

## Fruit Tree Training and Pruning

**Shengrui Yao**  
**NMSU Alcalde Center**  
**505-852-4241**  
**yaos@nmsu.edu**



## 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

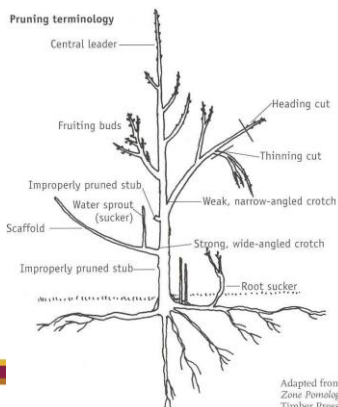


- [http://en.wikipedia.org/wiki/File:Pruning\\_Tools\\_M\\_D\\_Vaden.jpg](http://en.wikipedia.org/wiki/File:Pruning_Tools_M_D_Vaden.jpg)



## 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

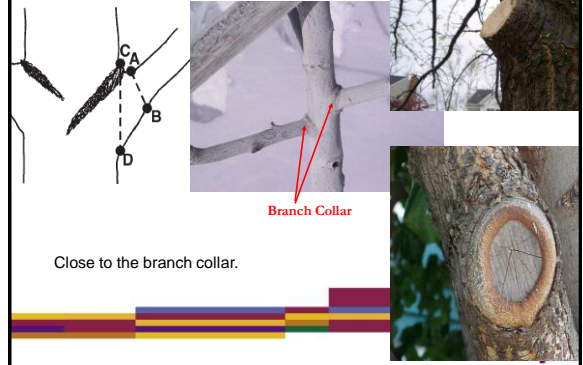


### Tips on pruning and training

- 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)

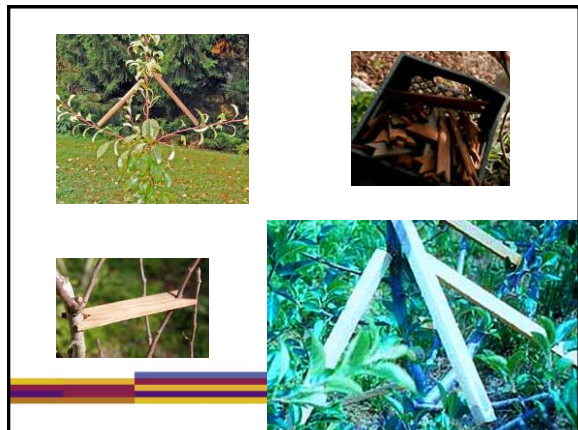


### Cloth pins



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.



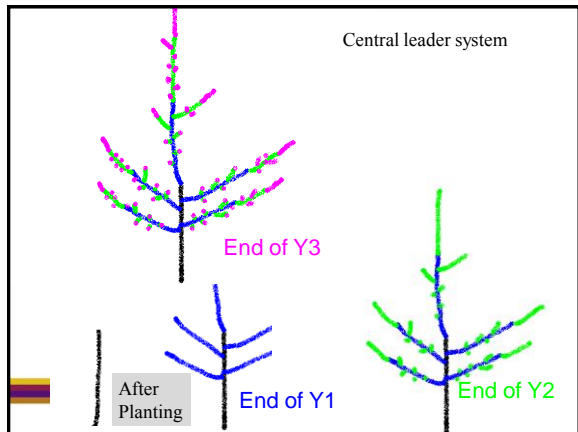
Remove big branches with Beveled cut



### 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](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.



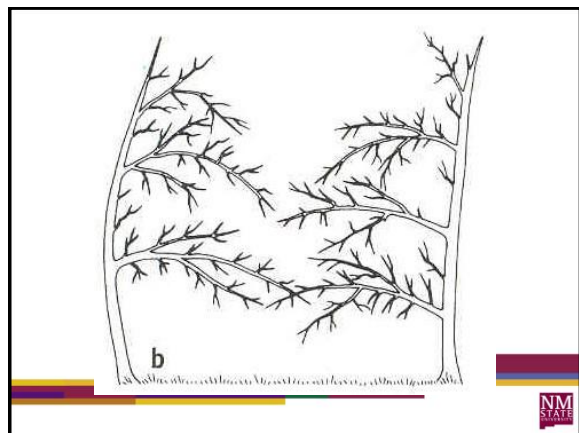
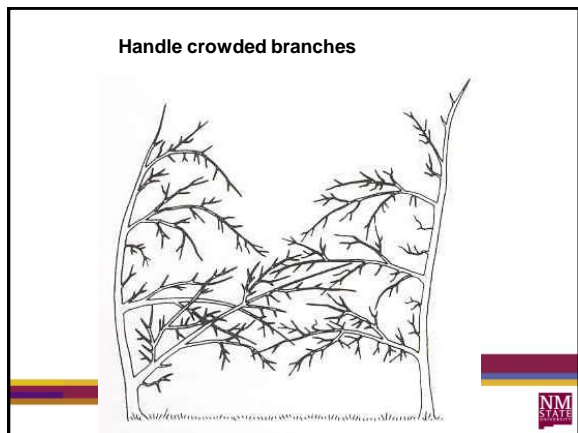
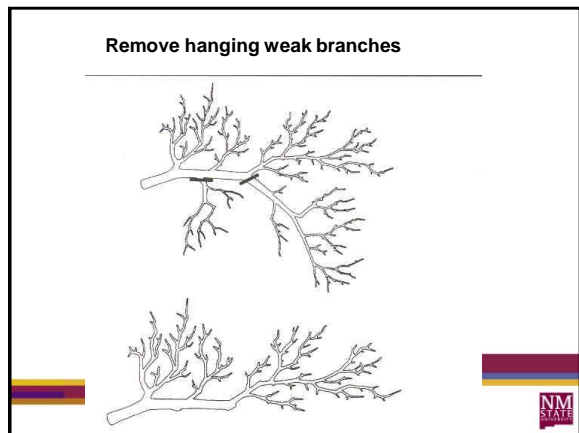


### Pruning mature trees

- 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

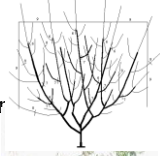







Too upright



### 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

### Floricanne cultivars:

- Prune the fruited floricanne (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 floricanne



## Blackberry pruning -floricanne cultivar



## References

1. Training young apple trees to the modified central leader system (NMSU)
  - [http://aces.nmsu.edu/pubs/\\_h/h-306.html](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](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](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.ashspublishations.org/cgi/reprint/4/4/362>

