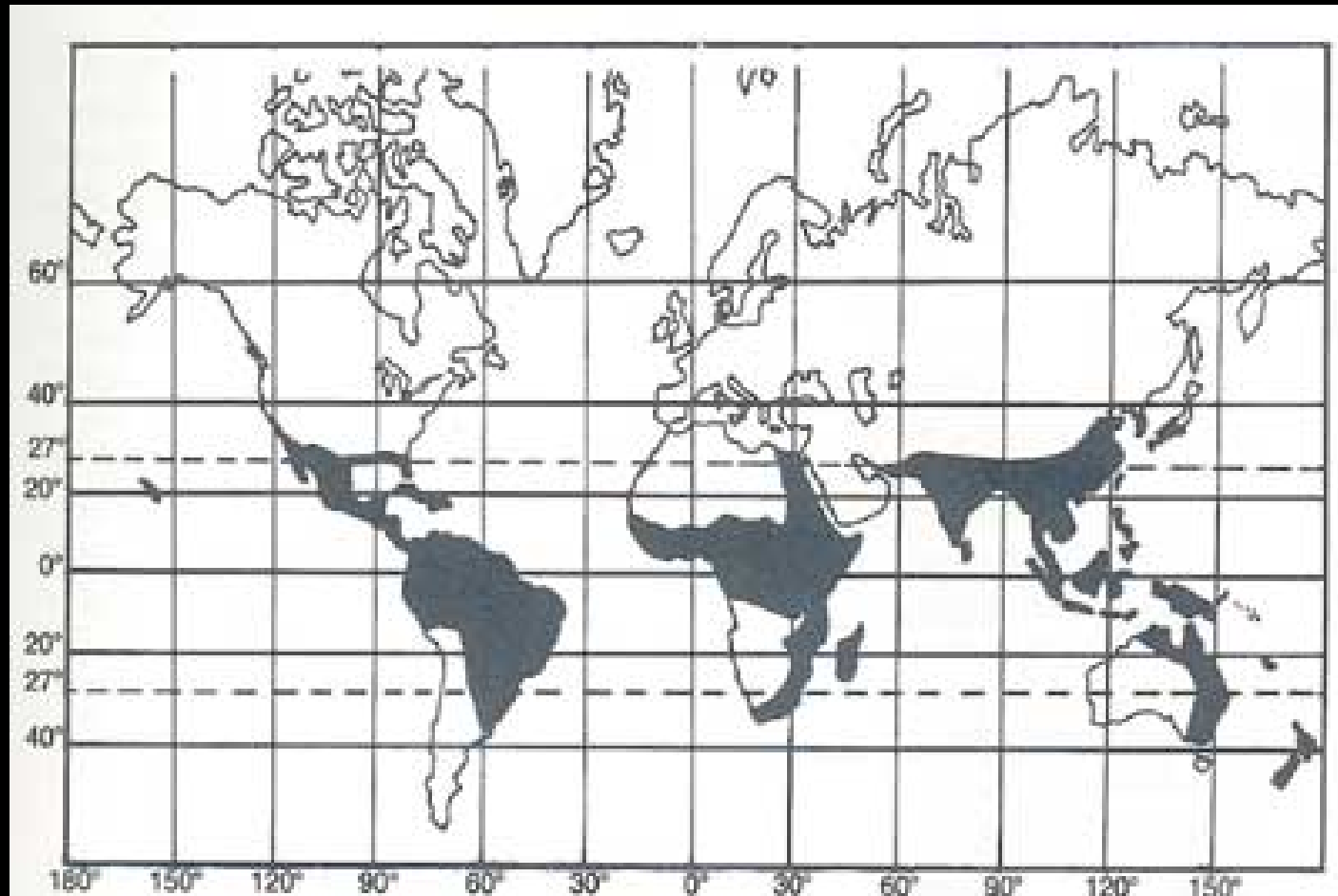
- Brief Introduction to Citrus
- Growing citrus outside of Florida
- Hardy and semi-hardy citrus varieties for cooler climates
- General Planting and Culture

# The Citrus Family, Rutaceae

- The most economically important genus in the family is *Citrus*
- Includes the orange (*C. sinensis*), lemon (*C. × limon*), grapefruit (*C. paradisi*), and lime (various, mostly *C. aurantifolia*).

