Home Orchards

Cowlitz County Master Gardener Program

Revised 1 - 2021

WASHINGTON STATE UNIVERSITY EXTENSION

Master Gardener Program

Topics:

- Climate.
- Legal Issues.
- Planning.
- Variety Selection.
- Rootstock.
- Site Selection & Planting.
- Irrigation.
- Pruning.
- Fertilizing.
- Fruit Thinning.
- Weed Management.
- Vertebrate Pests.
- Harvesting & Handling.

Western Washington:

- Coastal maritime climate.
- Mild, wet winters.
- Wet springs.
- Dry Summers
- Micro-climates.

The Legal Aspect:

Along with the pleasure of growing fruit & nuts in your orchard you have a legal responsibility to control insect pests & disease year-round.

Pear slug

Spotted wing drosophila fruit fly

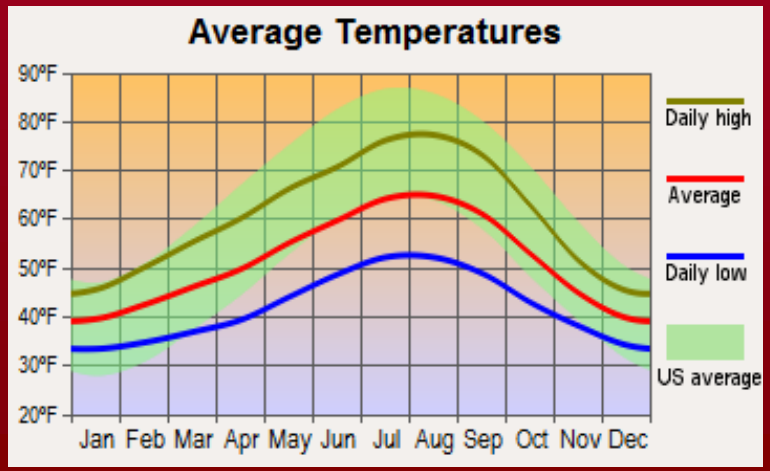
Tent caterpillar

Apple Maggot

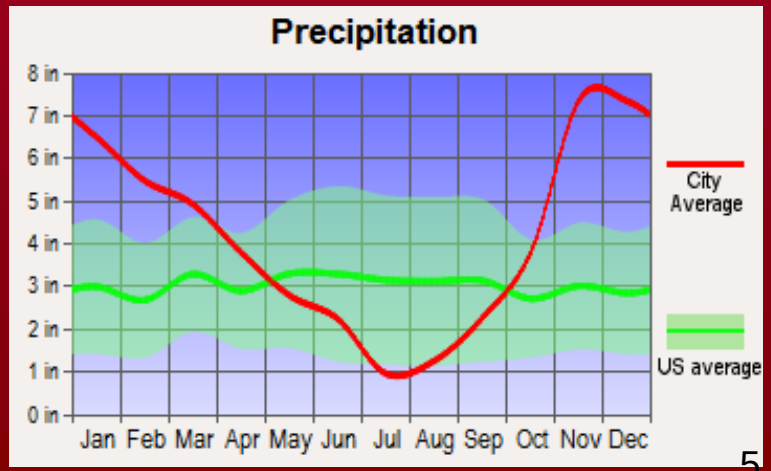
Coddling Moth

Fruit & Nut Trees for the PNW:

- There are a lot of limiting factors, with climate being the main one.
- Most fruit trees require at least 150 frost-free days.
- We are blessed with adequate water & soil, long & warm summer days, cool nights, winter chill for dormancy & a long growing season (approx. 197 frost free days).



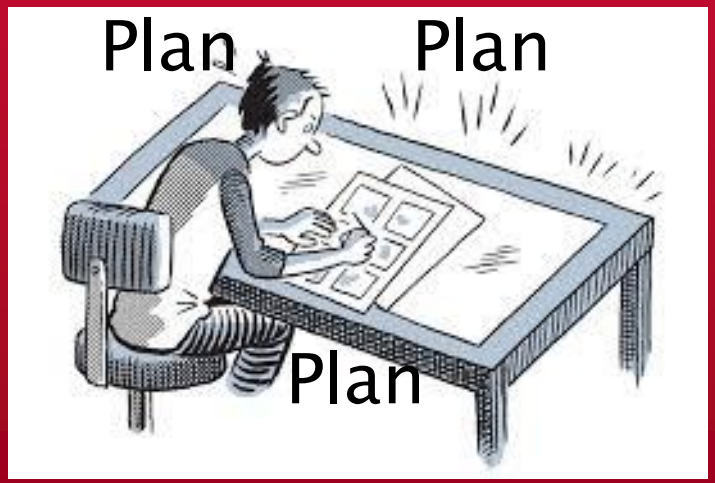
Cowlitz County



Planning:

- Variety Selection.
- Rootstock Selection.
- Pollination Requirements.

The more info the better!!!



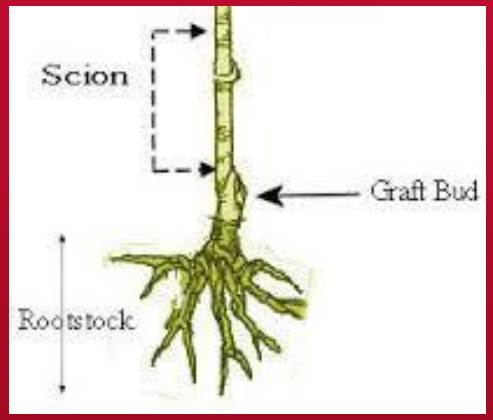
Variety Selection:

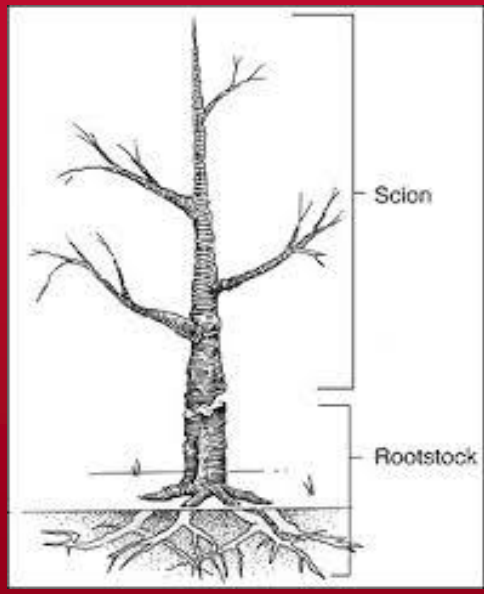
- Is going to greatly depend on your location!
- Know your conditions before you select.

- Apples: hundreds of varieties.
- Cherries: fruit flavor is the key.
- Pears: European or Asian.
- Stone Fruits: fruit productivity & disease susceptibility in Western Wash.
- Nuts: hazelnuts, walnuts & chestnuts.

Scion / Rootstock:

- Scion - above ground portion of the fruit tree. Can be collected at pruning.
- Rootstock - the bottom portion that makes up the root & collar. Rootstock must be compatible to the desired tree.
- A tree grown from a seed is grown on seedling rootstock.





Rootstock:

Grafting onto rootstock that is already established allows young fruit trees to bear fruit earlier.

