

Fruit Tree Training and Pruning

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Objectives of Training and Pruning

- Develop and maintain desired shaped trees that are capable of early production of large crops of high quality
- Balance vegetative growth and reproductive growth



What are training and pruning?

- Training is the process of directing tree growth to a desired shape or form. Performed on young trees.
- Pruning is removal terminal portion of a branch or the whole branch to adjust or maintain tree structure. Annual event.
- Pruning is part of training process.



Pruning tools

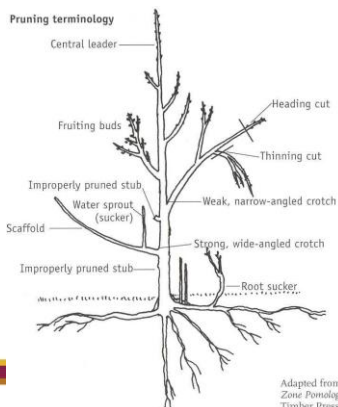


- http://en.wikipedia.org/wiki/File:Pruning_Tools_M_D_Vaden.jpg



Types of pruning cuts

- **Heading cut:** removal of the terminal portion of a shoot. Increasing side branches.
- **Thinning cut:** Removal of a shoot at the point of its origin. It will not invigorate the tree as heading cut.
- **Bench cut:** Removal of vigorous upright shoot back to a side branch that are flat and outward going. Used to open up the center of the tree and spread the branch outward.



Adapted from Figure 6-25, Temperate Zone Pomology by Melvin N. Westwood, Timber Press, Oregon, 1988

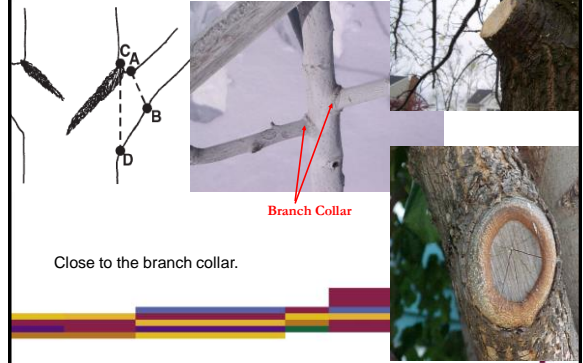


Tips on pruning and training

- Do not wait till the fruit trees grown up to prune them!
- Start working on your fruit trees just after planting
- During the first two or three years after planting, training and pruning are critical for the tree framework formation.



Where the cut should be?



Branching angle



Spreading branch angles

- Clothpin
- Toothpick
- Branch spreader
- Hanging weight
- (Tying down)

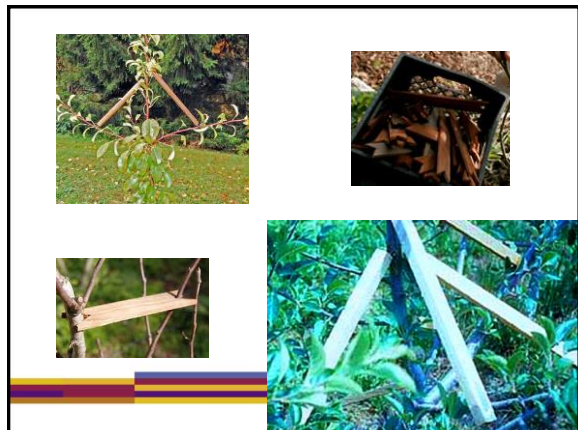


Cloth pins



Apple training with cloth pins at Alcalde, NM in 2013.





Different types of training systems

Apples

- Central leader- no support (traditional)
- Trellis-wires and support
- Slender spindle, tall spindle, super spindle, vertical axe - support and wire

Recent development of apple training

- High density planting with dwarfing rootstocks
- Minimum pruning
- Pruning out competition
- (Tie feathers down for tall spindle)
- Use early cropping to slow the tree down

Super Spindle and Vertical Axe

Tall spindle system

- Planting density 3×11 ft, or 4×12ft, 1000-1500/acre.
- Rootstock/scionwood: M9, B9, G11, G41 etc.
- Planting well feathered trees
- Tie down branches after planting
- Minimum pruning for the first several years, support central leader
- Removal branches with diameter 1” or bigger with bevel cut

Tall spindle – older trees



Tall Spindle (continued)

Trees need to be tall enough for good yield



Keep central leader dominance, tie down feathers.