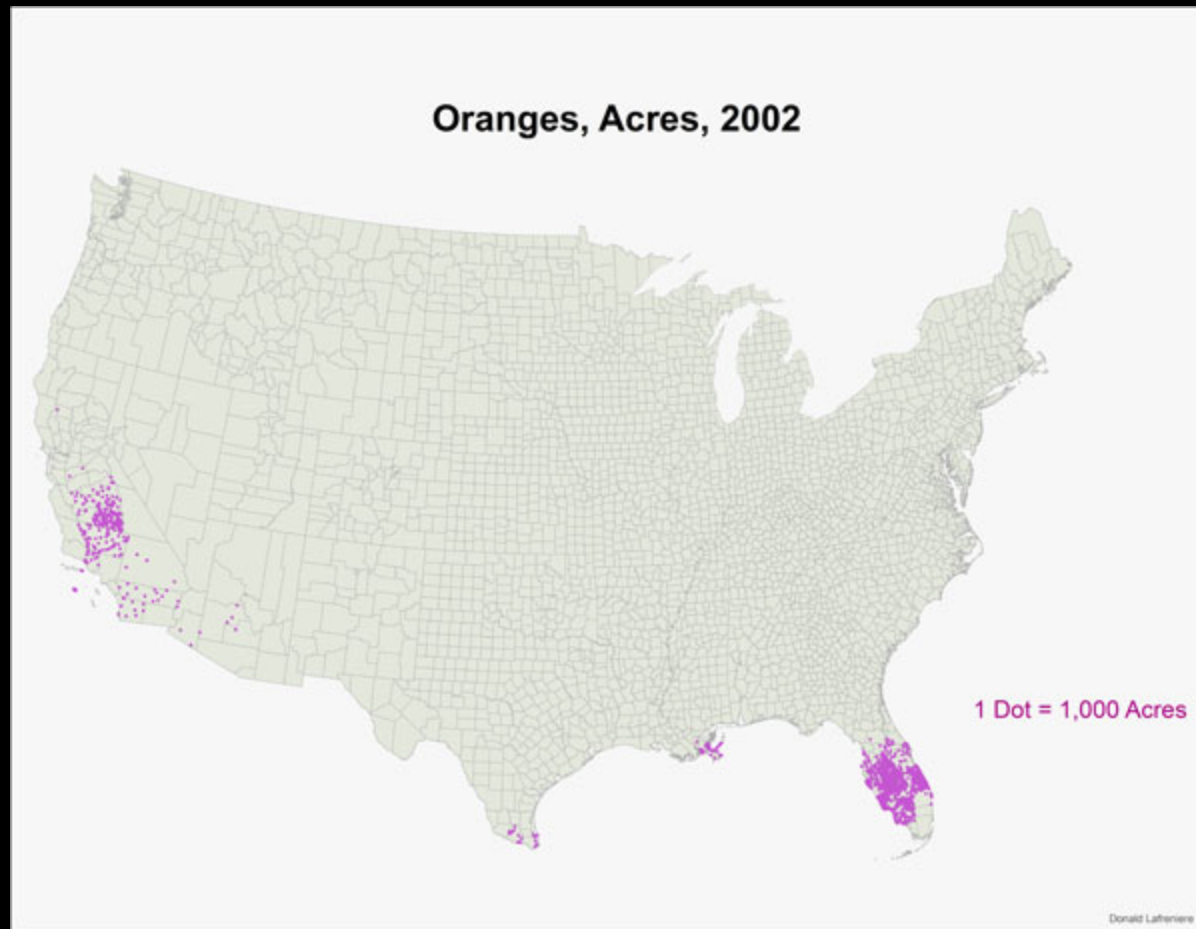


# The Citrus Belt

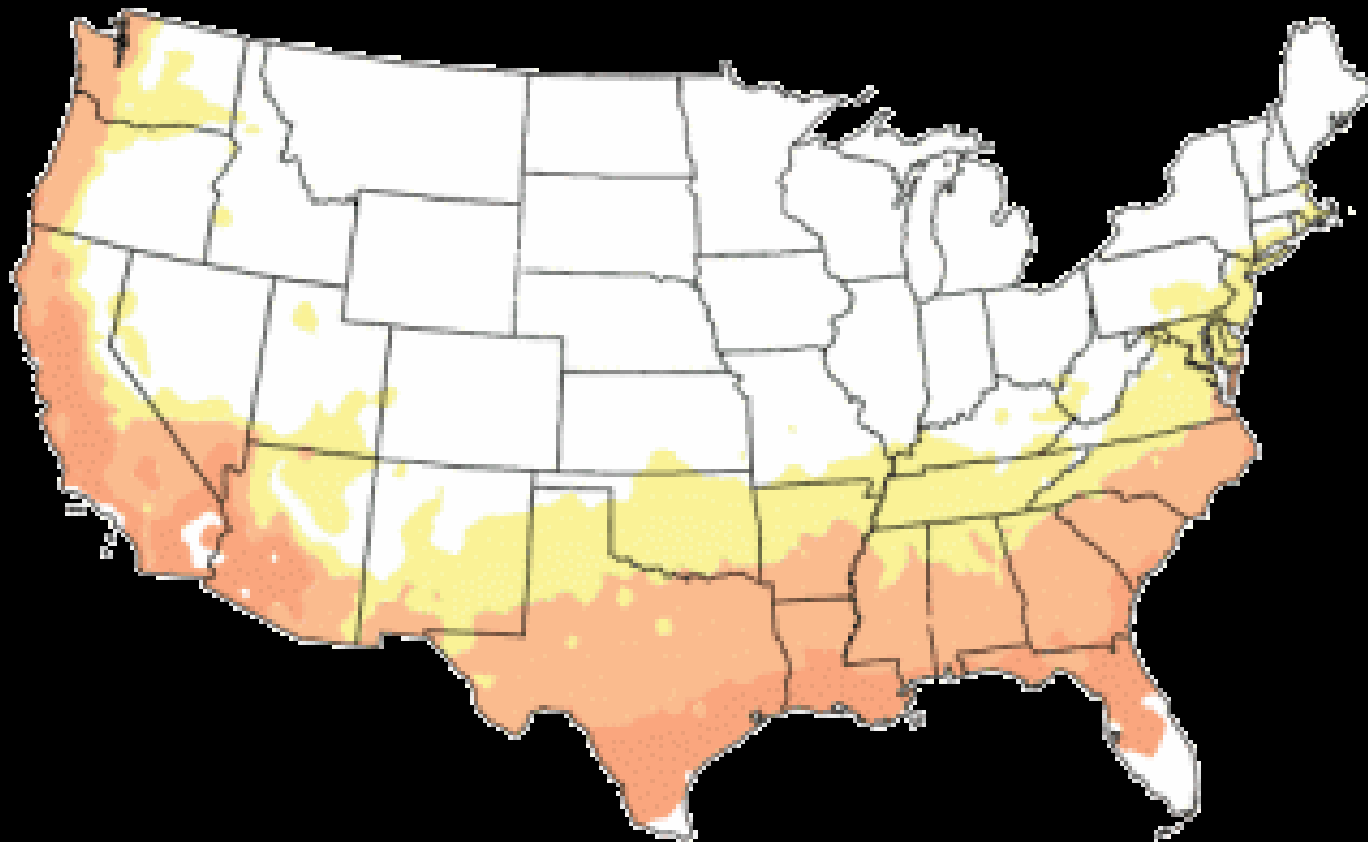




# Orange Production in the U.S.



# Hardy Citrus Zones



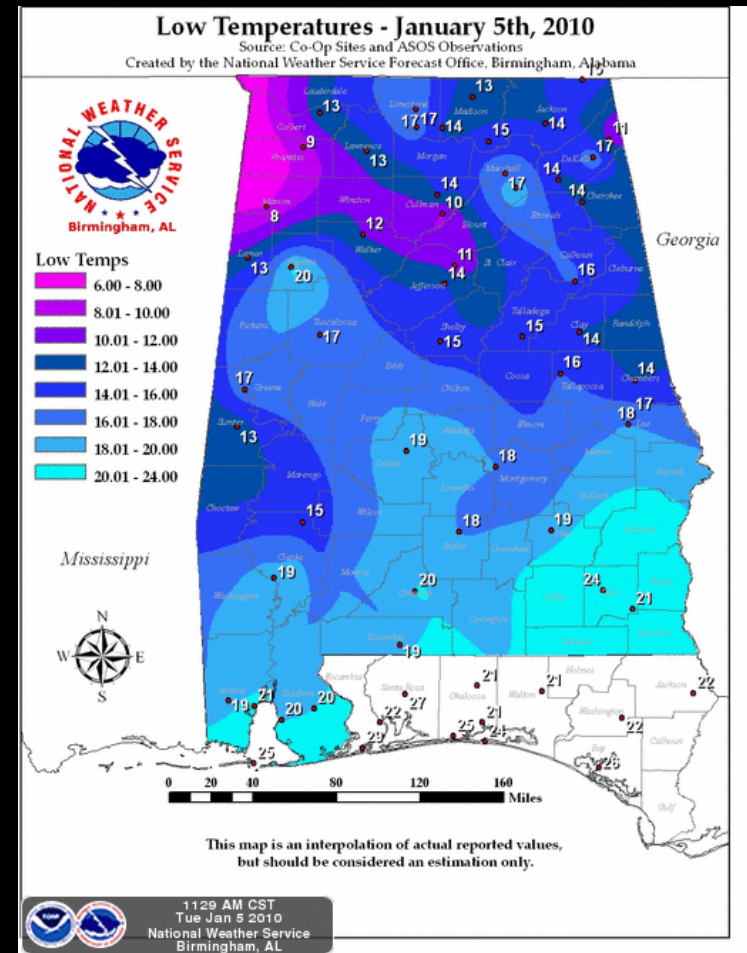
# What makes more hardiness?

