

CMG APPRENTICES AND
CONTINUING EDUCATION

TREE FRUIT BASICS



Susan Carter, Horticulture and Natural Resource Agent,
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COLORADO STATE UNIVERSITY
EXTENSION



There is a long history of fruit being grown in the Grand Valley, Western Colorado

Growing Good Fruit takes a lot of planning and WORK!

Fruit trees are the highest maintenance plant!

Even growing organic, you must spray and implement controls.

Is it cheaper to buy fruit?



Topics on Basic Fruit Growing:

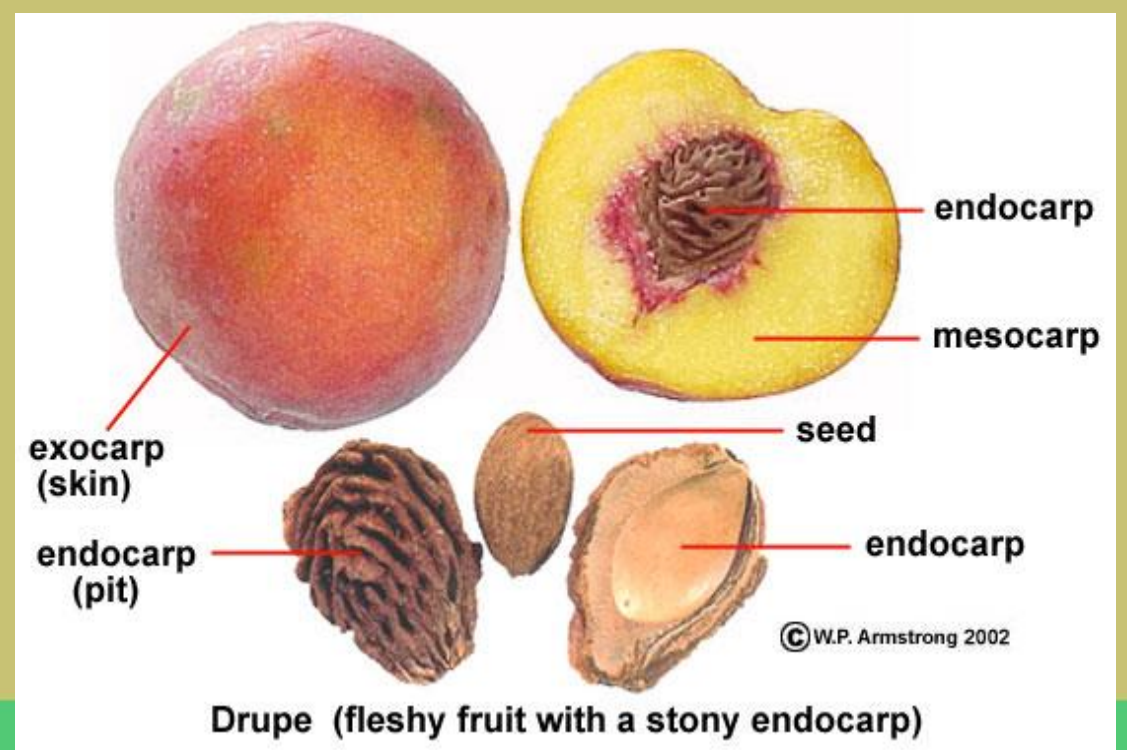
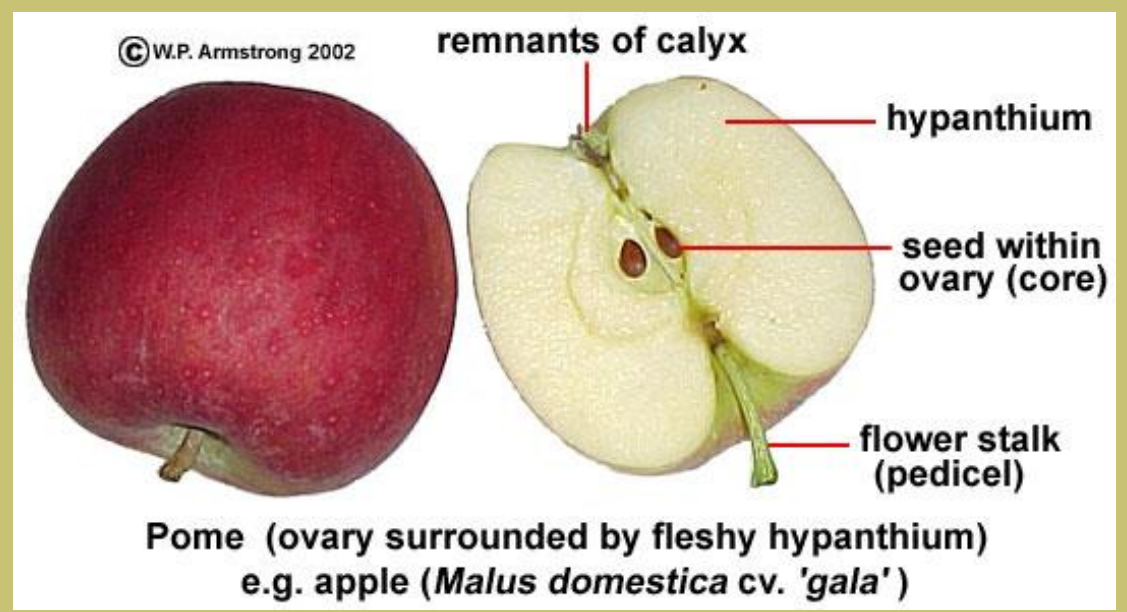
- Site selection
- Climate/microclimate
- Air Movement
- Soils
- Rootstocks / selection
- Planting / watering
- Pruning/ training
- Spraying
- Fertilizing
- Thinning
- Spraying
- Picking
- Cleanup

Types of Fruit

All of these fruits are in the **Rose Family, *Rosaceae***. Thus there is similarities in needs, and issues.

Pome - most of the fruit is formed from the receptacle (under the flower) A thick, fleshy hypanthium layer surrounds (and is fused with) the seed-bearing ovary or core. Examples are Apple, Pear and Quince

Drupe (Stone Fruits) - has fleshy fruit and a single seed with a hard endocarp. Composed of three distinct layers: An outer skin or exocarp, a fleshy middle layer or mesocarp, and a hard, woody layer (endocarp) surrounding the seed. Examples Peach, plum, apricot, cherry.



Most homeowners can't have a fan in their yard.

Growers go thru sleepless nights in spring and fall to protect their crops.

Picture by Emily at OMRS/CSU Western Campus.



Site Selection: Climate

- **Climate/microclimate**

Temperatures!

Winter extremes, Acclimation
Spring Freezes

- **Air Movement**

Frost happens during cold clear nights.

Fans can increase temp by 3 degrees.

Irrigation also can be used.

Homeowners can use a blanket.