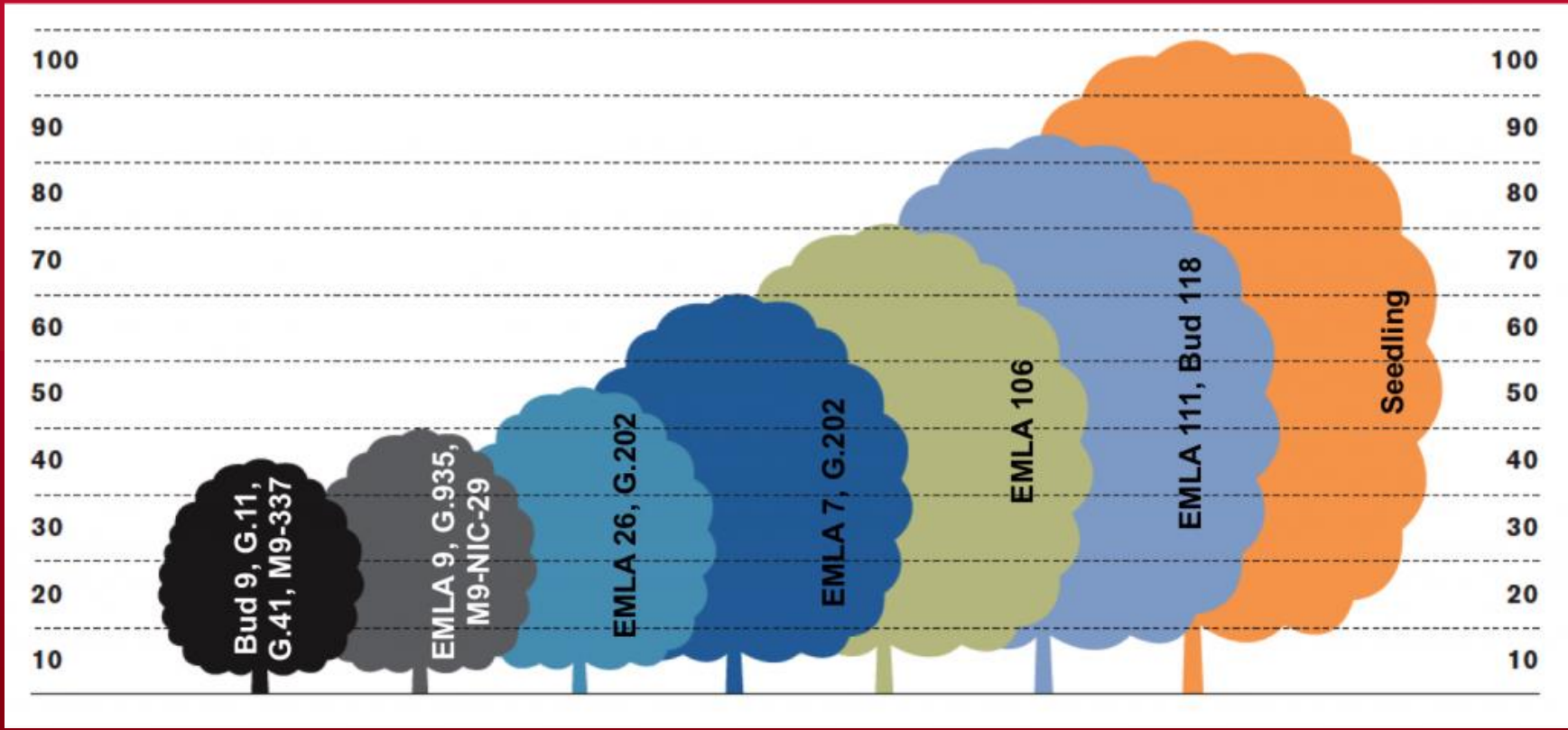
- Rootstock plants also determine:
  - Tree and root system size.
  - Fruit yield efficiency.
  - Longevity of the plant.
  - Resistance to pests and disease.
  - Cold hardiness.
  - Tree’s ability to adapt to soil types.

Rootstock:

Apple trees can grow up to 30 feet (know your labels):

- MM.111: 90% height of a tree planted from seed. (27 ft).
- MM.106: 60 - 75% height of a tree planted from seed. (18 - 22.5 ft).
- M.7, G.30, Supporter 4: 55 - 65% height of a tree planted from seed. (16.5 - 19.5 ft).
- M.26, G.11: 40 - 50% height of a tree planted from seed. (12 - 15 ft).
- M.9, Bud 9: 25 - 35% height of a tree planted from seed. (6.9 - 10.5 ft) support may be required.
- M.27 - less than 25% height (containers). (<6.9 ft).

Apple Rootstock:



Rootstock:

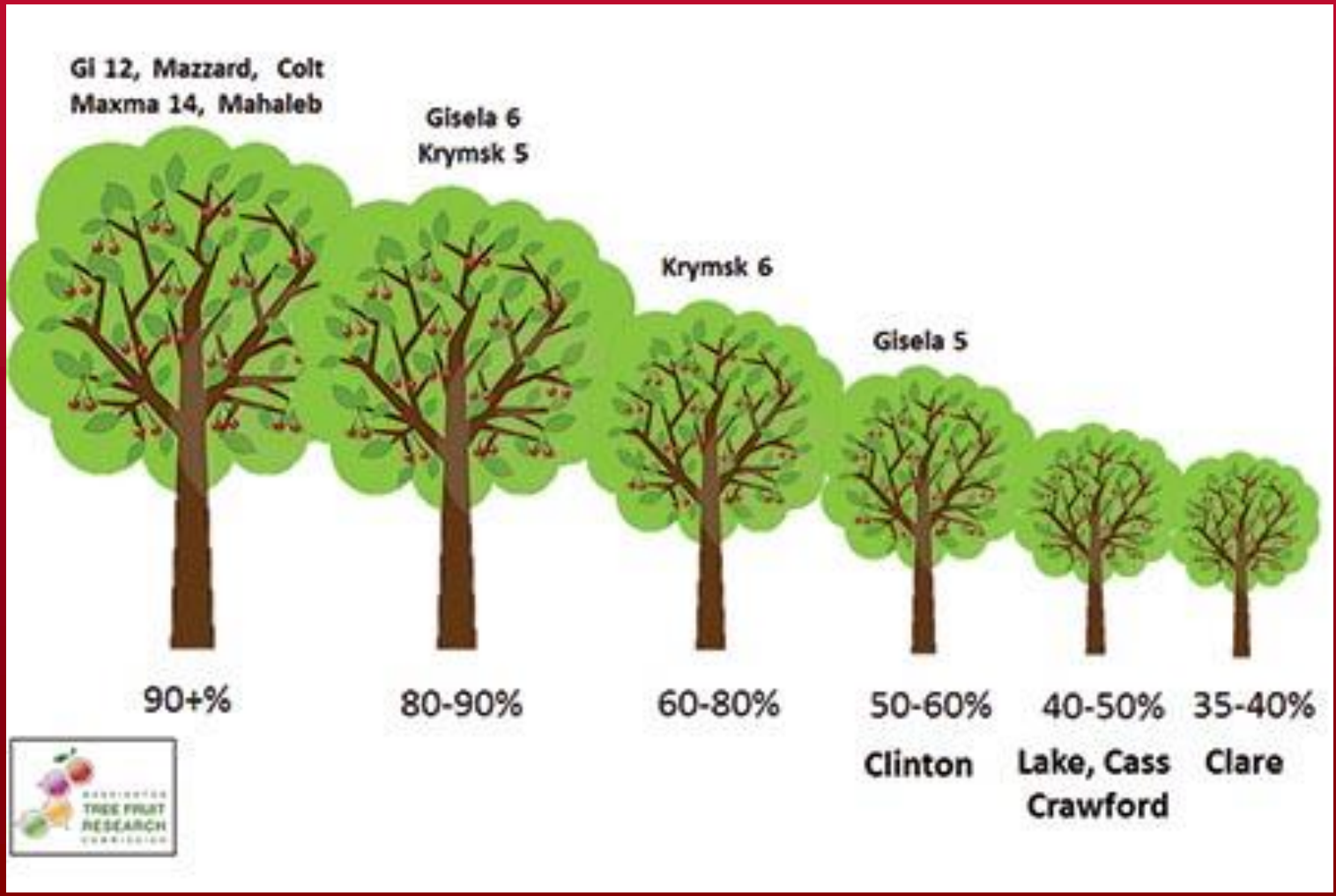
Other Fruit & Nuts: dwarfing rootstocks are not so common.

- Pears on one of many rootstocks. A standard pear tree can grow 18 - 20 feet tall and 12 - 13 feet wide.
- Plums a wide variety of rootstocks. Plum rootstock can be used to grow apricots and peaches.
- Peaches usually from seed. Size controlled by pruning.
- Cherries are grown on a fibrous rootstock called Mazzard rootstock. Cherry dwarf rootstock Gisela 5 (50%), Gisela 6 (80 - 90%) & Gisela 12 (60%). New type rootstock MxM2, MxM60 & MxM14 (75 - 85%) (bear fruit early & disease resistant. A standard cherry can grow to 30 feet.