- *Poncirus trifoliata* is a hardy citrus relative that has introduced the cold hardiness to citrus hybrids. However, the *Poncirus* fruit is considered barely edible.

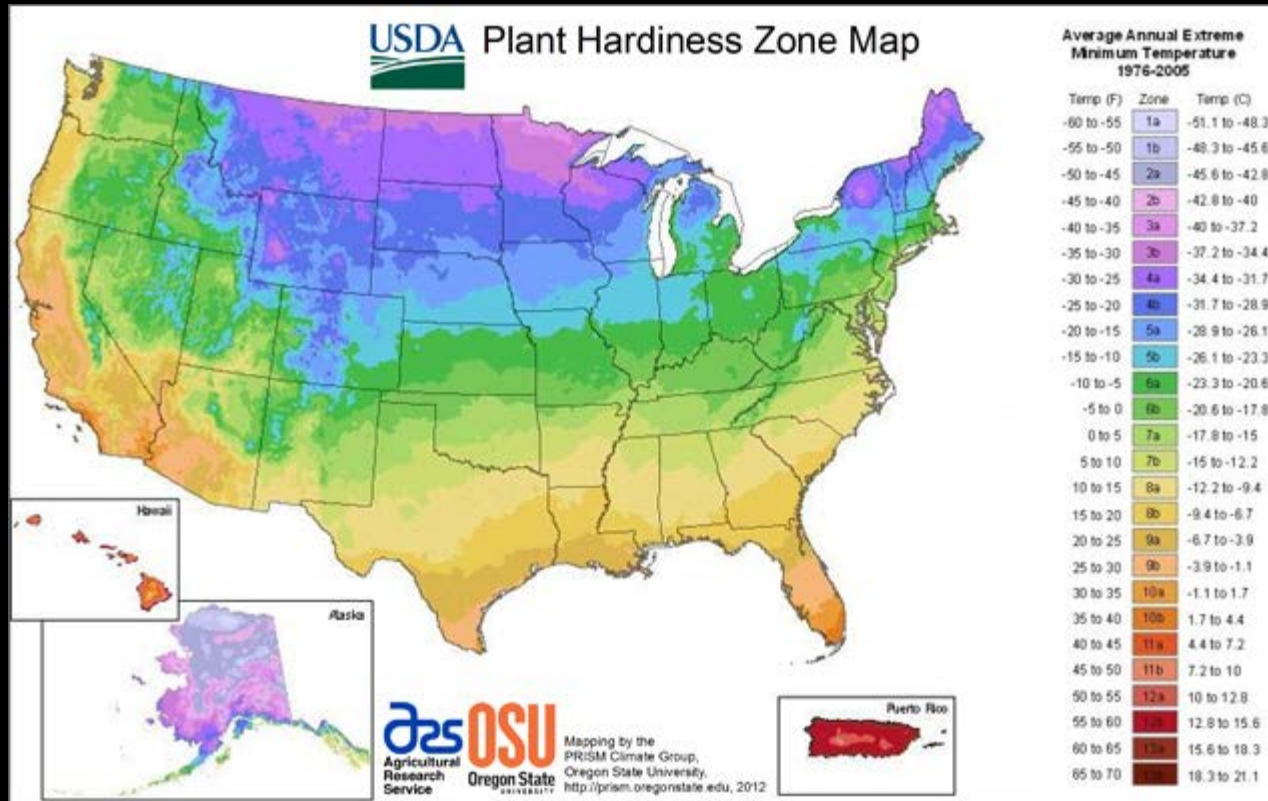


# Growing Citrus in the Southeast

- USDA zone 9 is considered the northern edge of where some commercial varieties of citrus can be grown...or the semi-hardy varieties like satsumas.