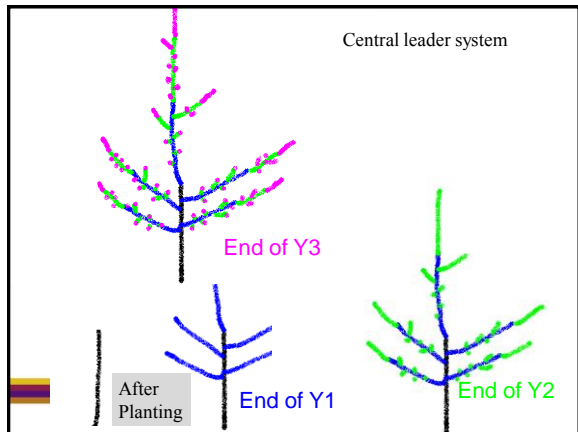
Remove big branches with Beveled cut



Pruning new plantings

- Central leader system: heading cut. The first 3-4 years are critical for tree framework formation.
- http://aces.nmsu.edu/pubs/_h/h-306.html
- Tall spindle, super spindle, vertical axe etc.: high density, no heading cut, minimum pruning for the first 3-4 years. Early cropping.



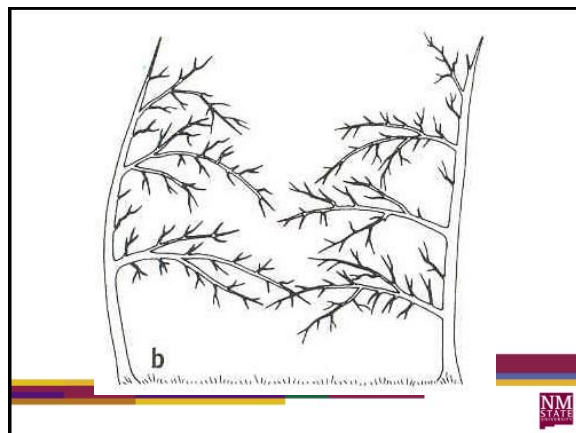
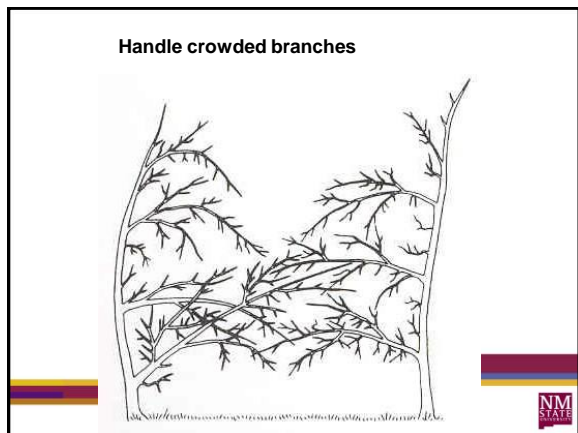
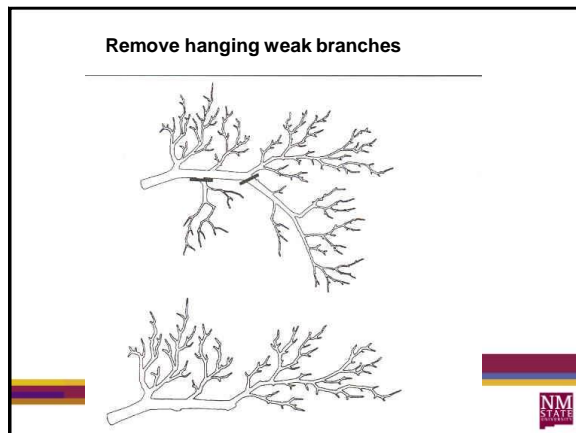