Pear Rootstock:

<40%	40-60%	61-70%	71-90%	91-100%	>100%
Amelanchier	Adams Quince	Fox 9	BM2000	Bartlett seedling	*P. betulifolia* seedling
Brossier series	Eline Quince	Fox 11	OHxF 97	Horner 4	
Crataegus	Pi-BU 3	Fox 16	OHxF 217	Winter Nelis seedling	
Malus	QR517/9	Horner 10	OHxF 220	*P. calleryana* D6	
Sorbus	QR708-36	OHxF 40	OHxF 267	*P. calleryana* seedling	
	QR719-3	OHxF 51			
	Quince EMA	OHxF 69			
	Quince BA29	OHxF 87			
	Quince EMC	OHxF 230			
	Quince C132	OHxF 333			
	Quince EMH	OHxF 513			
	Sydo Quince	Pi-BU 2			
		Pyro 2-33			
		Pyrodwarf			

Cherry Rootstock:



Pollination:

- Self-fruitful - each flower can be pollinated with pollen originating from the same fruit variety.
- Self-unfruitful - flowers are pollinated from flowers from another fruit variety.

Variety Pollinated / Pollen Source	Akane	Braeburn	Cortland	Empire	Fuji	Gala	Golden Delicious	Honey Crisp	Jonagold	Jonamac	Jonathan	Lodi	McIntosh	Paulared	Red Delicious	Red Gravenstein	Spartan	Tydemans's Early	Tydeman's Red	Winter Banana	Yellow
Akane		X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X
Braeburn	X		X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X
Cortland	X	X		X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X
Empire	X	X	X		X	X	X			X	X	X	X	X	X		X	X	X	X	X
Fuji	X	X	X	X		X	X	X		X	X	X	X	X	X		X	X	X	X	X
Gala	X	X	X	X	X			X		X	X	X	X	X	X		X	X	X	X	X
Golden Delicious	X		X	X			O	X		X	X	X	X	X	X		X	X	X	X	X
Honey Crisp	X	X	X	X	X	X	X			X	X	X	X	X	X		X	X	X	X	X
Jonagold	X	X	X	X	X	X		X		X	X	X	X	X	X		X	X	X	X	X
Jonamac	X	X	X	X	X	X	X	X			X	X	X	X	X		X	X	X	X	X
Jonathan	X	X	X	X	X	X	X	X		X		X	X	X	X		X	X	X	X	X
Lodi	X	X	X	X	X	X	X	X		X	X	O	X	X	X		X	X	X	X	X
McIntosh	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X	X	X	X
Paulared	X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X	X	X
Red Delicious	X	X	X	X	X	X	X	X		X	X	X	X	X			X	X	X	X	X
Red Gravenstein	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X
Spartan	X	X	X	X	X	X	X	X		X	X	X	X	X	X			X	X	X	X
Tydemans's Early	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X
Tydeman's Red	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	O	X	X
Winter Banana	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X		X
Yellow Transparent	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	O

credit: WSU Master Gardner publication C105

Key to symbols:
X = compatible O = partially self-compatible, but pollinizer suggested Blank space = not compatible

Pollinators:

- Bats
- Honey Bees
- Mason Bees
- Bumble Bees
- Beetles
- Humming Birds/Birds
- Butterflies
- Flies
- Wind
- Rain
- And many other insects!

Basic pollination syndrome character table.

FLOWER	bats	bees	beetles	birds	butterflies	flies	wind
color	dull white, green, purple	bright white, yellow, blue	dull white, green	orange, red, white	orange, red, purple	pale and dull to dark brown or purple, often veined	dull green or brown
odour	strong, fruity	fresh, mild, pleasant	fruity, spicy	none	spicy, none	putrid	none
shape	regular, bowl-shaped, closed during day	shallow, landing platform, tubular	large, bowl-like	large, funnel-like, no landing platform but strong perch support	narrow tube, wide landing pad	shallow, funnel-like or trap-like	regular, small, stigmas exerted, petals absent or reduced
bloom time	night	day	day	day	day	day and night	anytime
nectar	abundant, somewhat hidden	usually present	sometimes present, not hidden	ample, deeply hidden	ample, deeply hidden	usually absent	none

Site Selection & Planting:

Site Selection:

- Full Sun.
- Wind.
- Water.
- Room.
- Well-drained soils.

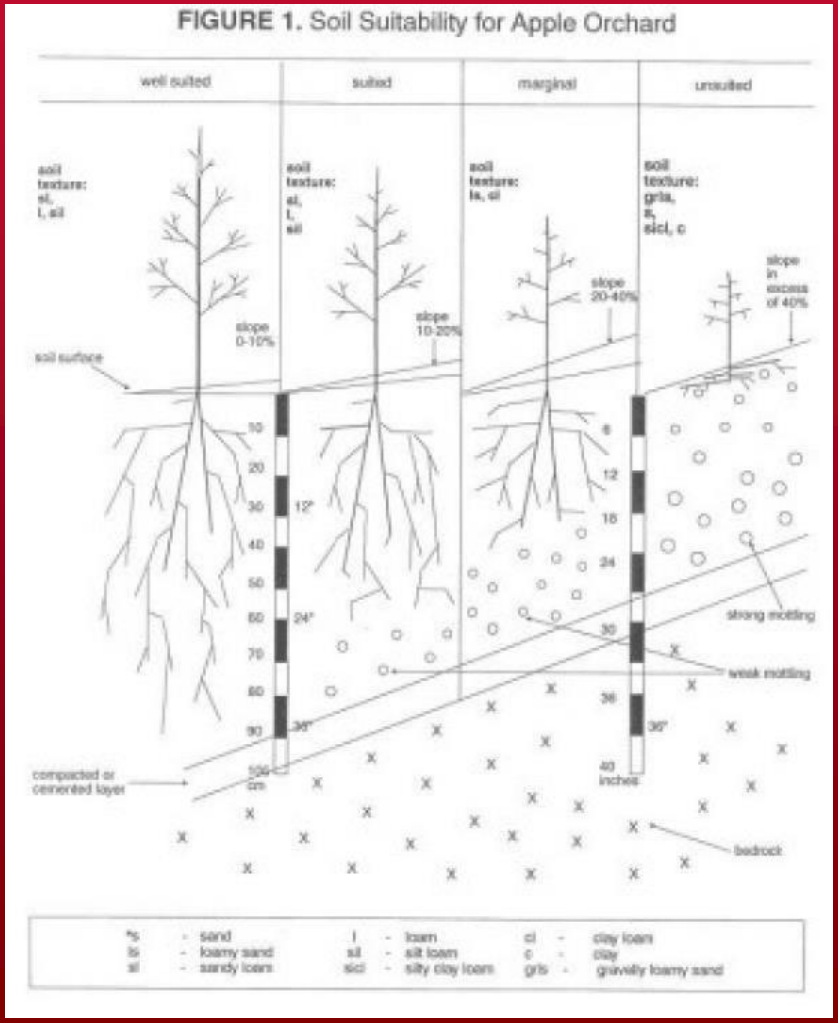
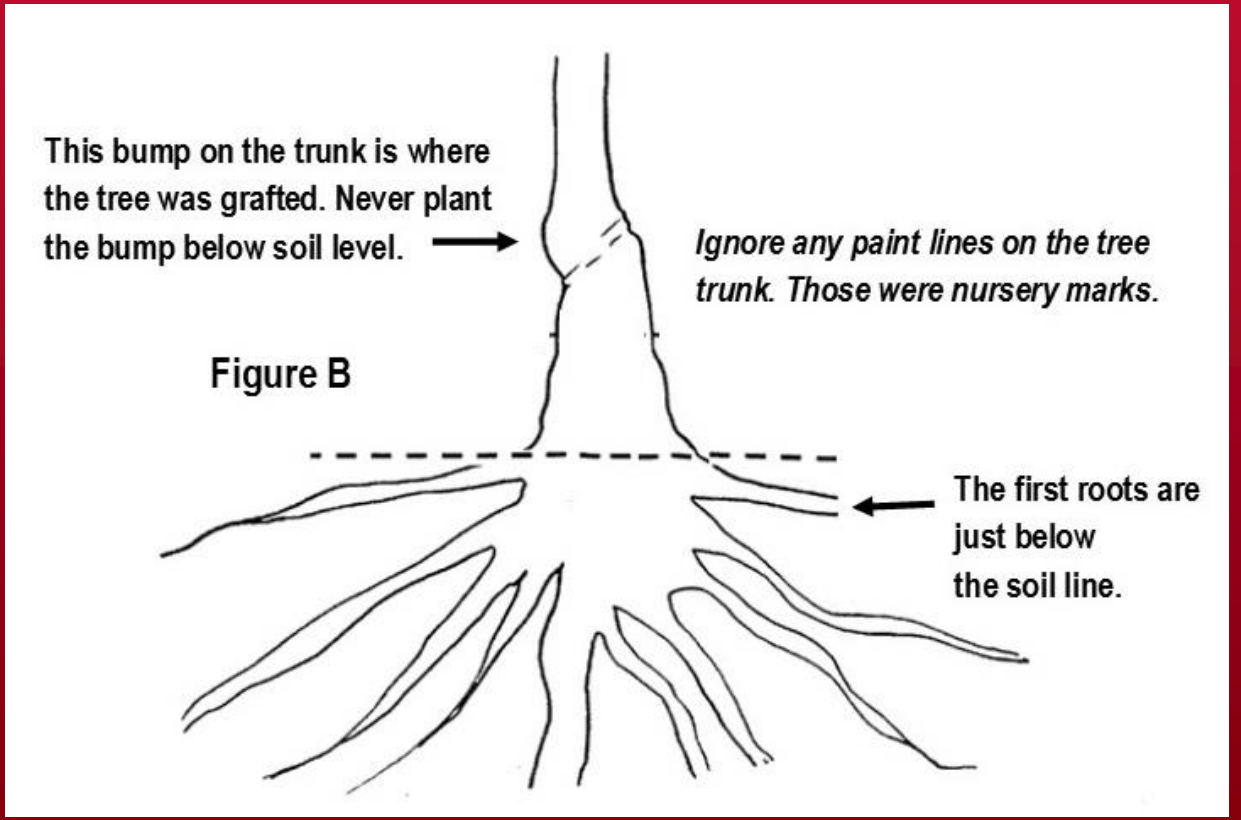