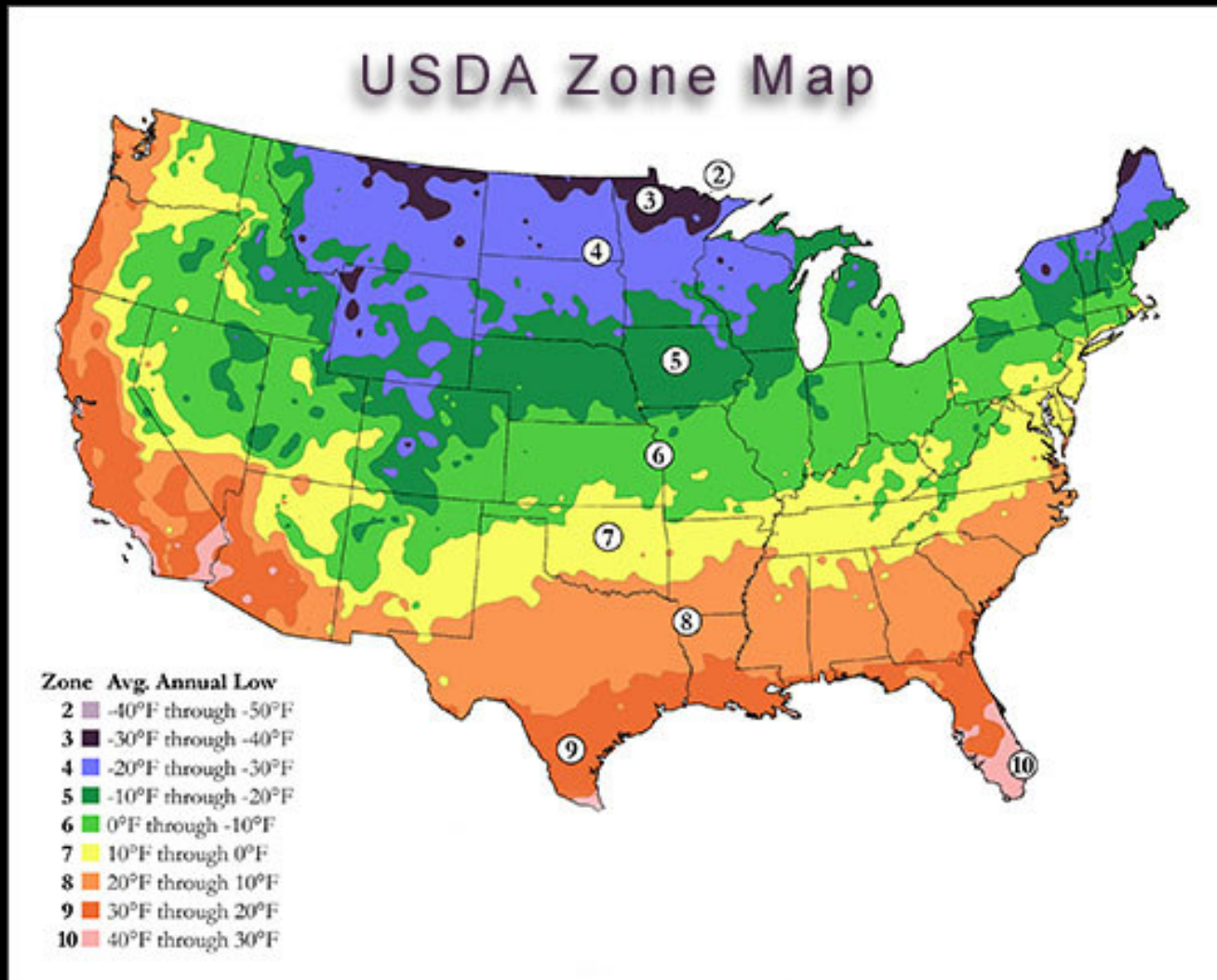


# USDA Zone Map 2012

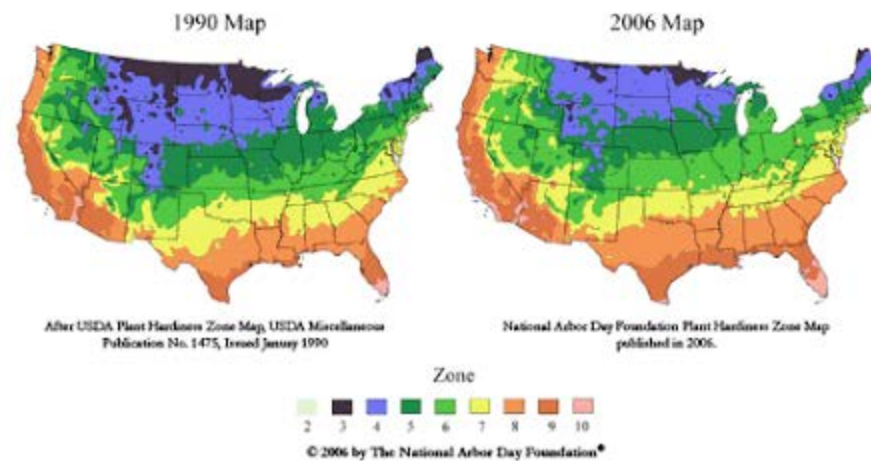
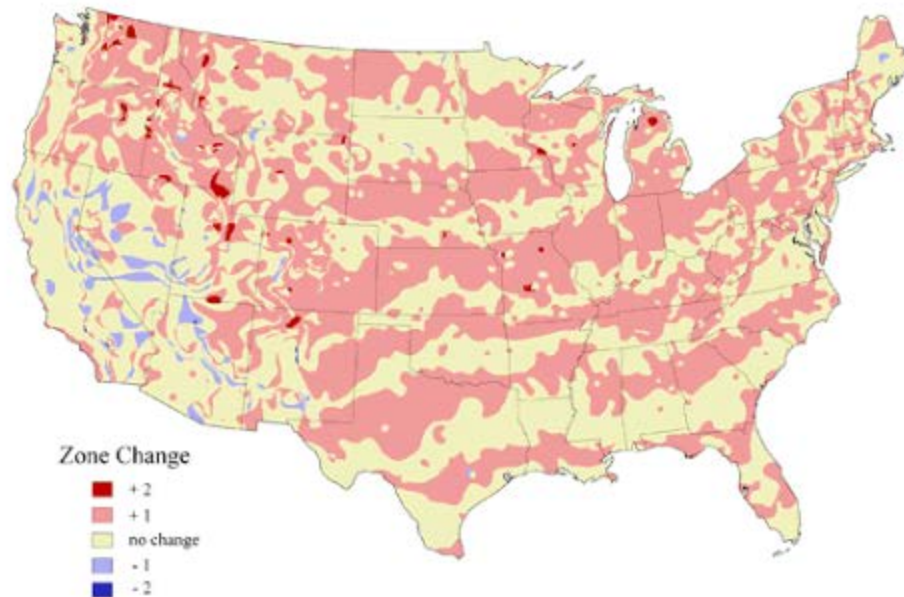




# USDA Zone Map 2006



Differences between 1990 USDA hardiness  
zones and 2006 arborday.org hardiness  
zones reflect warmer climate





# Sunset's Garden Climate Zones



# Anniston, AL USDA z8a



# Container Citrus

- Most any variety of citrus can be grown in a large container
- Moved indoors in winter season or occasionally during intermittent cold spells







# Versailles



# What size container?

- Eventually a half barrel size container will be needed for larger growing varieties.
- Rollers great aid in moving these pots.
- Soil should be well drained and light to make moving easier.



# “SEMI-HARDY” CITRUS

- Semi-hardy citrus is a relative term. From our perspective, this refers to citrus varieties that are hardy to temps in the mid to upper teens to low 20s.
- These make great container specimens





# Satsumas

- Satsumas are small, sweet oranges with a loose, easily-removed peel.
- They originated in Japan specifically from the former Satsuma province (now known as Kagoshima)



# Satsuma or Mandarin

## *Citrus unshiu*



# Owari Satsuma





# Brown Select (Anniston AL)



# Other Satsuma Varieties

- Armstrong
- Brown Select
- Kimbrough
- Miho
- Okitsu
- Orange Frost
- Arctic Frost
- Among others...