Pruning mature trees

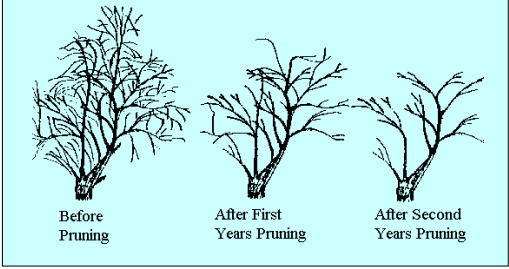
- First, remove diseased, broken, dead branches completely
- Remove overshadow, cross or competing branches
- Reduce tree height
- Remove suckers or water sprouts
- Manage numbers of removed big branches

Principles for pruning neglected trees

- Remove dead, diseased, damaged wood
- Lower the height of the tree
- Reducing overcrowding (remove undesirable interior branches)
- Remove low hanging off branches
- Prune moderately every year.





Pruning neglected apple trees





Before Pruning

After First Years Pruning

After Second Years Pruning





- Too many heading cut
- Stimulate water sprout growth
- Shade problem


- Remove strong water sprouts
- Leave some shoots untouched
- Head them back to spur the next season

Thinking about pruning TOO LATE!




Peach training and pruning

- Peach needs more sunlight than apples.
- **No central leader for peach training, all open centered.**
- Open Vase (center), Perpendicular V etc.




Open Vase

- 3-4 scaffolds
- Cover each quadrant to optimize light interception
- Tree height: 8 ft. optimize the activities without using a ladder.




Pruning Techniques


- Dormant Pruning
 - Remove vigorous shoots (water sprouts)
 - Shape tree
 - Choose fruiting wood
 - Thin branches
- Summer Pruning
 - Reduce height of tree to 8 feet
 - Remove dead shoots
 - Remove hanging shoots close to ground
 - Increase light penetration to middle of tree
 - Be careful of sunburn!
 - Light is very important to form flower buds for next year



Open Vase




Open Vase





Perpendicular-V

- System developed in California
- Trees are trained to two main scaffolds
 - 50-60 degrees apart between scaffolds
 - If angle is too vertical (<math><20^\circ</math> from vertical), scaffolds will be weak
 - If angle is too horizontal (>math>45^\circ</math> from vertical), scaffolds are sunburn-prone
- Tree height set at 8 feet
 - Optimize activities from ground



Perpendicular-V

- Pruning Techniques
- Dormant Pruning
 - Remove vigorous shoots (water sprouts)
 - Shape tree
 - Choose fruiting wood as close to scaffolds as possible
 - Thin branches
- Summer Pruning
 - Reduce height of tree to 8 feet
 - Remove dead shoots
 - Increase light penetration to fruiting wood
 - Thin shoots
 - Be careful of sunburn – leave a few upright shoots in middle

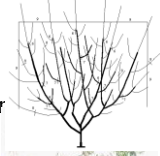
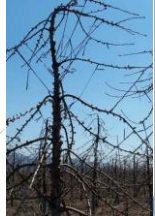






Too upright



Sweet Cherry

- **Central leader**
- **Spanish bush**
- **Vogel central leader**
- **Steep leaders**
- **Sol axe system**
- **UFO system**

Upright Fruiting Offshoots (UFO)

- Precocious system
- Space between trees filled at planting
- Use unpruned and unbranched trees
- Plant at an angle of 45-60° from vertical
- Focus growth on well-spaced upright buds



Raspberry and blackberry

Florican cultivars:

- Prune the fruited florican (second year) out in winter and keep the primocane (first year) for fruiting

Primocane cultivars:

- Prune them all the way down to the ground in winter.



Raspberry pruning -primocane cultivar



Blackberry primocane and florican



Blackberry pruning -florican cultivar



References

1. Training young apple trees to the modified central leader system (NMSU)
 - http://aces.nmsu.edu/pubs/_h/h-306.html
2. The Tall Spindle Planting System (Cornell)

http://www.fruit.cornell.edu/tree_fruit/resources/The%20Tall%20Spindle%20Planting%20System.pdf
3. The Vertical Axis System

http://www.fruit.cornell.edu/tree_fruit/resources/The%20Vertical%20Axis%20Planting%20System.pdf
4. Cherry UFO System (Prosser, WA)

<http://fruit.prosser.wsu.edu/UFO.html>
5. Peach Perpendicular V System

<http://horttech.ashspublishings.org/cgi/reprint/4/4/362>