AIR MOVEMENT AND COLD Considerations

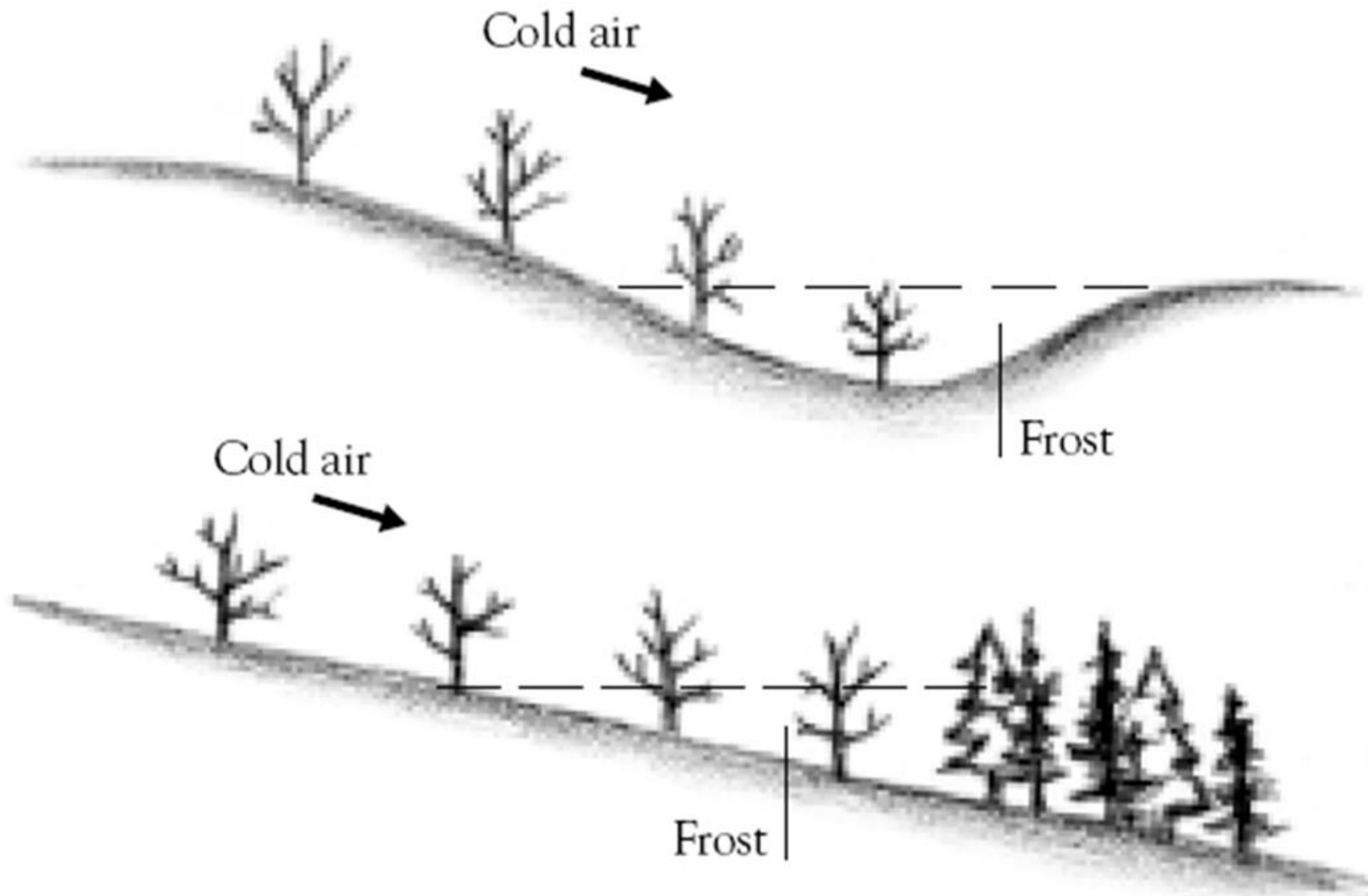


AIR MOVEMENT AND COLD



Wind and water





Movement of Cold Air

Cold settles to the lowest point and follows water.

The movement of this cold air can be blocked by trees, fences, buildings, hills...

Cold Effects on Buds- Spring Freezes

Calyx Green

10% killed at 21 degrees

90% killed at 5 degrees

Pink Stage

10% killed at 25 degrees

90% killed at 15 degrees



Clemson



Clemson

Cold Effects on Buds- Spring Freezes

Full bloom

10% killed at 26 degrees

90% killed at 21 degrees

Microclimates

Bookcliff effect and the \$1,000,000 wind

Slopes have better air drainage

Avoid cold sinks

South facing exposures may be too warm



Microclimates in the yard

East exposure typically the most moderate

Fruit buds on plants set in a low spot are more likely to be killed than those on a slope

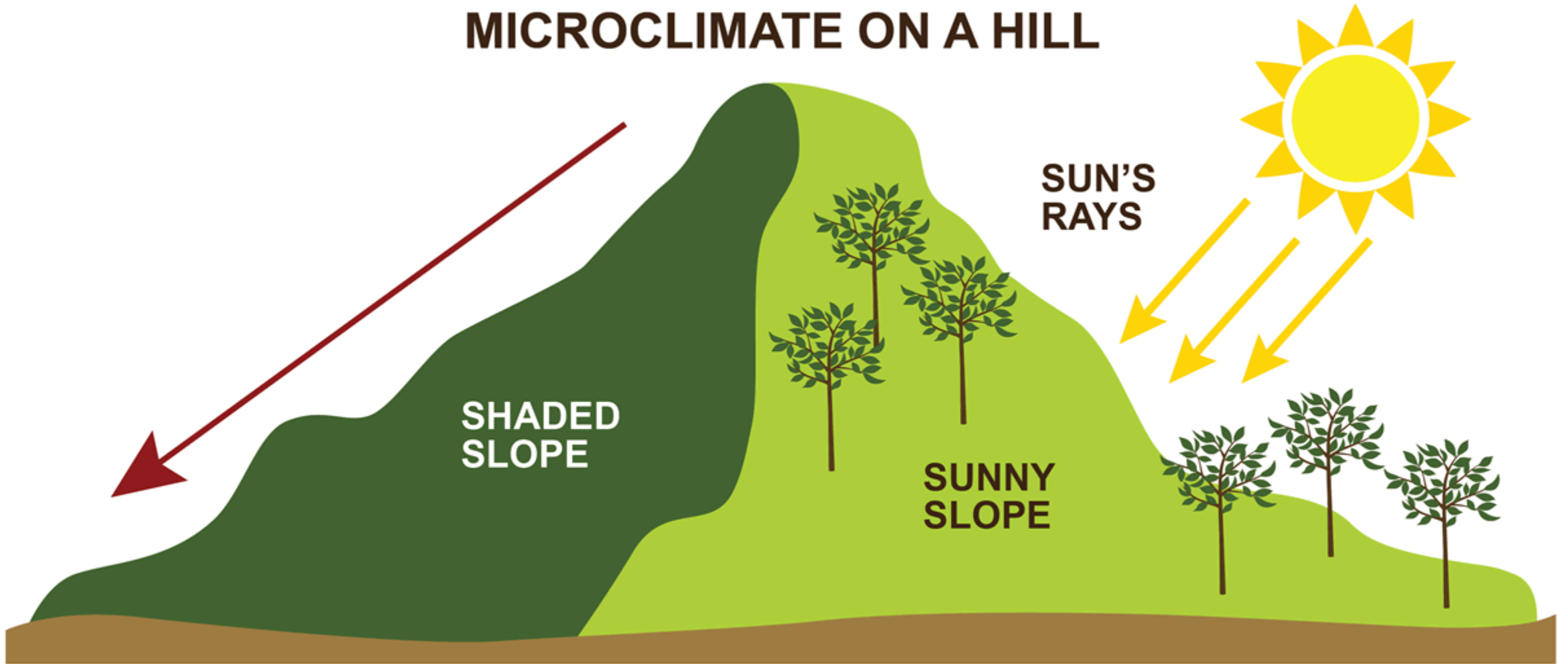
Frost pockets; low, wet spots; and locations exposed to strong, prevailing winds must be avoided.

