

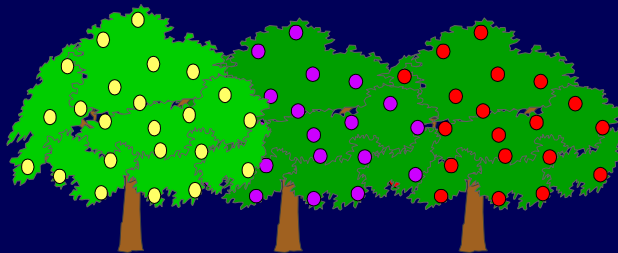
Master Gardener Fruit Trees in the Home Garden

M. Elena Garcia Ph.D.



Fruit Trees

- Growing fruit trees in the home garden
- Pruning and training



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Fruit Trees

► Why?



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Fruit Trees

- Important factors for successful fruit production
 - Site selection
 - Variety and rootstock
 - Proper planting
 - Adequate fertility
 - Pruning and training
 - Pest management

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Site Selection

▸ Survey

- Soil conditions
- Sun exposure
- Available space
- Frost pockets

Make a Map!!



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Site selection

▸ Soil conditions

- Ideal soil for most tree fruits
 - slightly acidic
 - well drained
 - medium loam



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Site selection

▸ Soil Conditions

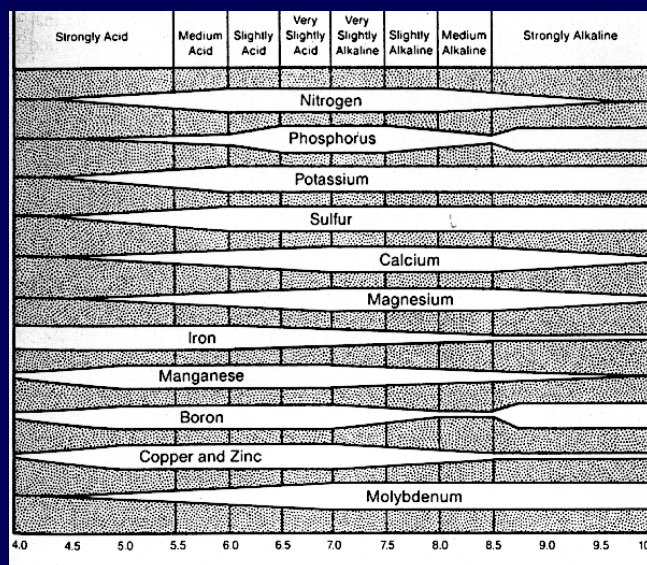
▸ pH

▸ Range 6.0-6.5

▸ Availability of elements

▸ **Test your soil pH before planting**

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Soil Conditions

- Problems:
- < 5.3
 - Bark measles due to excess Mn
 - Ca and Mg deficiencies become more acute
 - N and K become less available
 - Al can build up to become toxic

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Soil Conditions

- Problems:
- > 6.5
 - B, Cu, Mn, Zn, and Fe uptake seriously reduced

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Site selection

- Soil fertility
 - Soil amendments
 - peat moss, lime, organic matter, or mineral elements



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Site selection

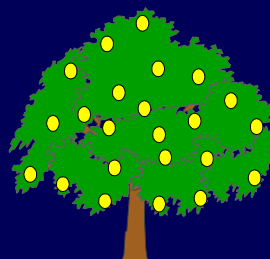
- Soil conditions
 - Drainage
 - Soil type
 - clay
 - sandy
 - hardpan
 - Best soil: Sandy loam