FIGURE 1. Soil Suitability for Apple Orchard

Site Selection & Planting:

- Hole large enough to accommodate the rooting system and for the roots to lay out flat.
- Ensure graft and scion stay above ground.
- Ensure sides of hole are rough & not smooth.

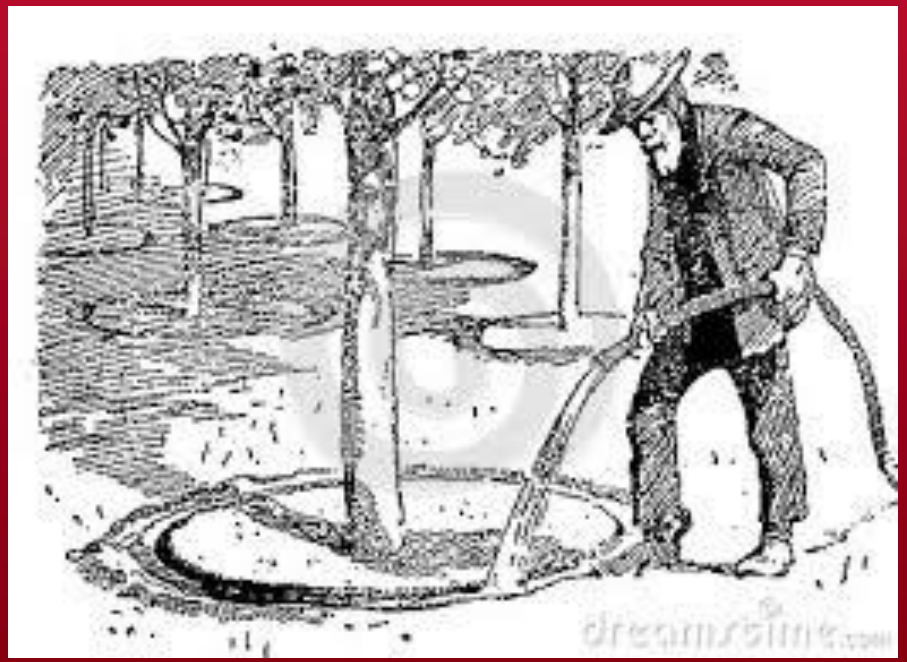


Planting:

- If the graft gets buried the following can result:
- The tree will grow to the size of the scion wood.
- The scion wood will grow roots.
- The tree will send shoots from the roots.
- The tree will still have the rootstock characteristics.

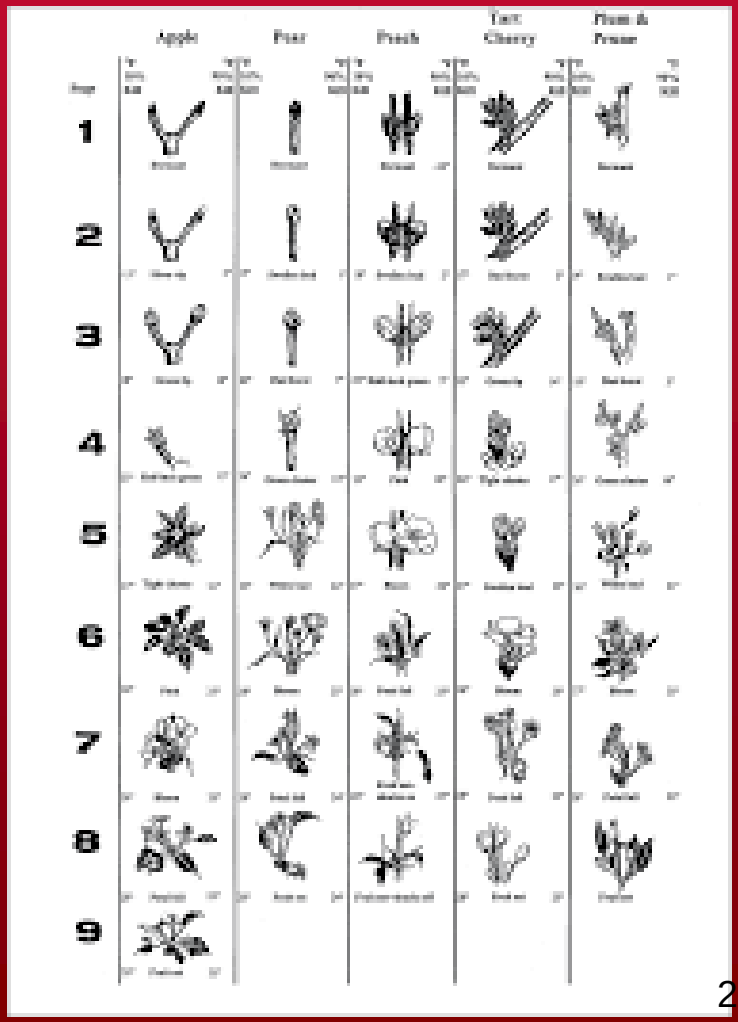
Proper Irrigation:

- Usually an Eastern Washington problem.
- The key in Western Washington is when you plant!
- Check soil by digging down 12” - 24” & grab a ball of soil and squeeze if it crumbles too dry if drips too wet!
- During summer keep an eye out for leaf curl, wilting, or premature leaf drop.
- Mature trees can use deep watering every 7 - 14 days.
- Avoid over-watering!



Tree Pruning & Training:

- Directs growth.
- Maintains health.
- Manages fruit bearing potential.
  - Walnuts produce on current season's shoots.
  - Hazelnuts, nectarines, peaches, quince & Japanese plums produce on previous season shoots.
  - Some sour cherries, some apples & some pears produce on previous season's spurs & shoots.
  - Apples, apricots, sour & sweet cherries, pears & plums produce on long-lived spurs.