# Kumquats



- Kumquats look like miniature oranges and can be round or oblong. The fruit has a sweet rind with an acidic pulp.
- Kumquats can be eaten fresh, but are more often used in marmalades or candied



# Candied Kumquats





# Kumquat Varieties

- Nagami
- Meiwa
- Chang Shou
- Ten Degree



# Meyer Lemon (*Citrus x meyeri*)

- Frank Meyer's life was short: He drowned, mysteriously, on a return expedition to China. But his namesake tree won immortality.
- California growers deemed the lemons too soft for commercial use, but home gardeners fell in love with the Meyer's sweet, orange-accented flavor.



# Improved Meyer Lemon (Virus free)



# COLD HARDY CITRUS





# Trifoliate Orange

## *Poncirus trifoliata*



# Trifoliate Orange

- Trees are native of Asia and are extremely cold hardy. It has been reported that this hardy species will survive as far north as New England. Fruits are golf ball sized and the trees are deciduous. Hardy to around - 5F
- Commonly seen in Southern gardens, this species is a parent of many hardy hybrid citrus varieties.

# The Pros and Cons of Hardy Citrus

- Backyard citrus is possible in our area
- The trees are highly ornamental in flower and fruit
- Grafted tree produce faster than non-grafted
- Becoming more popular
- The flavor is not usually comparable to grocery store citrus
- Many tree are thorny
- Trees can take 8-10 years to fruit from seed
- Not readily available from most nurseries

# Hardy Citrus Varieties

- Citranges
- Citrangequats- Kumquats
- Hardy Lemons
- Hardy Grapefruits
- Citrumelos- grapefruit x Poncirus
- Citrandarins
- Other hybrids



# THE HARDIEST CITRUS



# CITRANGES

- Citrange is a hybrid between sweet oranges and trifoliate orange.. These are very cold hardy and will grow and produce fruit where other citrus trees fail. Hardy to 0F.
- Several named varieties include Morton, Troyer, Rusk, Sinton.
- The flavor is subjective and can vary from variety to variety.

# Morton Citrange





# Morton Citrange in Anniston AL





# Morton Citrange

- Ruby orange × Trifoliate orange cross made by Walter T. Swingle. He named it in 1913 in honor of Julius Sterling Morton (1832 -1902), a former Secretary of Agriculture.



# Morton Citrange

- Morton citrange is valued for making lemonades and mixed drinks and it is also good for pies, marmalade and jams.



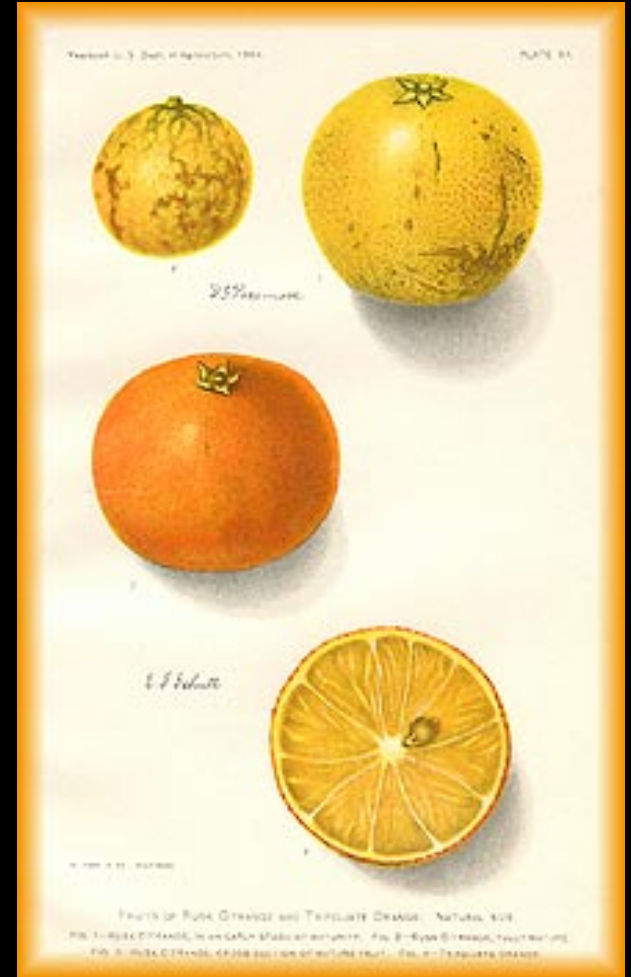
# Other Citranges...

- Rusk
- Savage
- Carizzo
- Troyer
- Benton



# Rusk

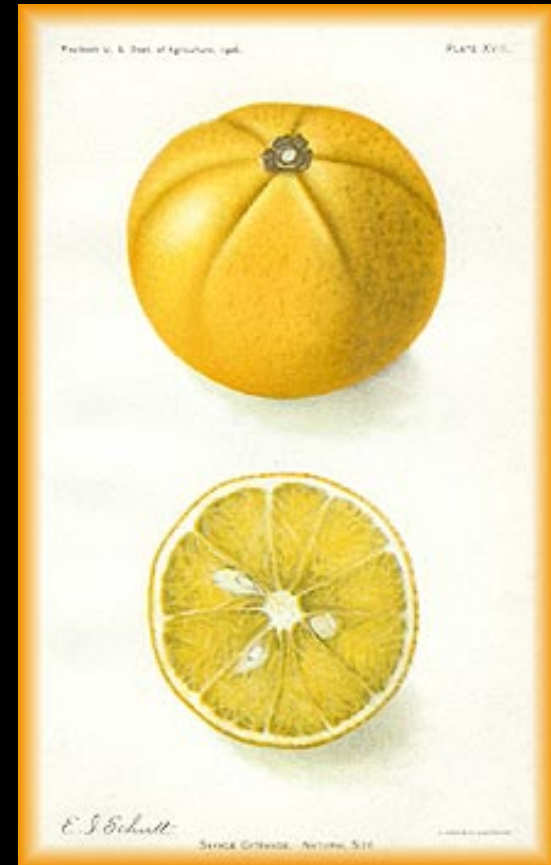
- The Rusk developed from an orange flower fertilized with *Poncirus trifoliata* pollen. All the other citranges were derived from different seeds of a single trifoliate fruit from one flower cross-pollinated by sweet orange. This hybridization is considered unusual, because *Poncirus* is often said not to be 'zygotic', which means it does not normally form seeds by sexual fertilization.





# Savage

- Another trifoliate cross that is used for understock on numerous other citrus. The plant is highly decorative in fruit, but sugar needs to be added.



# Carizzo

- hybrid of Washington navel orange and *Poncirus trifoliata*. The original cross was made in the early 1900s by the USDA with the intention of producing cold-tolerant scion varieties.