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Planting Site

- Sun exposure
 - Row orientation
 - North-south best



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Planting Site

SPACE REQUIREMENTS, YIELD, BEARING AGE, AND LIFE EXPECTANCY OF TREE FRUITS

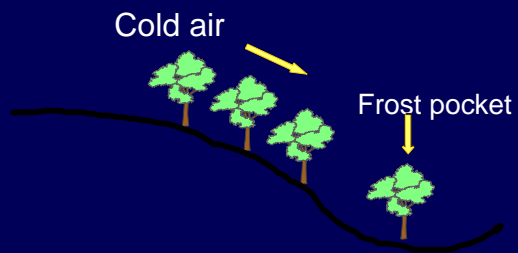
FRUIT	MINIMUM DISTANCE BETWEEN PLANTS	APPROXIMATELY YIELD PER PLANT (BUSHELS)	BEARING AGE	LIFE EXPECTANCY (YEARS)
Apples (standard)	30	8	6 to 10	35 +
Apple (semidwarf)	15	4	4 to 6	20 to 25
Apple (dwarf)	10	1	2 to 3	15 to 20
Pear (standard)	25	3	5 to 8	35 to 45
Pear (Semidwarf)	15	1-2	4 to 6	20 to 25
Peach	15	4	3 to 4	15 to 20
Plum	18	2	4 to 5	15 to 20
Cherry	20	60 qt.	4 to 5	15 to 20

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Planting Site

► Slope

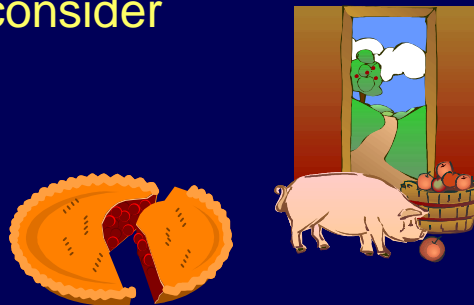
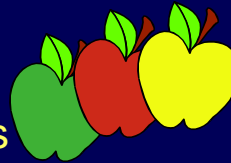
- A 4 to 8% slope is ideal.
- A steeper than 10% slope may make it difficult to operate machinery.
- Avoid areas at the bottom of the hill where cold air settles and frost pockets form.



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Variety and Rootstock

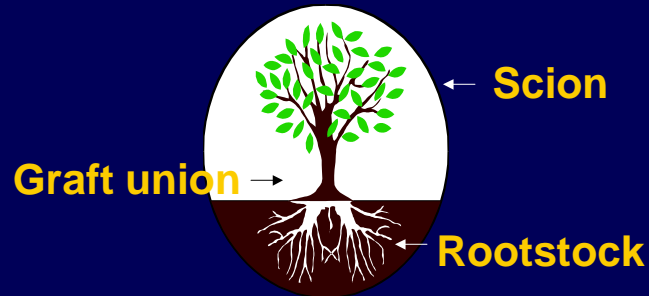
- Large selection
 - Apples ~10,000 cultivars
- Questions to consider
 - Uses
 - Maturity
 - Storage



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Cultivars and Rootstocks

- ▶ Most commercially sold fruit trees consist of two parts



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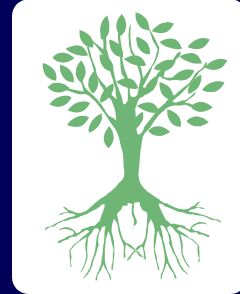
Cultivar and Rootstock

- ▶ Why are most fruit trees grafted?
- ▶ Most are open pollinated
 - ▶ genetic variability
- ▶ To get certain characteristics

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Cultivar and Rootstock

- ▶ What to look for in a cultivar
 - ▶ Type and use for fruit
 - ▶ Disease resistance
 - ▶ Type of tree
 - ▶ Cold hardiness
 - ▶ Pollination



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Commonly used apple cultivars

Cultivar	Color	Harvest	Use
McIntosh	Red	Mid-Sept	Fresh, dessert
Delicious	Red	2 weeks after Mc's	Fresh
Northern Spy	Red	20 days after Mc's	Cooking

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Disease Resistant Cultivars

- Resistance cultivars
- Apple scab resistance
 - have varying degrees of resistance to other diseases
- <http://orchard.uvm.edu/uvmapple/hort/cultivars/>
 - Liberty, Redfree, Novamac, Jonafree
Williams Pride
- Fireblight resistance in pears
- Bacterial spot resistance in peaches