Tree Pruning & Training:

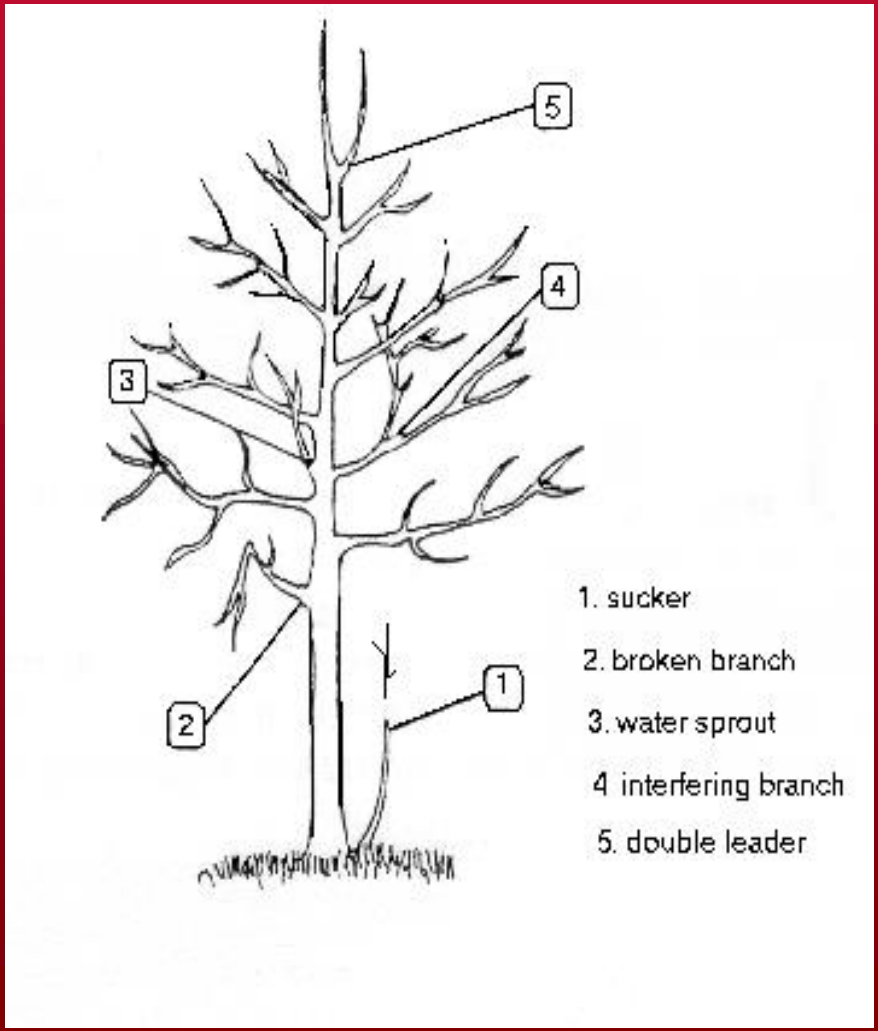
4Ds:

- Damaged.
  Broken branch (2)

- Dead.

- Diseased.

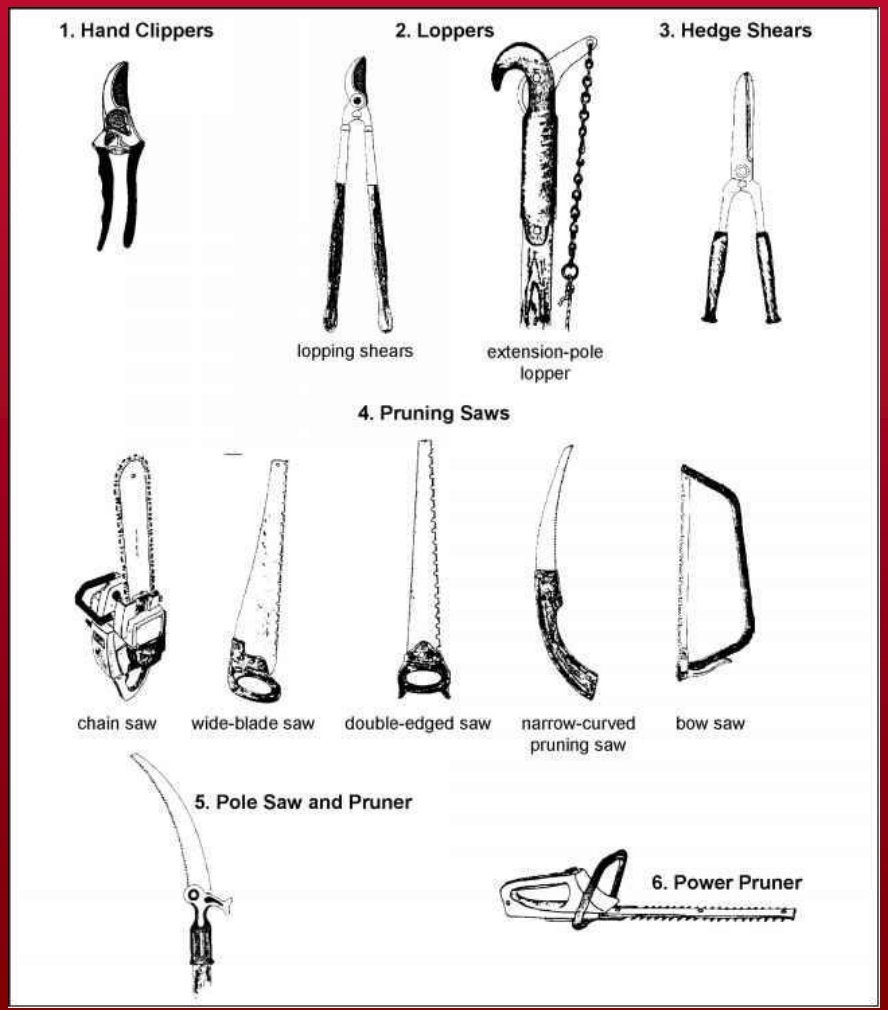
- Dysfunctional.
  Sucker (1)
  Water sprout (3)
  Interfering branch (4)
  Crossing or vertical (upward or downward)
  Double leader (5)



Tree Pruning & Training:

Guidelines:

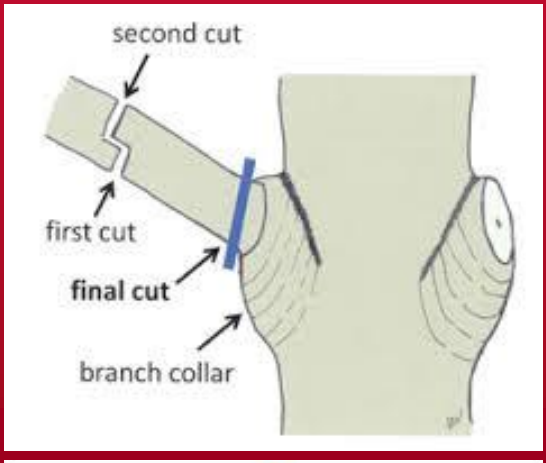
- Prune all fruit & nut trees at planting time (cut just above the height where you want the lowest branches to grow 30” - 40” above the ground.
- Prune young trees lightly. Heavy pruning will delay fruiting.
- Prune mature trees heavily. Max - 1/3 of tree can be pruned out.
- Prune top of tree heavier than lower.



Tree Pruning & Training:

Guidelines:

- Train trees young scaffolds 45^{o} to 60^{o}.
- To keep trees small prune moderately every year.
- Prune most during dormant season. Cherries & Asian Pears in August to resist bacterial infection.
- Double cut on large limbs.
- Tree will self-heal no need to paint cut.



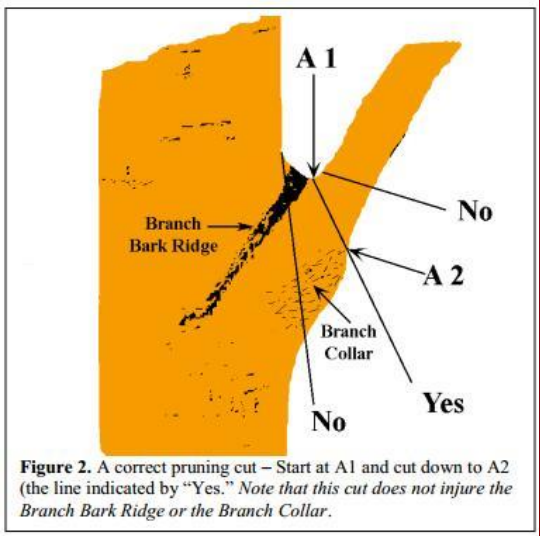


Figure 2. A correct pruning cut – Start at A1 and cut down to A2 (the line indicated by "Yes." *Note that this cut does not injure the Branch Bark Ridge or the Branch Collar.*

Two types of pruning cuts:

Thinning - cutting out a whole branch or shoot back to its origin.

Heading - cutting off part of a branch or shoot.