# Troyer

- A hybrid of the Washington navel orange crossed with trifoliate orange pollen that was made at Riverside, California in 1909. In 1934, Swingle named it for A. M. Troyer, on whose place at Fairhope, Alabama, it first fruited.



# Benton

- a hybrid of Ruby Blood sweet orange and *P. trifoliata*. These fruits need added sugar to be eaten by most individuals.





# CITRANGEQUATS

- A trigenic hybrid cross between the trifoliate orange, sweet orange, and kumquat. It is pear-shaped, with a blaze-orange rind that is quite pebbly.
- The flavor is acidic unless fully mature, when it becomes sweet enough for eating fresh.

# Citrangequat

- The citrangequat was developed at the turn of the 20th century with the hope of producing a fruit with the hardiness of a trifoliate and the sweetness of the orange.



# Thomasville Citrangequat



# Thomasville Citrangequat

- The Thomasville citrangequat is one of the early attempts by citrus researchers to produce a cold hardy citrus tree with good fruit. Trees can grow to 15 feet and are very cold hardy.
- The tree is named for Thomasville, Georgia where it first fruited. Hardy to around 5F once established.



# Thomasvilles at the Anniston Museum of Natural History

- Thomasvilles are very prolific bearers and the immature fruits make a great lime substitute. Fruit ripens in late fall and has a kumquat/orange flavor.



# Sinton Citrangequat

- This Oval kumquat and Rusk citrange hybrid first fruited at Sinton, Texas, and was named and described in 1923.
- An attractive ornamental and the fruit is beautifully colored but highly acid.



# CITRUMELLOS

- Citrumelo is a hybrid of the trifoliate orange and grapefruit. Trees are very vigorous growers and the fruit is very similar to commercial grapefruits. Trees have been reported to produce fruit as far north as Tennessee.

# Citrumelo





# Citrumelo Varieties

- Dunstan
- Swingle
- US 80-5
- 119





# HARDY GRAPEFRUIT



# Kinkoji or Bloomsweet Grapefruit

- Hardy to zone 8, this thin-peeled, yellow fruit is sweet with no bitterness. Probably a hybrid with a pummelo, the flesh is coarse and drier than a grapefruit.



# HARDY LEMONS





# Ichang Lemon



# Ichang Lemon

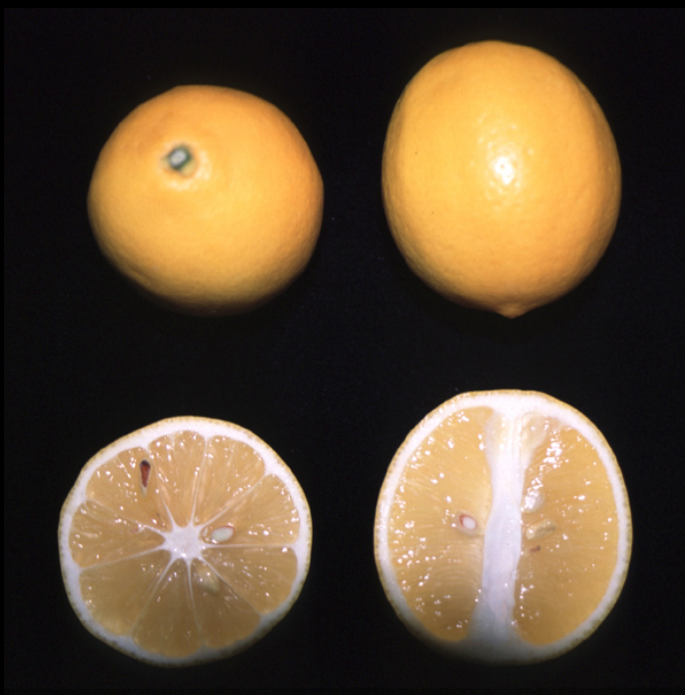




# Ichang Lemon

- The Ichang lemon is a native of the foothills of China. Trees bear good crops of large, almost grapefruit sized lemons. Trees are thorny and grow at a moderate rate.
- The fruits make delicious lemon pie and the trees are very ornamental. Hardy to around 10F or lower. Fruits are fragrant!