South-facing slopes/structures encourage early bud development and can result in frost damage.

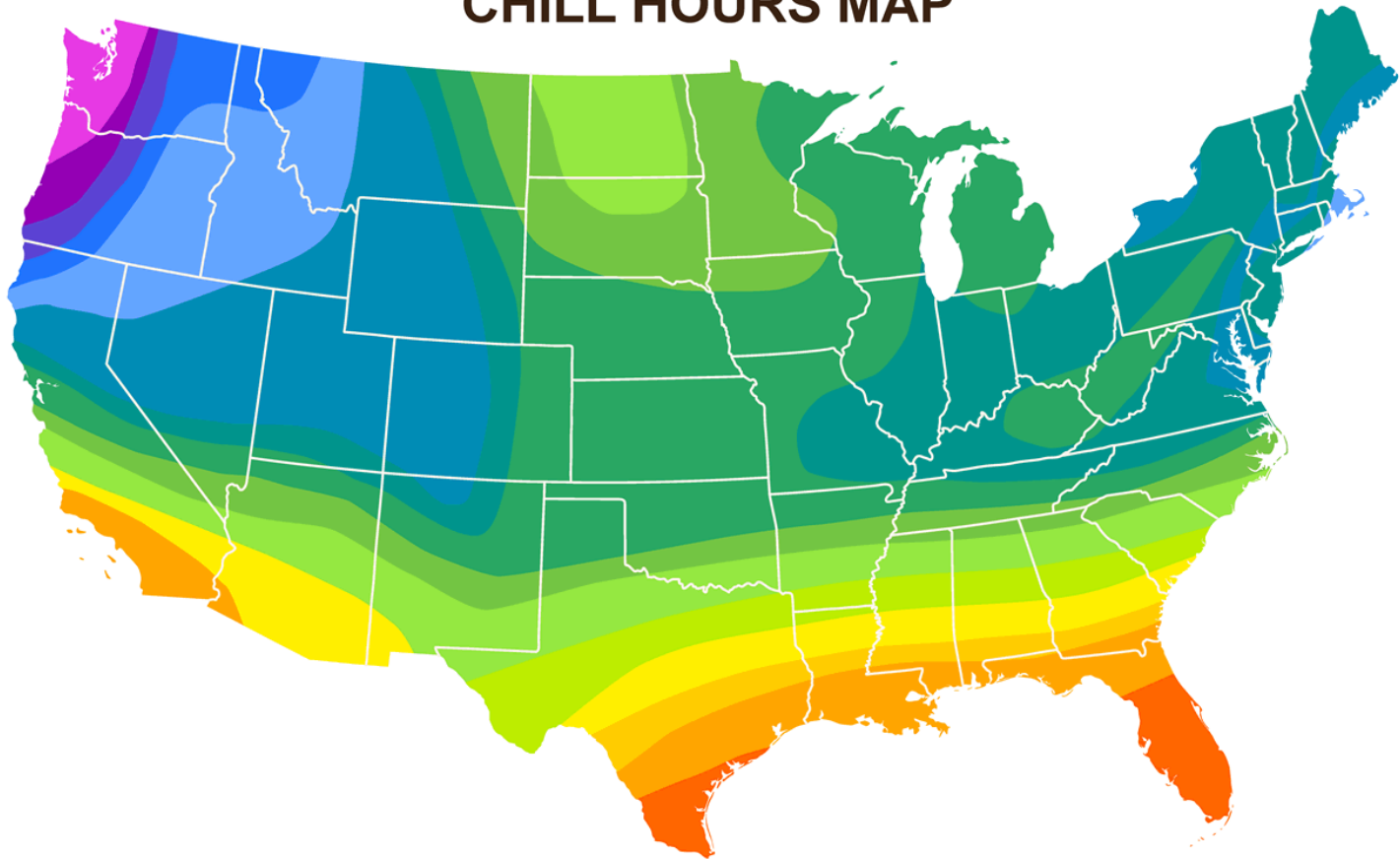
Think about your site and climate.

Wind, slope, thermal mass, sun

MICROCLIMATE ON A HILL



CHILL HOURS MAP



Based on data from the University of Maryland

Chill vs. Degree or Growing Days

Chill: minimum period of cold weather (32-45 degrees F) after which a fruit-bearing tree will blossom. It is often expressed in chill hours

Growing degree-days (GGDs), is a method of predicting crop and insect development. Differing threshold temperatures and beginning accumulation dates are used to determine accumulated heat units for different crops.



Soils

- Do a soil test at least one year prior and correct problems prior to plant.
- Previous pastures are a great place to plant fruit trees as there is typically good OM.
- Fruit trees need:
 - Well-drained soil (Loam)
 - Low salts
 - OM 5%
 - Optimum pH 6.0-7.5, ours higher
 - No perennial weeds



Soils

Good drainage

Don't do well in lawns- Lawns and trees in general have different watering needs.



Soil tests

CSU Soil, Water & Plant Testing Lab
Ward Laboratory
American Agricultural Lab., Inc.

Replant issues

WATER / IRRIGATION



agrifetoday.tamu.edu-texas-crop-weather-pecan-orchard-irrigation

Water: availability?

irrigation system- drip, micro-spray

pH- is the pH of the water high

Precipitation- 7-10" in GJ

snow load- breakage, water source, growing season

Ideally keeping trunk dry but watering root zone and cover crop or grass



Plant Selection

- Always buy certified disease free
- Nurseries and Garden Centers will have better trees (rootstocks) than the big box stores
- PLAN- look at pollination needs, bloom time to match your microclimate, size ...
- And of course, WHY do you want the tree- Fresh, frozen, pie, jelly, fruit leather...



Factors to consider when choosing varieties:

Flavor

Hardiness

Will they store well

Disease resistance

Did you know?

At one point, there were 20,000 varieties of Apples in the world and that there are 25 characteristics to id them.

There are about 1000 cultivars historically, some dating back 4000 yrs in China.