Gary A. Moulton & Jacqueline King
WSU Mount Vernon NWREC

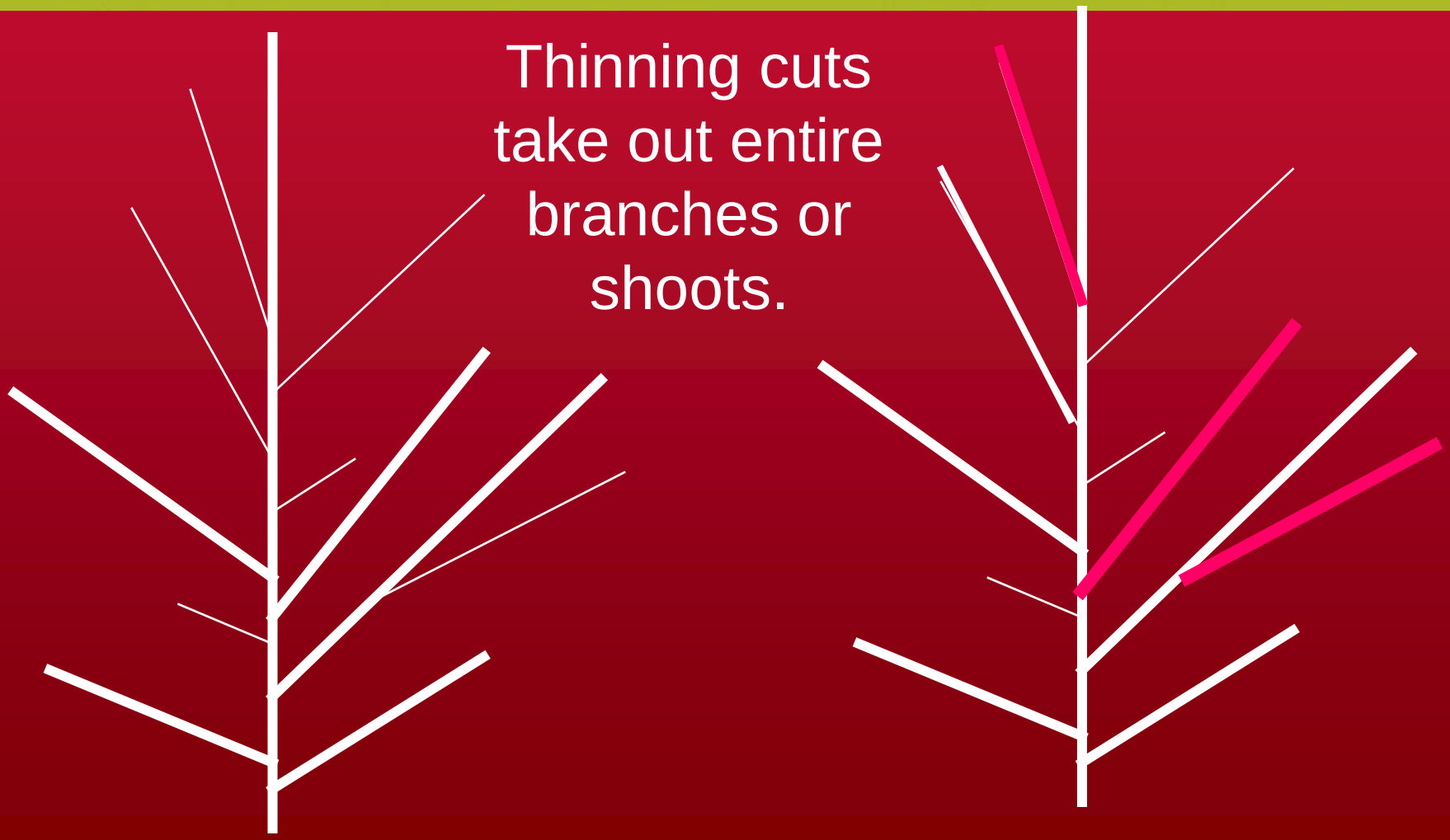
Thinning Cuts:

Open light channels.

Increase fruit production and quality.

Thinning Cuts:

Thinning cuts take out entire branches or shoots.



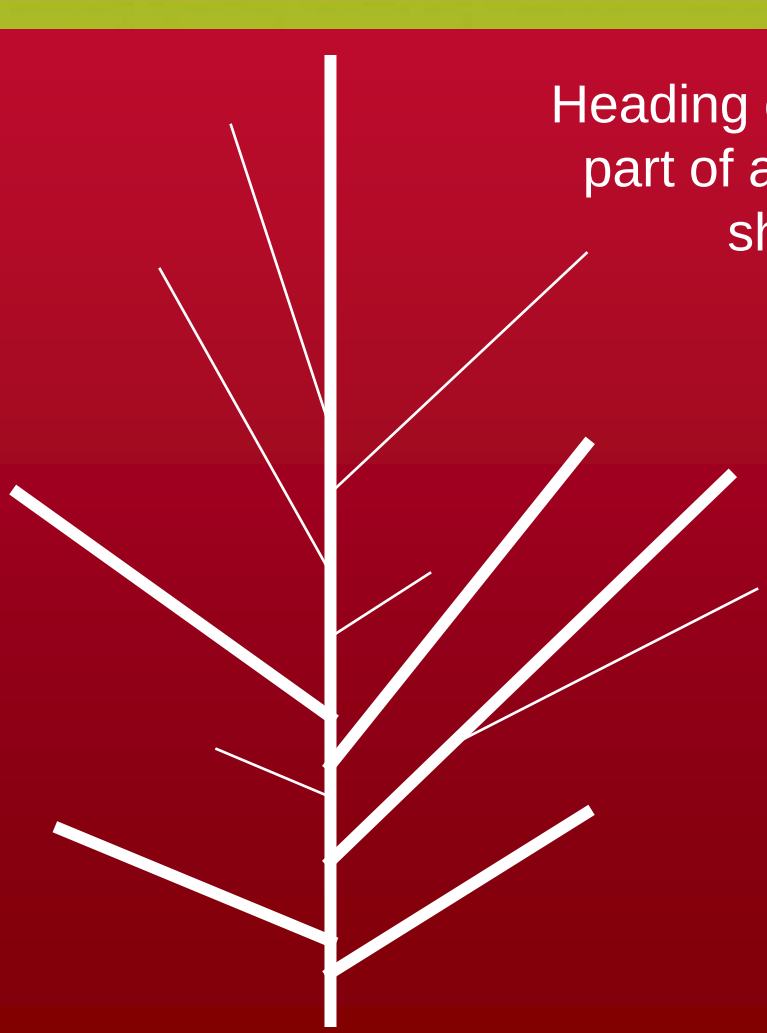
Heading Cuts:

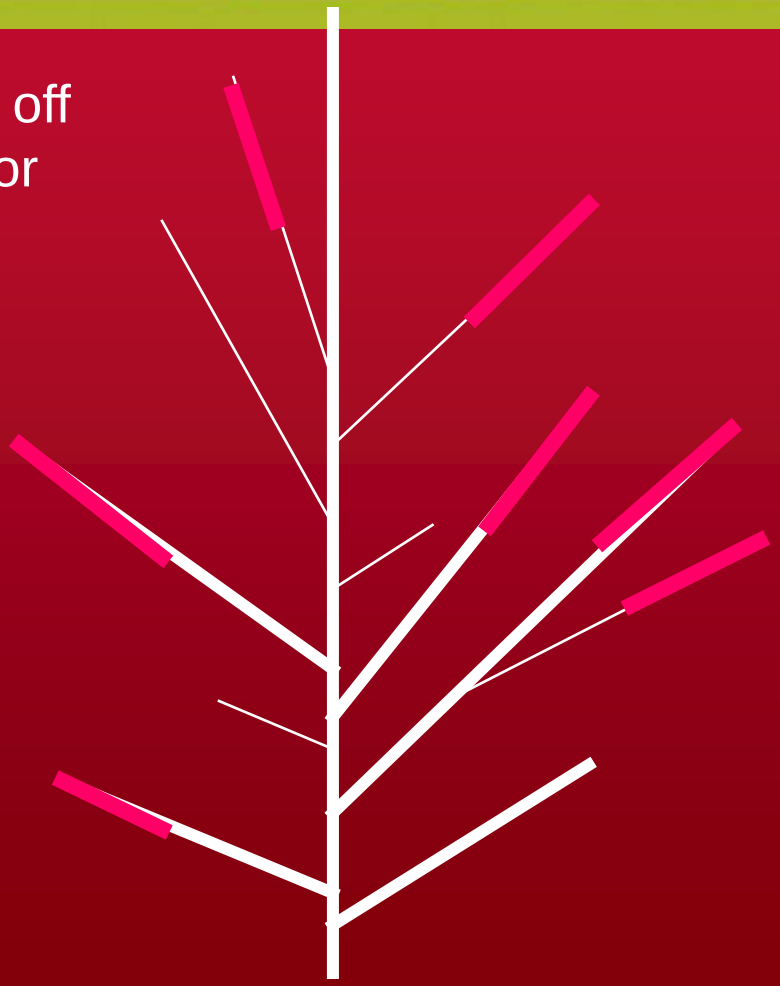
Tend to close off light channels.