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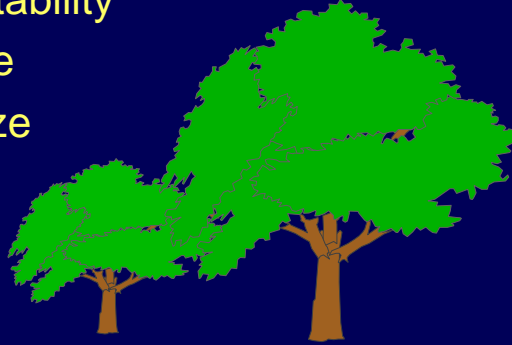
Cultivars

- <http://orchard.uvm.edu/uvmapple/hort/cultivars/index.htm>
- [Cultivars for Vermont](#)

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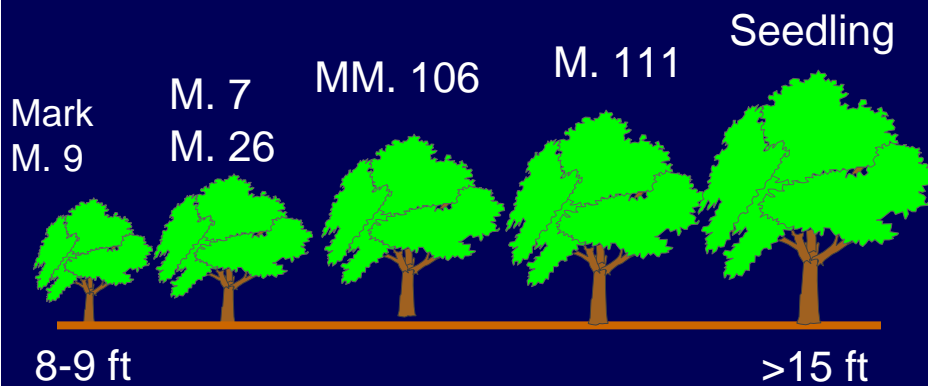
Cultivars and rootstocks

- What to look for in a rootstock
 - Hardiness
 - Soil type adaptability
 - Pest resistance
 - Overall tree size
 - standard
 - semidwarf
 - dwarf



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Rootstocks



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Rootstocks for Cherries



GI-5

GI-7

GI-6

Mazzard

GI-148-2 GI-148-8

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Rootstocks

► <http://orchard.uvm.edu/uvmaple/hort/rootstocks/index1.htm>

► [Rootstocks for Vermont](#)

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Proper planting

- When to plant?
 - Spring
 - If trees are bare- root
 - Late April or May
 - Fall
 - If trees are in containers



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Proper planting

- Never let the roots dry out
 - Soak roots of bare-root trees 1-3 hrs before planting
- Hole should be twice as large as the root system
- If putting any soil amendment, mix with soil that will be used to refill the hole

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Proper planting

- Prune roots
- Graft union should be 2"-3" above the soil line
- Pack the soil gently, but firmly
- Stake dwarf trees
- Place mouse guard at base of tree
- "Head back" to about 36" tall

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Mineral nutrition

- | | |
|---------------------------|---------------|
| ‣ <i>Nitrogen</i> | ‣ Phosphorous |
| ‣ <i>Potassium</i> | ‣ Manganese |
| ‣ <i>Calcium</i> | ‣ Copper |
| ‣ <i>Magnesium</i> | ‣ Iron |
| ‣ <i>Boron</i> | ‣ Zinc |

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Adequate Fertility

- ▶ Major nutrients for growth are nitrogen, phosphorous, and potassium (N-P-K)
- ▶ As a rule, no fertilizer at planting time
- ▶ Soil preparation should be done in Fall before planting



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Adequate Fertility

- ▶ After growth begins
 - ▶ 1/2lb of a 16% or 20% nitrate fertilizer
 - ▶ 8-10 inches from tree trunk
- ▶ **AVOID OVER FERTILIZATION!!**



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Adequate Fertility

- ▶ For one year old and older trees
 - ▶ When growth begins, 1/2lb of 10-10-10/ age of tree
 - ▶ In a band or a circle at least 18 inches from the trunk
 - ▶ No fertilizers after June