Pollination

Cross-pollinated stone fruits

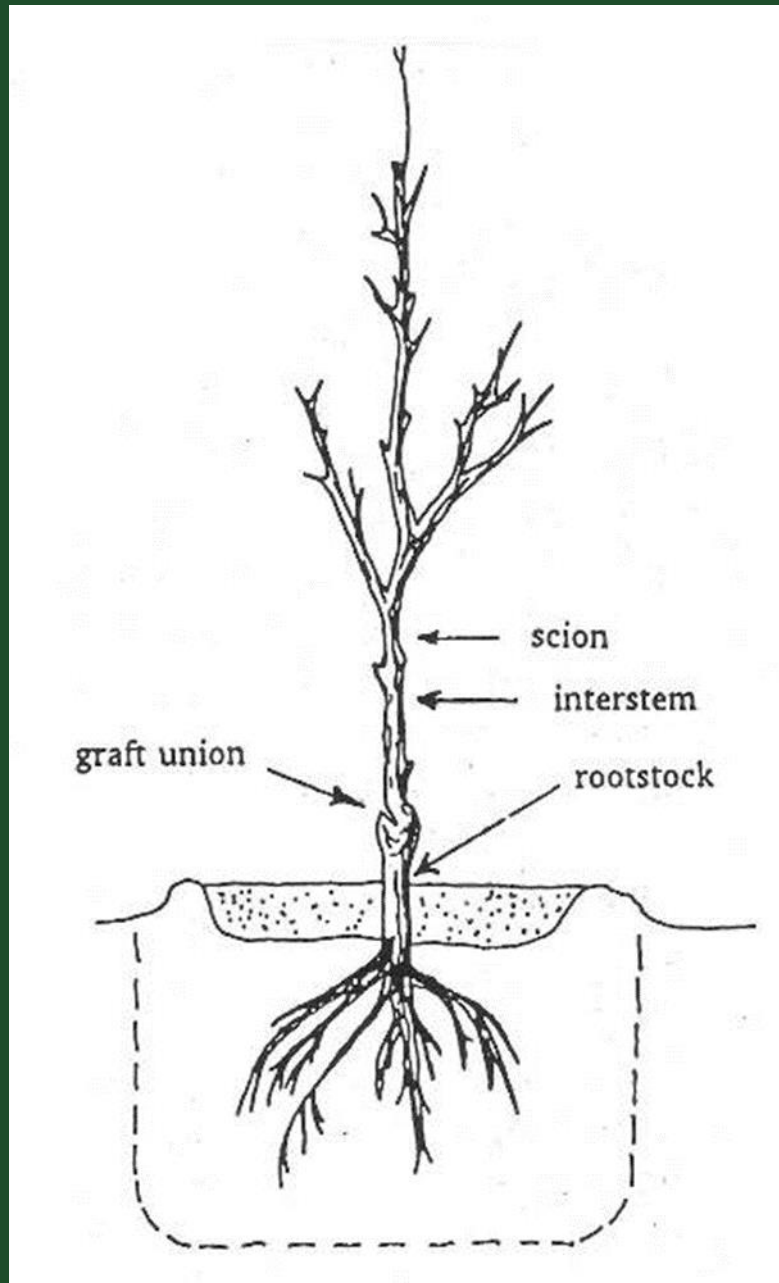
- (transfer of pollen between two varieties)
- Sweet cherries
- Japanese plums
- Pears- both

Self-pollinated stone fruits

- (pollination occurs within the same variety)
- Peaches
- Nectarines
- Sour cherries
- Plums
- Apples- but better if cross pollinated



CSU Extension photo

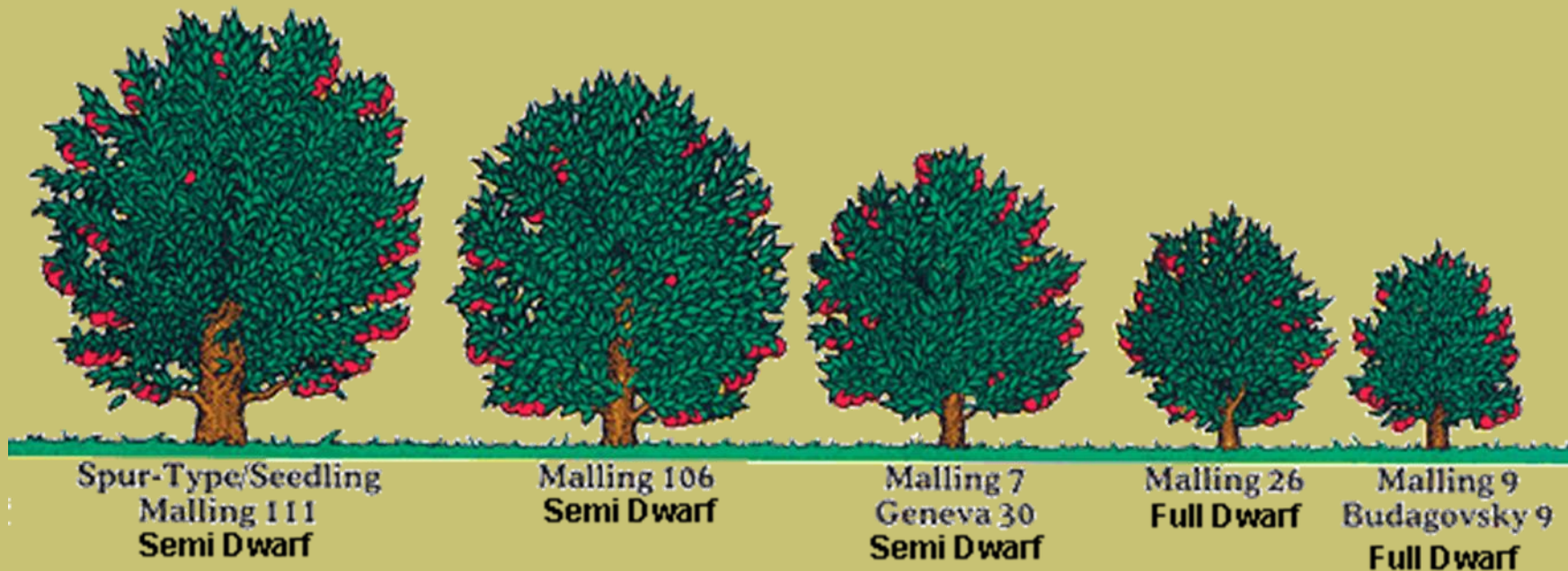


Plant Selection

- Rootstocks play a huge factor in what the tree will be- size, hardiness, fruit quantity and quality...
- The rootstock should be a dwarfing rootstock.
- Do your homework and buy from a similar climate and healthy, resistant stock.
- The scion is the part that was grafted to the rootstock. Cutting typically taken in Jan/Feb.

Apple Rootstocks

Influences height, rooting and anchorage of trees...



85-100%

14-18' sp.

Exc.

Anchorage

80%

12-16' sp.

Exc. Anc.

70%

10-14' sp.

Fair Anc.

50%

8-12' sp.

Poor Anc.

35%

4-8' sp.