Decrease fruit production.

Heading Cuts:

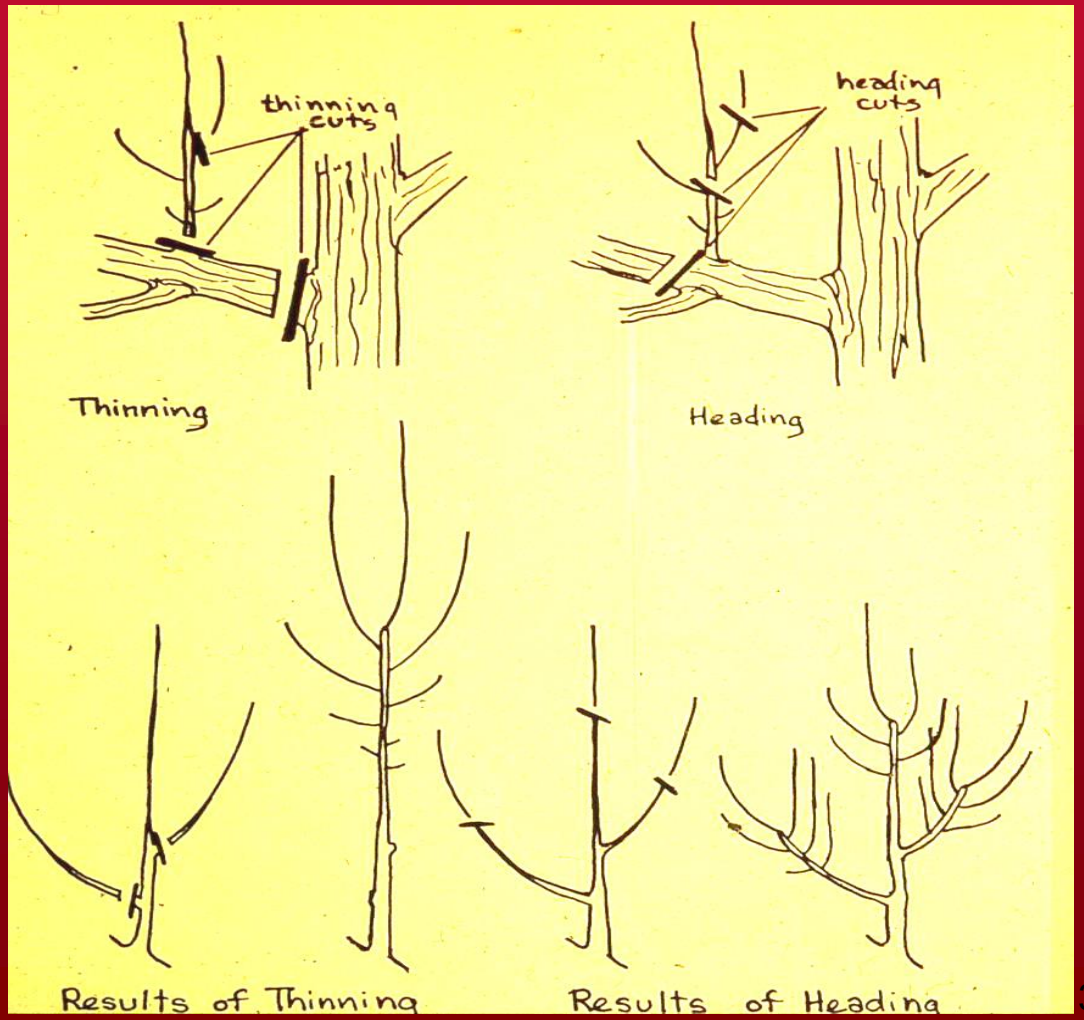
Heading cuts take off part of a branch or shoot.





Thinning vs. Heading: Results

Results of a thinning cut and a heading cut.



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WSU Mount Vernon
NWREC

Pruning:

Pruning Strategies Should Take into Consideration Fruit Bearing:

- **Walnuts produce fruit on the current season's shoots.**
- **Hazelnuts, nectarines, peaches, quince, and Japanese plums produce fruit on the previous season's shoots.**
- **Sour cherries, some apples, and some pears produce fruit on the previous season's spurs and shoots.**
- **Apples, apricots, sour cherries, sweet cherries, pears, and plums (European and Japanese) produce fruit on long-lived spurs.**

Tree Topping:

The Bottom Line:

• Tree topping is never a justifiable pruning practice; it increases tree health problems and is aesthetically unappealing.

• A topped tree will require constant maintenance and has an increased potential to become hazardous.

• Hazardous trees are a liability and ultimately the property owner is responsible for any damage hazard trees cause.

• Certified arborists and other legitimate landscape professionals do not practice tree topping.

• There are acceptable pruning techniques designed to keep trees away from power lines and other structures.

• If problems caused by a tree cannot be solved through acceptable management practices, the tree should be removed and replaced with plant material more appropriate for the site.

• Think about the mature size of a tree and where it will grow relative to power lines and other structures before you plant it.

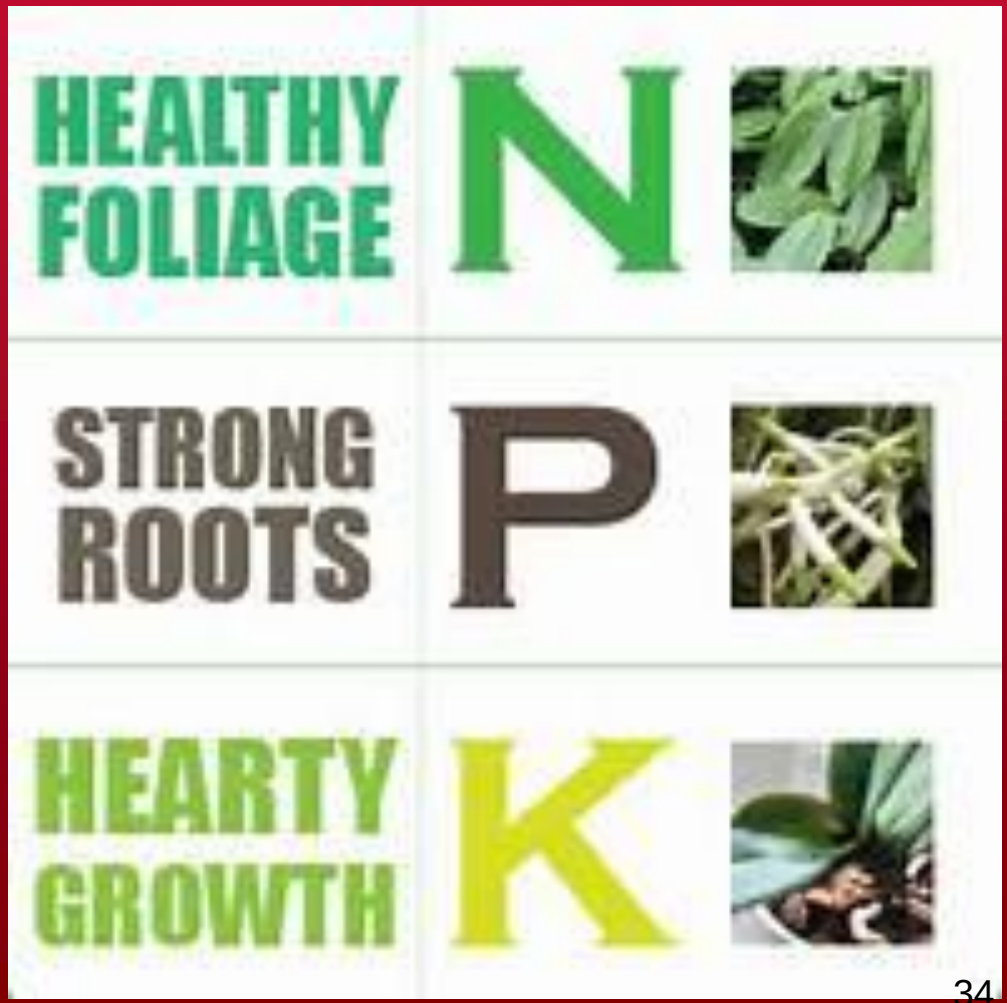
- *You can contact Dr. Chalker-Scott at lindacs@wsu.edu.