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Fertility

- ▶ Calcium deficiency



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Fertility

▸ Zn deficiency



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Fertility

▸ Mg deficiencies



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Fertility

- ▶ Boron deficiency



- ▶ Boron toxicity



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Fruiting Trees

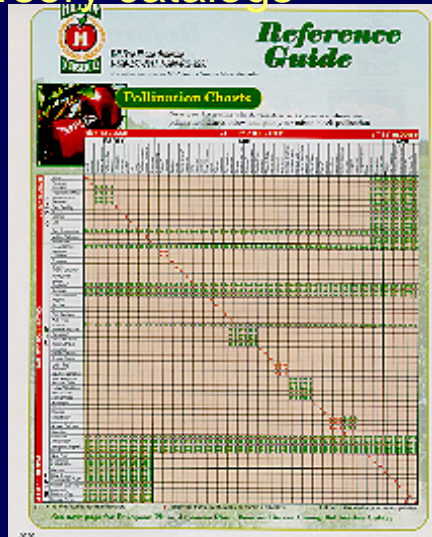


- ▶ Pollination
- ▶ Most fruit trees are not self-fertile
 - ▶ cross-pollination
- ▶ Cultivars' bloom period should coincide
- ▶ Tetraploid apple cultivars such as Mutsu produce sterile pollen
- ▶ Honey bees are the primary pollinators



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Pollination charts are available in most nursery catalogs



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Fruit Thinning

- Removing some of the developing fruit
 - To provide top quality, full-sized fruit
 - To ensure good return bloom the following year
- Time of thinning depends on the time of flower initiation according to the species

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Time of flower initiation of some deciduous fruits

Fruit	Initiation	Flowers borne on
Peach	Late June- late July	Lateral buds, 1 yr. shoots
Apricot	Early Aug	Lateral buds, 1 yr. Shoots + 2 yr. spurs
Cherry(swt)	Early July	Lateral buds, 2 yr. spurs
Cherry sour	Mid-July	Lateral buds, 2 yr. spurs
Apple	Mid-June- mid-July	Terminal buds. 2yr.spurs
Pear	Early July– early Aug.	Terminal buds. 2yr.spurs

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FRUIT	TYPE OF BUDS	FLOWER BUD LOC. AND TYPE	INFLORESCENCE	FLOWER NUMBER	TIME OF FLOWER INITIATION	CHARC. 1ST YEAR WOOD	CHARC. 2ND YEAR WOOD	CHARC. 3RD YEAR WOOD	WOOD PRODUCTIVITY
Apple	Vegetative and mixed	Terminal epigynous	Determinate	5	Early summer	Where buds are attached	Will initiate flower buds for next season	Where fruit is found	Youngest wood most productive
Pear	Vegetative and mixed	Terminal epigynous	Indeterminate	7-8	60 days past full bloom	Similar to apple	Similar to apple	Similar to apple	Similar to apple
Peach	Unmixed	Lateral perigynous	Solitary	1	Midsummer	Where fruit is located	Inferior flower buds		
Cherry	Unmixed clusters	Lateral preigynous	Cluster	2-4	July, after crop is harvested	Sweet Cherry- spurs Sour cherry- long shoots	Sweet Cherry- best spurs Sour cherry-		Long productivity 10 -15 years in sweet cherry
Plum	Unmixed	Lateral perigynous	1-3 flowers/ bud	1-3	Mid to late summer		Most vigorous spurs Fruit production		Similar to apple, spurs older than 4 years may die

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Fruit Thinning

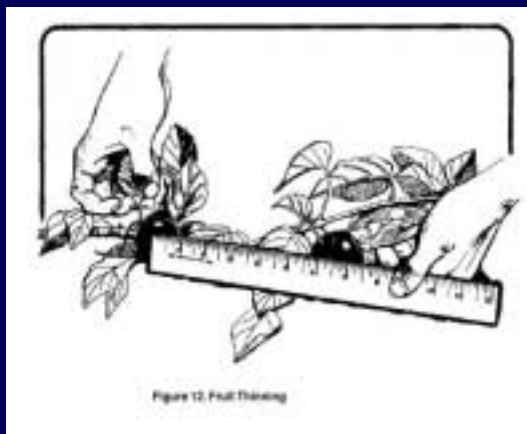
- ▶ How to thin apples
 - ▶ As early as possible after bloom
 - ▶ Use small hand pruners
 - ▶ Cut off the young fruit by their stems
 - ▶ Leave the largest fruit
 - ▶ Fruit should be 4-6 inches apart
- ▶ Goal: Keep the “king” fruit
- ▶ June drop