Poor Anc



Planting

- Graft above ground
- Root flare above ground
- Spread roots
- Trim off broken or extra long roots
- Layer soil
- You can water as you layer or water well afterwards



OSU Extension

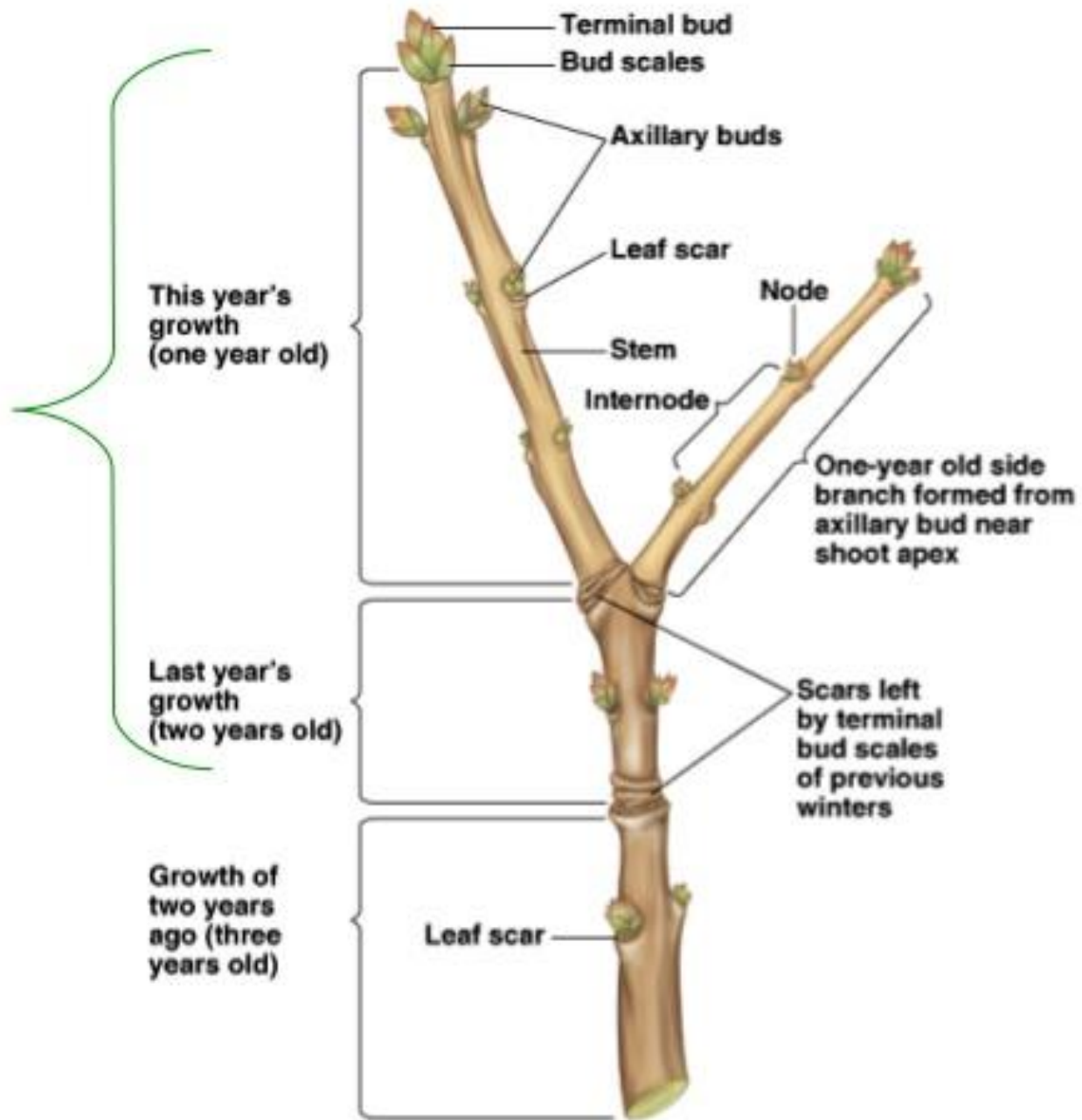
Watering fruit trees

Irrigating is essential. During the first year from planting, young fruit trees should receive 3-5 gallons, twice a week. Sprinkler or drip irrigation may be enough. You'll want to check the soil to ensure that it is moist to a depth of 6-12" inches near the tree. Deep watering is essential to root development.

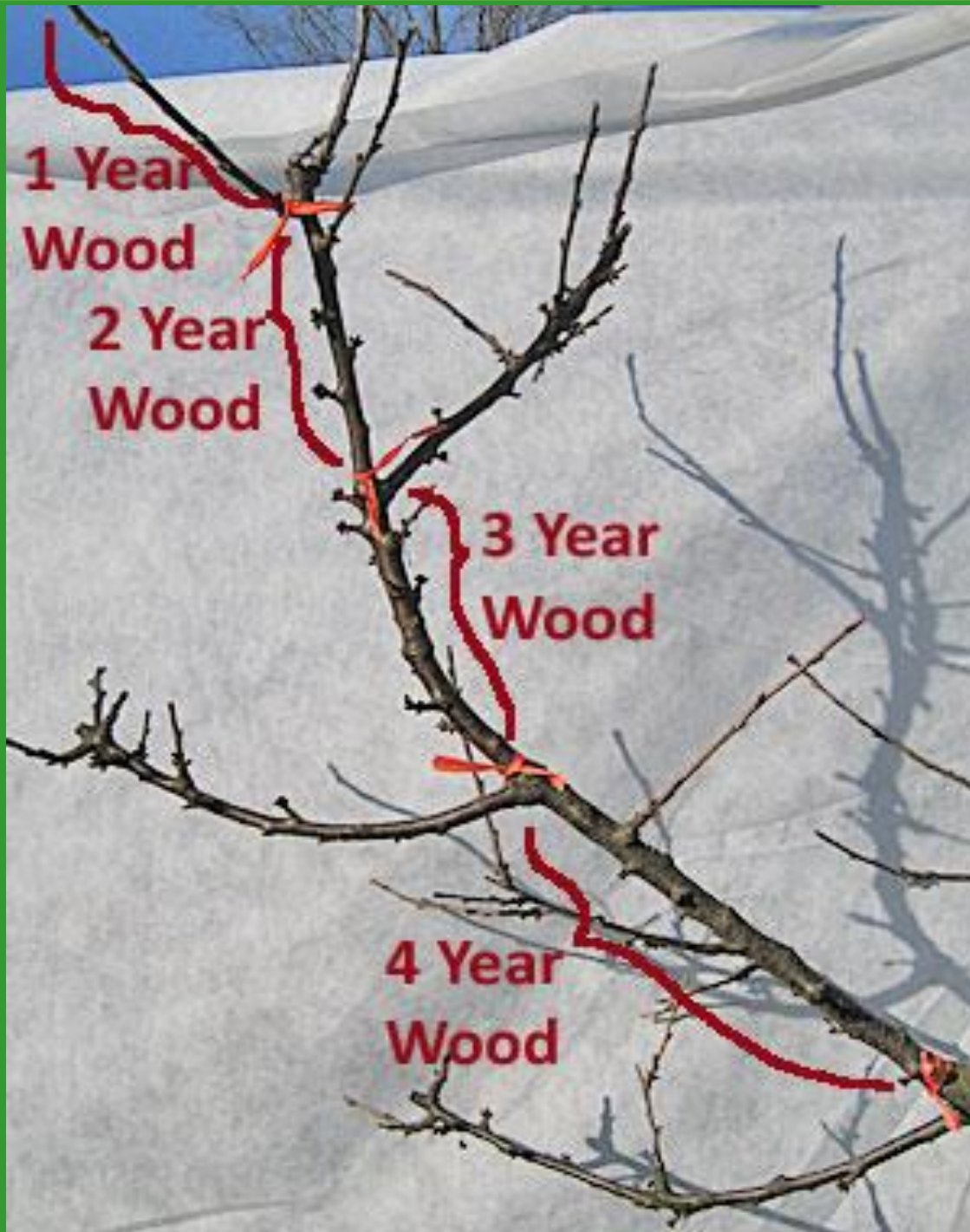
In subsequent years, trees will need to receive 1-3" of water per week during the dry summer months and into the fall. Don't reduce water in the fall until the leaves have dropped from the trees. Irrigation can be suspended following significant rain storms.