https://s3.wp.wsu.edu/uploads/sites/403/2015/03/tree-topping.pdf

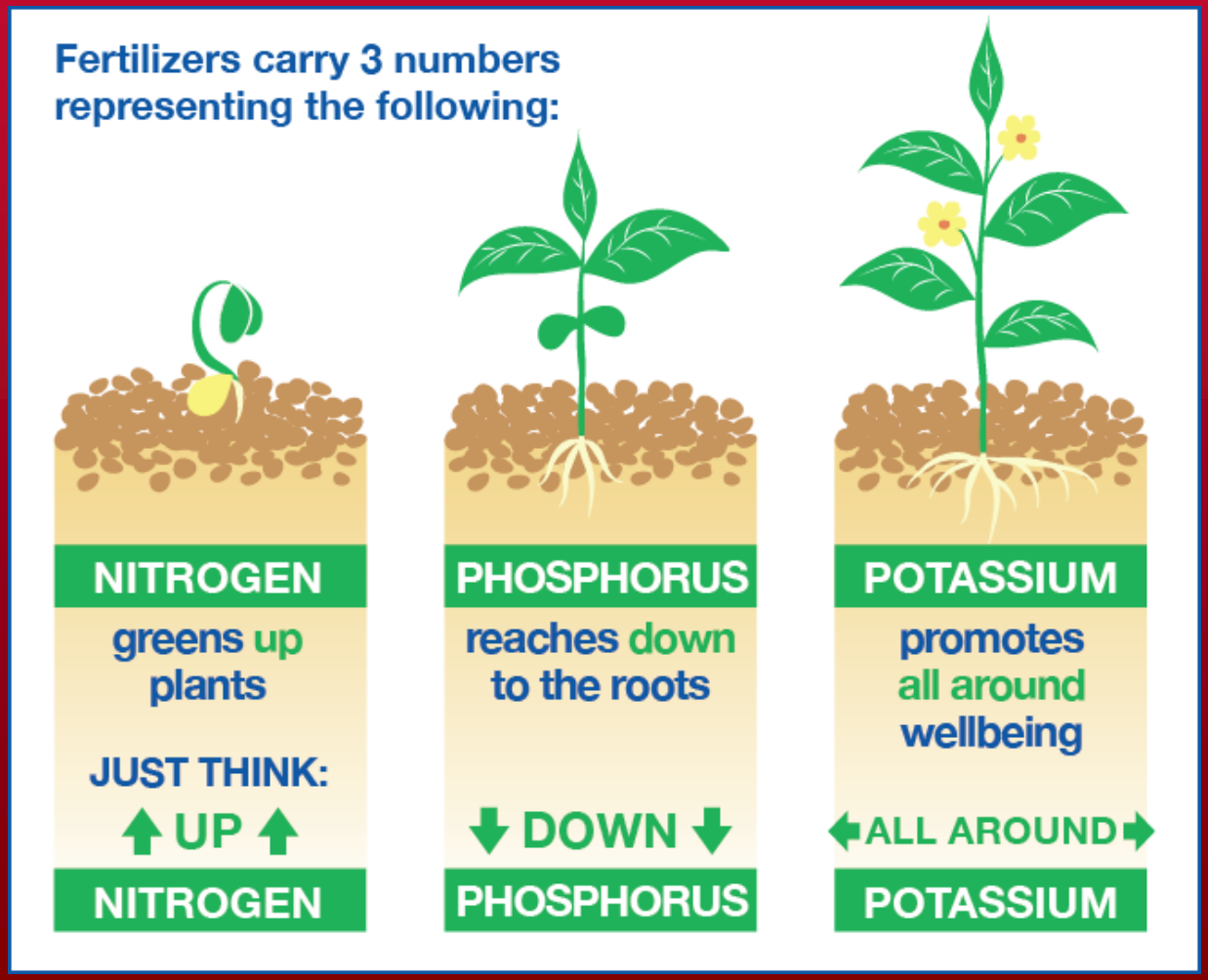
Pruning Gone Bad:

Fertilizing:

- Watch the needs of the tree & test your soil.
- Most gardeners use a complete fertilizer (NPK).
- If a tree has 12” - 18” growth in a year the tree is thriving.



Fertilizing:



Fertilizing:

- Using a complete fertilizer year after year can cause the P & K to build-up.

- Even though boron is a micronutrient it is essential for plant health & productivity to include fruit setting. (1 Tbsp. Borax to 2 gals water. Check before adding) Too much can be toxic.

Fruit Thinning:

- Important part of orchard management.
- Improves size & quality of fruit.
- Ensures an adequate crop for the next year.

- 3 ways to thin:
  - Picking the tiny fruit or blossoms by hand.
  - Mechanical thinning using a tool to knock off the fruit.
  - Spraying plant growth regulators.

Fruit Thinning:

- Apples: Remove the smaller fruit. The king bloom is the middle blossom or fruit & produces the largest.
- Asian Pears: Save the middle bloom & remove the rest. Roughly 2 fruit per spur.
- Peaches: 4 - 6” from each other.
- Other fruit:
  - European pears seldom over-set so thinning is not necessary.
  - Cherries & plums are seldom thinned.

Weed Management:

- Recommend hand pulling.
- If using a spray read the label.
- Mature trees will usually surpass the weeds for nutrients.

Insect Management:

Insect & Disease Management
will be covered
Wednesday, 20 Jan. at 6 P.M.

Vertebrate Pests:

https://wdfw.wa.gov/species-habitats/living/species-facts

- Birds - Netting, visual & audio scare tactics.
- Rodents - Trapping & remove habitat.
  - Voles eat rooting systems & bark.
- Deer - Fencing, deer repellents, human hair, animal scents, hanging soap.

Harvesting:

- Best method to know when the fruit is ripe is taste or use a refractometer.
  - Brix scale read in degrees.
  - Increments mean 1 gram of sucrose per 100 grams solution.

Refractometer: Brix Scale

Fruit	Poor	OK	Good	Great
Apple	6	10	12	14
Peach	6	10	14	18
Pear	6	10	12	14
Plum	8	12	16	20

Handling:

- Fruit continues to ripen after picked. (so pick before ripening if planning to store)
- If storing cool it as soon as possible.
- Gently handle picked fruit so not to bruise it.

Summary: Home Orchards:

- Climate.
- Legal Issues.
- Planning.
- Variety Selection.
- Rootstock.
- Site Selection & Planting.
- Irrigation.
- Pruning.
- Fertilizing.
- Fruit Thinning.
- Weed Management.
- Vertebrate Pests.
- Harvesting & Handling.

Questions????

References:

- WSU Master Gardener Training Manual, Chap 7.
- Home Orchards:

  http://figs4fun.com/Links/FigLink777.pdf Don't be deceived by the link title.

  https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/ec819.pdf

  http://content.libraries.wsu.edu/index.php/utils/getfile/collection/cahnrs-arch/id/351/filename/60230182432004_PNW400.pdf
- Insect and Disease Management:
  - Hortsense: http://hortsense.cahnrs.wsu.edu/Home/HortsenseHome.aspx
  - Pestsense: http://pestsense.cahnrs.wsu.edu/Home/PestsenseHome.aspx
  - PNW Handbooks: https://pnwhandbooks.org/plantdisease/about
- Washington Department of Fish and Wildlife (WDFW) website: https://wdfw.wa.gov/species-hbitats/living/species-facts


Save the date!
Master Gardener Foundation of Cowlitz County
PLANT SALE
&
TOMATOPALOOZA
Saturday
May 15
MASTER GARDENER FOUNDATION OF COWLITZ COUNTY
Master Gardener Program
Washington State University Extension

Upcoming Workshops:

Tuesdays at Noon	
1 - 19	Writing a Will
1 - 26	Make Your Own Paper
2 - 02	Feb. Garden Tasks
2 - 09	Planning to Plant
2 - 16	Shopping to Save Dollars
2 - 23	Rose Care

Wednesday at 6 P.M.	
1 - 20	Caring for Fruit Trees
1 - 27	Greenhouse Info
2 - 03	Mason Bees
2 - 10	Grape Pruning
2 - 17	Growing Vegetables from Seeds
2 - 24	Fruit Growing for the Beginner

Home Orchards:

Presented by the Cowlitz County Master Gardener Program.