# Ichang Lemon



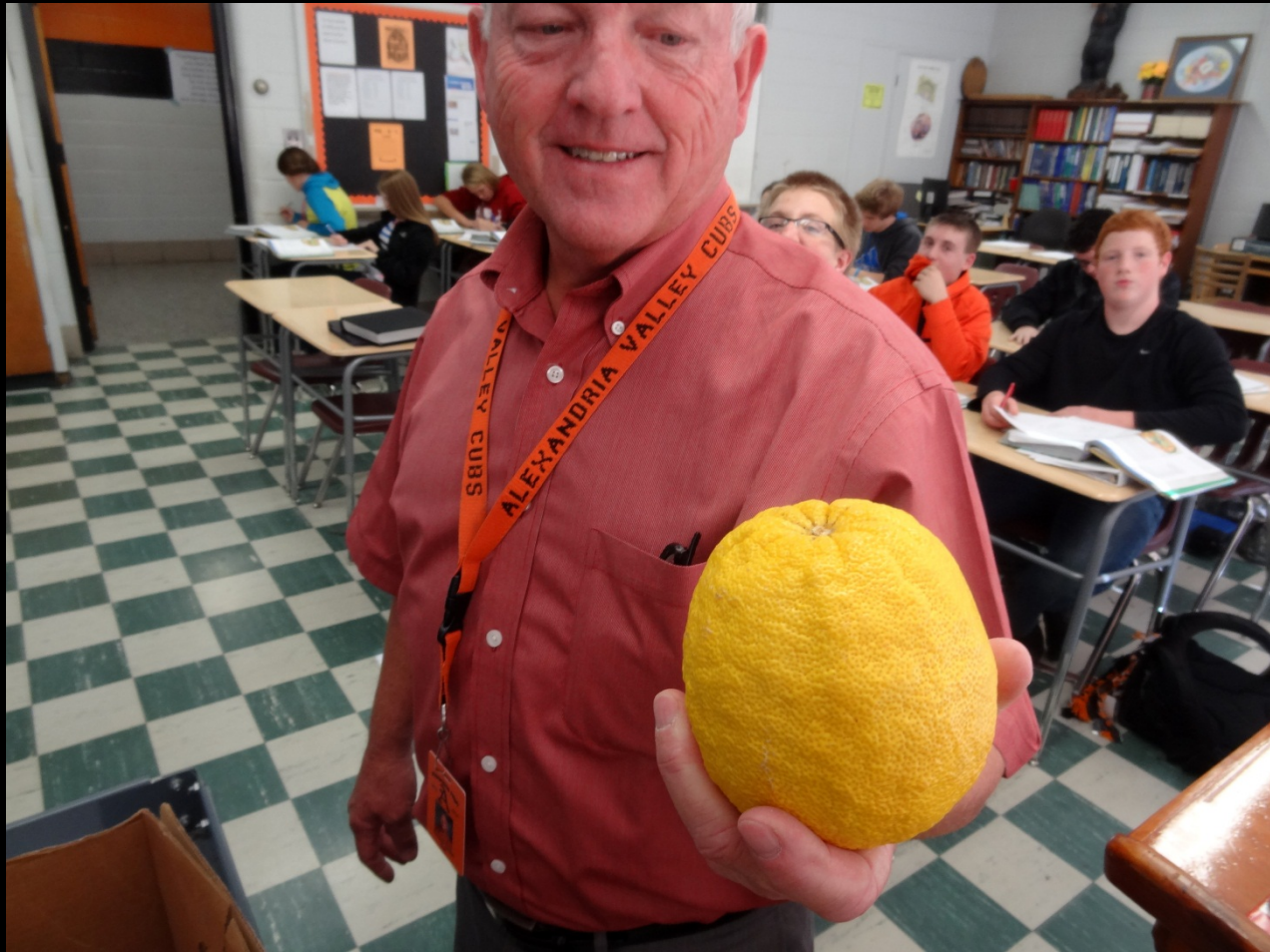


# Ichang Lemon Tree in Anniston











# Ichang Lemon



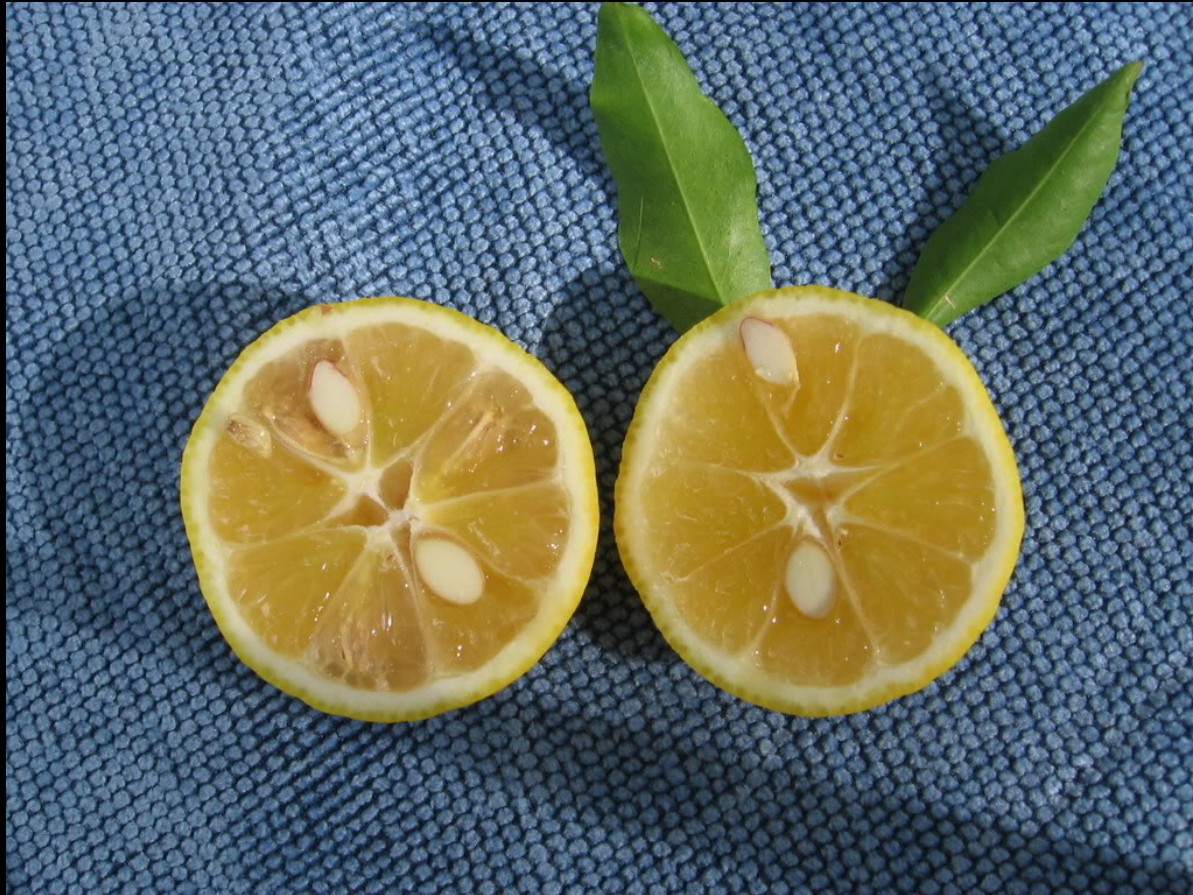
# Taichang Lemon

- A cross between Ichang Lemon and *Citrus taiwanica*.





# Taichang Lemon



# Yuzu

- Yuzu is a cold hardy citrus hybrid from the highlands of Japan. Yuzu has been reported to survive temperatures into the low teens. Fruit has a complex flavor of lemon/lime/grapefruit and is useful as an ingredient in seafood, sherbets, cosmetics and more.

# Yuzu

- It smells something like a lime, but its fragrance is unique.
- Trendy in culinary realms
- The Japanese often wrap several of the aromatic fruits in cheesecloth and float them in a hot bath





# OTHER HARDY CITRUS VARIETIES AND HYBRIDS



# Yuzuquat

- A cross with yuzu and kumquat, this yellow fruit is smaller than a lemon. The fruit has a lemon-like flavor and numerous seeds.
- Makes a great marmalade and is hardy to 10F.



# Nippon Orangequat

- Nippon orangequat is a hybrid of the satsuma mandarin orange and kumquat. Trees are very cold hardy and are prolific bearers. The fruits have a sweet orange taste and ripen in late fall. Hardy to around 10 F.



# Nippon Orangequat



# Nansho Daidai

## (*Citrus taiwanica*)

- Nansho Daidai is very cold hardy. It tolerates subfreezing temperatures without leaf drop or loss of crop the following season. It is reported to have survived temperatures down to 5F.
- Nansho Daidai is one of the hardiest evergreen citrus trees.
- Flesh is juicy with an acid flavor with a bitter aftertaste. Flesh color is dull yellow.