- USU Recommendations

Scion wood
Should be
One or two
Years old



General Tree Anatomy



Fruiting Wood

- Apple - terminal with some lateral, on spurs, 2-5 year old wood depend. on variety
- Pear - same as apples
- Peach - lateral, never terminal, one year-old wood
- Apricot - mainly on lateral spurs, also one year-old wood
- Sweet Cherry - lateral, never terminal, on spurs and shoots
- Sour Cherry - lateral, mostly on shoots, not as many on spurs as with sweet cherry



Fruiting Wood

- Fruiting wood of Cherry
- These are fruiting spurs

Training and Pruning



Colostate image

Many different systems out there.
Pick what matches your property and the growth of the tree and rootstock you have picked.
The main point of pruning is to capture the sun- photosynthesis equals fruit production.

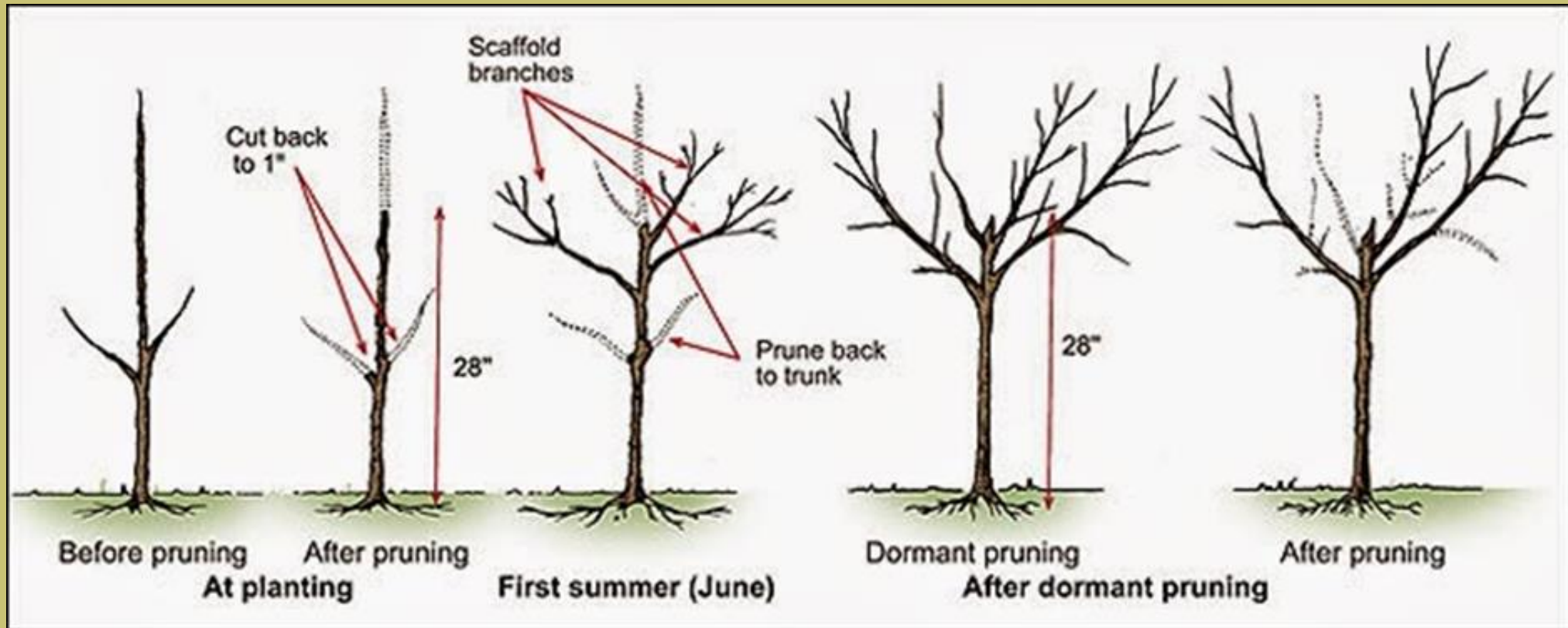
This perpendicular V pruning system of peaches used for production.



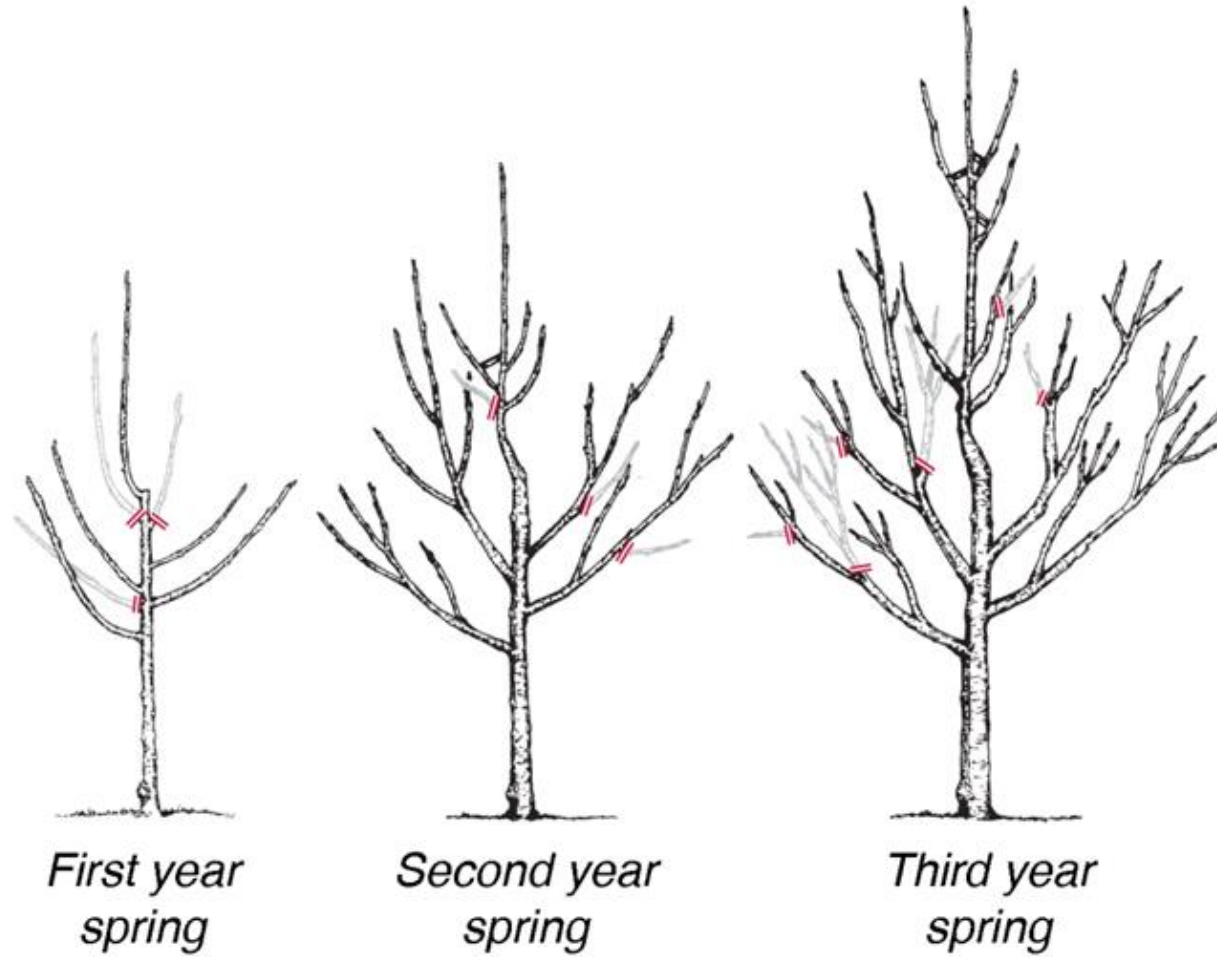
Figure 2. Young peach tree pruned to an "open center vase".