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Fruit Thinning

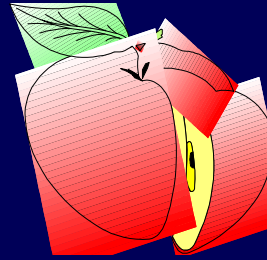
As a general rule for apples, 18 leaves are necessary for one apple to develop satisfactorily



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Harvesting

- Apples are matured
 - Stems separate easily from spur
 - Seeds are brown



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Storage tips for apple

- Generally early cultivars do not store well
- Storage tips
 - Pick apples when slightly green
 - Only blemish-free fruit
 - Cool as soon as possible
 - High humidity
 - 32⁰-35⁰ F

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Apple bud stages



Dormant (D)



Silver Tip (TP)



Green Tip (GT)

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Apple bud Stages (Cont.)



**Half inch Green
(HIG)**



Tight Cluster (TC)



Pink (P)

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Apple bud stages



Full Bloom (FB)



Petal Fall (PF)



Fruit Set (FS)

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Pruning and Training

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Pruning and Truing

- ▶ Goals for training and pruning include:
 - ▶ Producing a supporting framework for the tree
 - ▶ Allowing annual flower formation
 - ▶ Developing a tree which allows maximum fruit growth and quality development
 - ▶ Ease of management

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Pruning Equipment

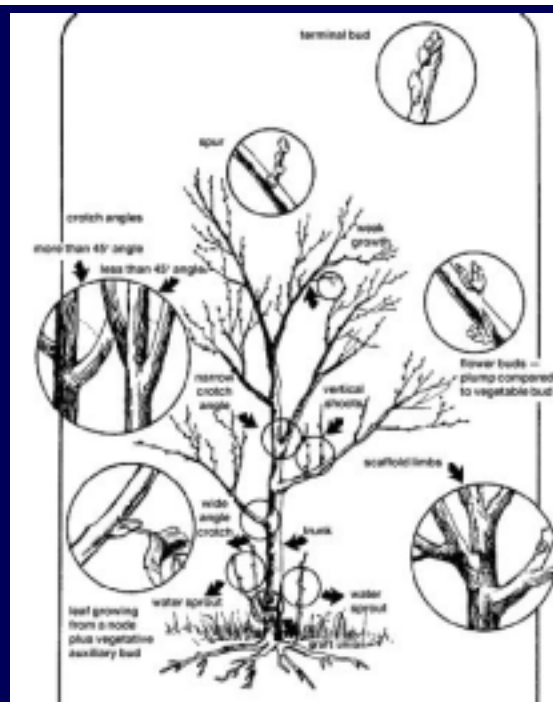
Keep Sharp!

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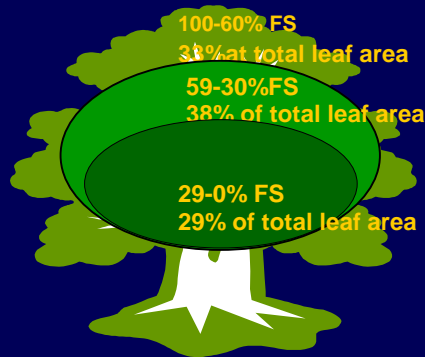
Parts of a Fruit Tree

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Light Penetration

Light penetration into the canopy of a large tree



Effective light penetration into an unrestricted canopy is ~ 1 m

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Light Penetration

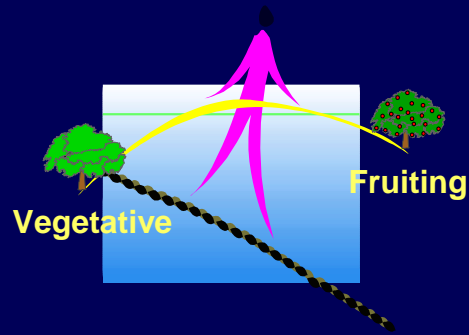
% of full radiation needed for various quality factors in apples