# Nansho Daidai



# Ten Degree Tangerine

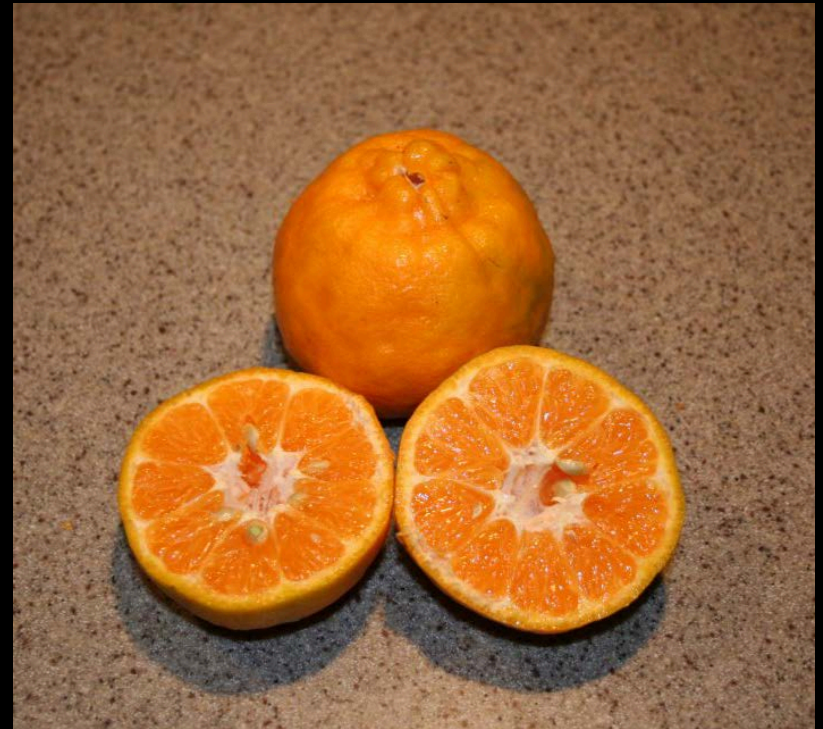
- The Ten Degree tangerine certainly lives up to its name. My tree has never been exposed to 10 F but has sailed thru a night of 13 F with flying colors. Tree is very thorny but produces good crops of tangerines with a somewhat sweet/tart flavor. The ten degree tangerine was developed in Texas and has Yuzu and some other mandarins in its bloodline.

# Ten Degree Tangerine



# Jaunita Tangerine

- A seedling with a story...this hardy tangerine was grown from a grocery store fruit and turned out to be cold hardy in South Carolina.





# Changsha (Mandarin)

- Changshas come from the foothills of China and are very cold hardy once they have grown to maturity. Fruits are small, bright orange and somewhat seedy. The flavor is very sweet and is very good as a juicer. Hardy to around 10 F .

# Changsha



# Sunquats & Marmaladequats

- More recent hybrids with sweet juice and edible peels. Thorny trees with an upright habit produce yellow fruits. Hardy to around 15F, but resprout vigorously if damaged.





# ORNAMENTAL CITRUS





# Calamondin



# Hong Kong Kumquat



# Procimequat



# Procimequat

- An ornamental hybrid between the Eustis limequat and the Hong Kong kumquat. This small, round fruit grows in clusters on thorny branches with long deep green leaves. The smooth orange rind is soft and easy to tear. The flesh is dense and contains a few seeds



# Flying Dragon Trifoliate Orange



# Flying Dragon





# Hardiness Recap...



# Hardy to 5F or lower

- Trifoliate orange (*Poncirus trifoliata*)
- Ichang Papeda (*Citrus ichangensis*)
- Citrandarins (*Poncirus* x *mandarin*)
- Citranges (*Poncirus* x *C sinensis*)
- Citrumelos (*Poncirus* x *grapefruit*)
- Nansho Daidai (*Citrus tiawanica*)



# Hardy to 10F

- Bloomsweet or Kinkoji Grapefruit
- Citrangequats
- Ichang Lemon (*ichangensis* x *maxima*)
- Yuzu
- Yuzuquat (yuzu x kumquat)
- Nippon Orangequat
- Changsha Mandarin
- Jaunita Tangerine

# Hardy to low to mid Teens

- Keraji Mandarin
- Seville Sour Orange
- Kumquats (Fortunella species)
- Procimequat
- Sunquat and marmaladequat

# Hayes' Picks

- Ichang Lemon
- Morton Citrange
- Thomasville Citrangequats



# Uses

- Juices and Aides
- Cooking and garnishing
- Fresh eating
- Marmalades
- Zests
- Aromatic Qualities





# Best Marmalades

- Rusk
- Thomasville
- Nippon Orangequat
- Sunquat
- Marmaladequat



# CULTURE



# Culture Tips

- Full sun for best fruit production, will tolerate some shade
- Plant in spring to allow plants to establish
- Protect from sudden freezes especially when small
- Utilize microclimates

# Propagation





# Seed Propagation

- Citrus seed is unusual compared to most fruit crops because it forms nucellar embryos (maternal clones) in addition to the zygotic embryo produced through fertilization.
- Exceptions include some tangerines and the pummelo, in which only a zygotic embryo forms (a M-F cross) Otherwise, clonal propagation occurs in citrus seed (rare in horticultural crops).

# Maintenance

- Citrus maintenance mainly consists of fertilization and watering during droughts.



# Fertilizer

- Citrus are heavy feeders. A complete fertilizer is always suitable.
- Refrain from fertilizing after August to allow plants to harden off and go dormant before frost and freezing temps.



# Pruning

- Citrus require little pruning. Although new growth is often rank, refrain from pruning these shoots .
- Always remove suckers from below the graft.





# Protecting

- Occasional severe cold snaps can damage citrus especially to small and newly planted trees. Covering with cloth and even Christmas lights for a little extra heat will always be a benefit.



# Insects

- Many insects can infest citrus, but most commonly seen are aphids and spider mites.
- Periodical Inspection and occasional soapy water is an easy method for control.



# Diseases

- There are numerous diseases that affect citrus, but more so in commercial production areas... Consult local Extension 😊
- Buy healthy plants from reliable sources.
- Plants from seeds carry no viruses.



# Florida Citrus Ban due to Citrus Greening





# Hardy Citrus Expo



# Sources

- Mckenzie Farms (SC) mail order
- Woodlanders Nursery (SC) mail order
- Ponds and Plants (Dayton, TN) retail
- Petals from the Past (Jemison, AL) retail
- Plantfolks Nursery (Port Royal, SC) retail
- KEEP IN MIND AGRICULTURE LAWS ☺

# Questions?