Pruning and training

1 year old fruiting wood on peaches



Pruning and training with Central Leader



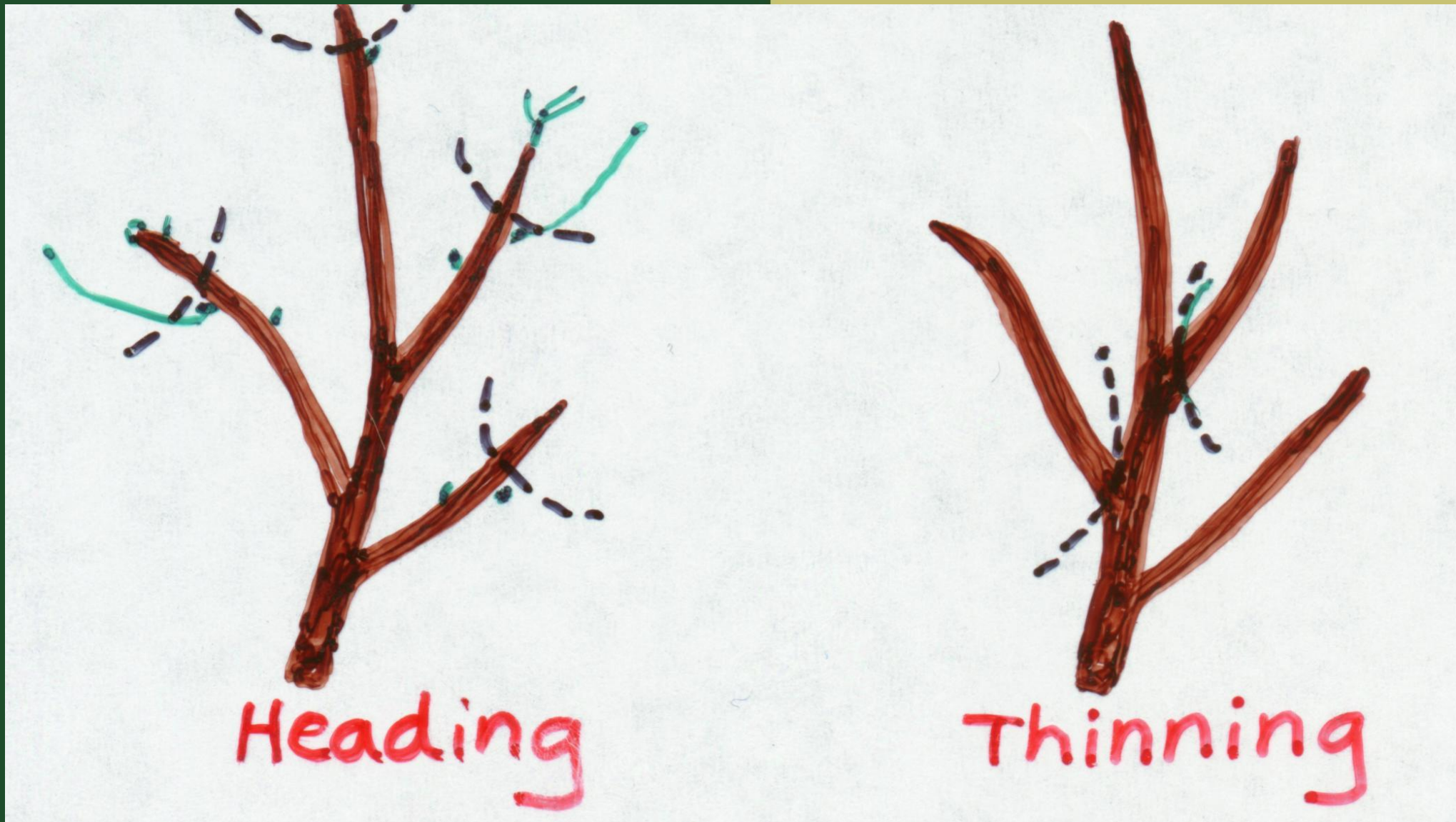
Central leader pruning

Annual pruning types of cuts:

- **Renewing cuts**- removing old wood, but cutting to leave dormant buds to grow
- **Thinning cuts**- eliminate undesirable growth and to open the tree up. Removes the branch all the way back to where it originated.
- **Heading cuts** -the tips of the branch or trunk are removed. Heading cuts are used on young fruit trees to encourage lateral branch formation.



Renewing cut on Barlett Pear, WSU





Pruning Objectives

- Let sun in for good growth (leaves) and fruit production.
- Provide uniform distribution of fruiting wood. Manage the years of growth for continued fruiting.
- Control size and health of the tree. Remove dead, dying and diseased wood.
- Reduce limb breakage
- Increase aeration to decrease disease
- Produce quality fruit



Pruning Tools

Good Bypass Pruners

Fruit tree loppers

Hand Saw for large branches



Cleaning supplies to prevent spread of disease:

Disinfectant- Lysol, 10% alcohol, etc..