Character	Satisfactory development	Unsatisfactory development
Fruit size	>50%	<50%
Red color	>70%	<40%
Spur development	>30%	<25%

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Pruning and training

Balancing Act



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Vertical View Showing Desired Distribution of Scaffolds

*...needs to be
developed
during years
1-3 of training*

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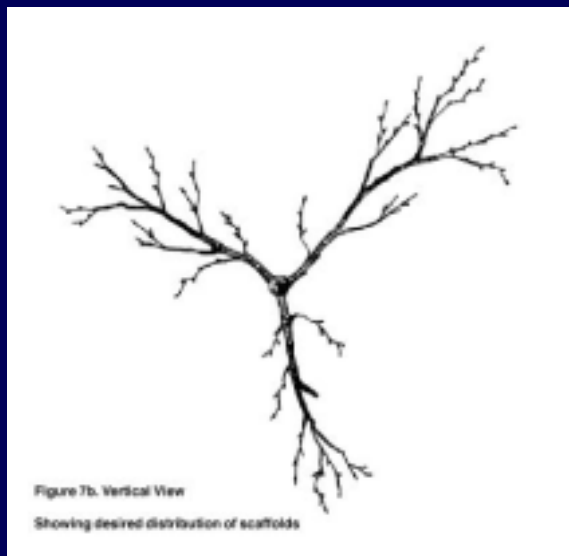


Figure 7b. Vertical View
Showing desired distribution of scaffolds

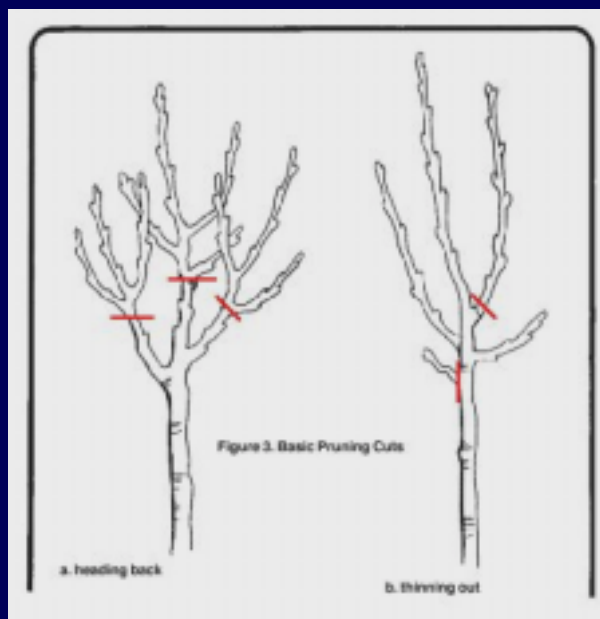
Light Penetration



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Types of Pruning Cuts

- heading back
- thinning out



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Pruning Heading back cuts

- Removal of a part of a shoot or branch
 - It removes terminal buds
 - Apical dominance is weakened or lost
 - Physiological effects
- Net result: increase in total shoot growth

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Pruning Heading back cuts



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Pruning Thinning cuts

- Removal of an entire shoot or branch at its junction with the trunk
- Ratio of terminal to lateral buds is not disturbed
 - Less physiological changes
- Net result: It does not increase shoot growth as much as heading cuts