Let it dry



Dispose of diseased wood- burn, bury, city dump

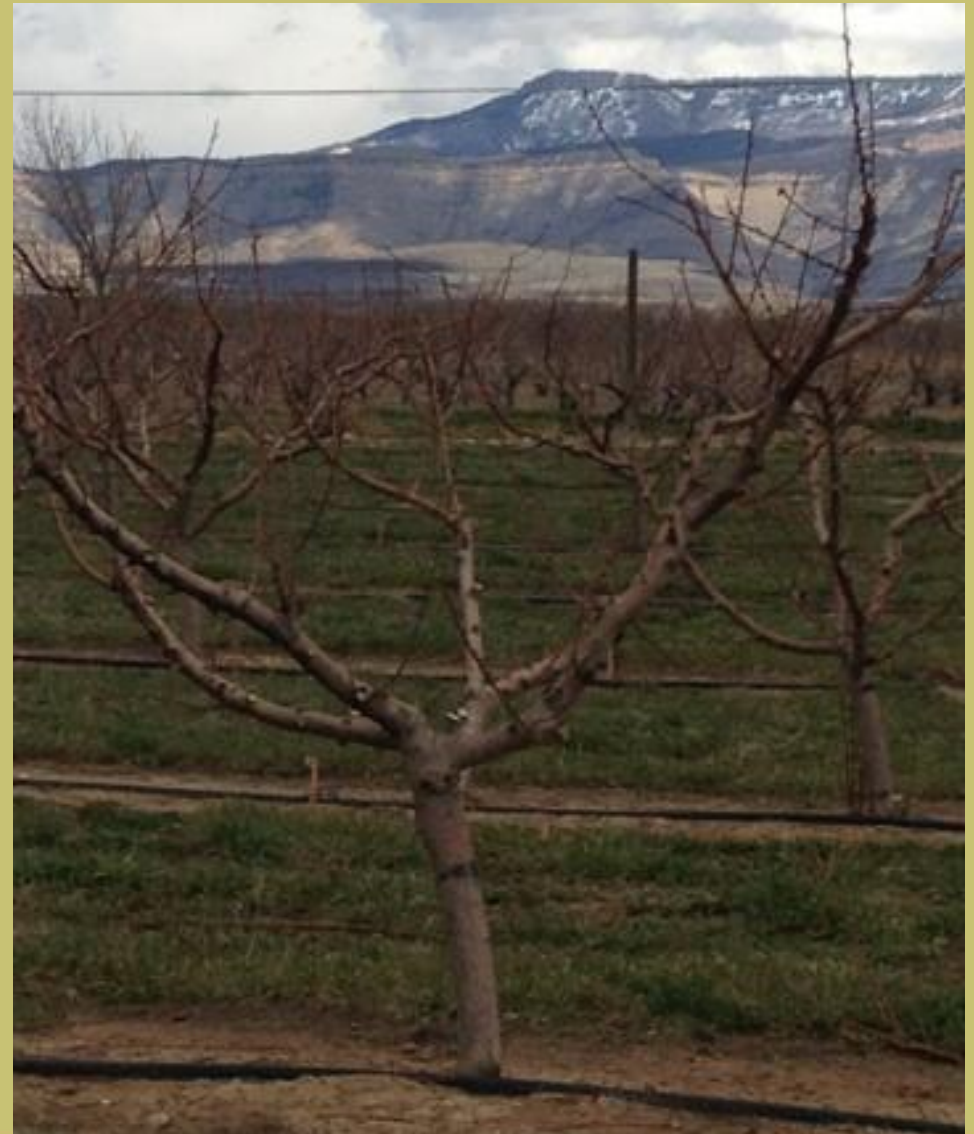
Pruning Yesterday



Pruning Today

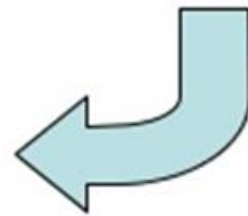


Before and After



Factors to consider when pruning:

“Bench cuts” produce strong vertical growth at the cut →



Bench Cuts

Used to keep trees pedestrian. Gives them a scalloped look. Will need to prune vertical growth the following year.

With any pruning system, keep a few small inward branches to shade main branches.

Pruning Videos



Pruning Peaches into an open vase, USUE

<https://www.youtube.com/watch?v=XzI-OaUKbE>

Pruning an apple with a modified central leader, USUE

https://www.youtube.com/watch?v=f3dMf_4OtLA

Pruning an apple with Carol O'Meara, CSUE

<https://www.youtube.com/watch?v=1SzDPmAOZKo>

Thinning of Fruit

- Pruning is the first stage of thinning, you just thinned off potential fruit
- Cherries are not thinned, all others are.
- Thinning produces larger juicier fruit.
- Thinning can help with some insects like Codling Moth on apples.
- Thinning prevents limb breakage.



Thinning of peaches, U of Maine Extension



Thinning

- Start by removing the ones at the tip, then every 6-8" - peaches, nectarine, apricot, pear. Plums not as important.
- For apples, ideally you end up with one apple per cluster.
- Thin when fruit is larger than a dime, but smaller than a quarter.
- If wait too late, tree still thinks it has many fruit and will still produce less juicy, smaller fruits.



See how these fruit trees are not doing well. They have crown rot. Moisture is kept around their base from the weeds and air is blocked. CSUE TRA

Weed Control

- Essential the first 3 years of a young tree.
 - Reduces competition for water and nutrients.
 - Keep just soil under tree for those first few years.
 - Weeds can harbor many unwanted insects and promote disease.
 - Plant a drought tolerant grass or cover crop around your trees or mulch out past the soil ring.

Herbicide Damage

- Herbicides can be safely used- Read and follow the label! Pay attention to rate, wind, temperature...

A close-up photograph of an apricot branch showing significant damage from 2,4-D herbicide. The leaves are severely distorted, curled, and have a yellowish-green, necrotic appearance. The branch itself is thin and woody.

2-4 D Herbicide Damage on Apricot



Fertilizing

- Nitrogen-Go by how much growth:

Bearing Trees	
Apple Non-Spur	6 to 18 inches
Apple Spur-type	6 to 10 inches
Pear	12 to 16 inches
Peach & Nectarine	12 to 18 inches
Tart Cherry	~ 8 inches
Plum & Sweet Cherry	~ 8 inches

Fertilize **stone fruit** at a maximum rate of 1/8 pound of nitrogen per inch of trunk diameter if tree's annual growth is the low end, above. Apply less fertilizer if the previous season's growth rate falls in between the growth increments. Too much nitrogen can lead to excessive leaf and tree growth over fruit production.

Fertilize **pome fruit** trees at a maximum rate of 1/10th pound of nitrogen per inch of trunk diameter, if previous year's growth was at the low end of the recommended rate. As with stone fruits, apply less nitrogen the closer the actual growth rate approximates the recommended growth rate.

Fertilizing

- Calcium- most of our soils are high in calcium but due to high pH, compaction and overwatering, trees may struggle to uptake calcium. Apples can develop spots, esp. in storage. This is called bitter pit. Plant varieties that are resistant like Winesap or Delicious.



Bitter pit from calcium deficiency in apple, wsu.edu

Fertilizing

- Iron- deficiency is yellow leaves with green veins at tips of branches. Apply chelated iron, don't overwater, add organic matter if needed.



Iron deficiency in peach, USU

Fertilizing

- Zinc- Interveinal chlorosis, pointy leaves-a common micronutrient deficiency. spray prior to bud break in the spring is recommended.

<https://extension.colostate.edu/topic-areas/yard-garden/fertilizing-fruit-trees-7-612/>



Mild Zinc deficiency in peach, ucanr

The End

- Join us for Issues of Fruit trees after lunch. Questions?