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Pruning Thinning cuts

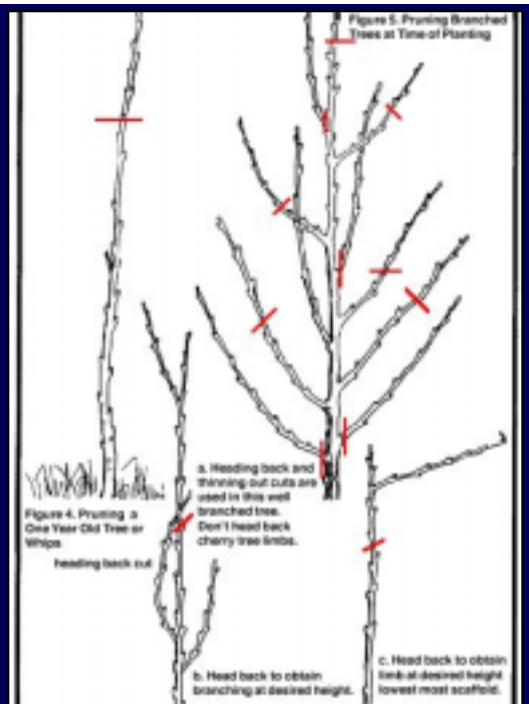


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MODIFIED CENTRAL LEADER System

...at planting

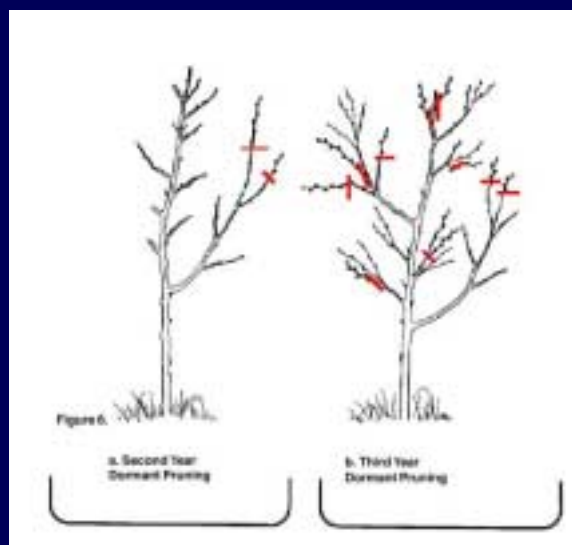
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MODIFIED CENTRAL LEADER (cont.)

*...2nd and
3rd year
dormant
pruning*

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Before and After



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Branch Spreading

- promotes strong crotch angles
- promotes early bearing
- reduces scaffold vigor



Figure 13. Spreading Branches to Obtain Desired Branch
Use spreaders or tie down branches

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Pruning Bearing Fruit Trees

- annual necessary
- dead, damaged branches
- water sprouts
- weak, drooping wood
- crossing-over
- thin out ot increase light

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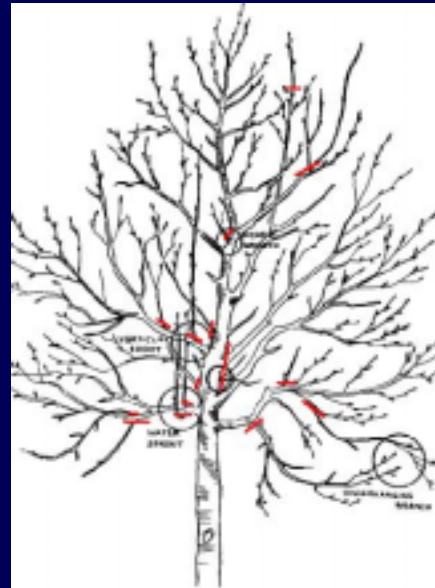
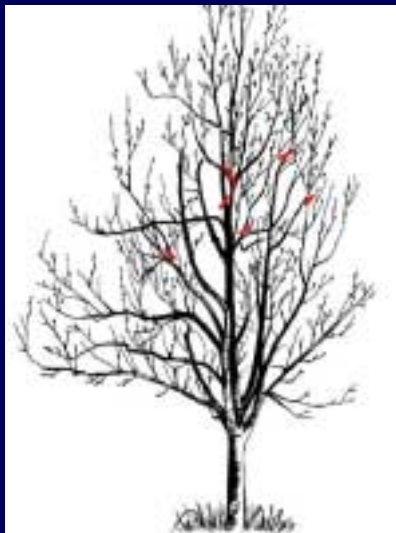


Figure 11. Thinning Out Undesired Growth from a Bearing or Neglected Fruit Tree

Lowering the Height of a Neglected Tree



Removing Undesired Interior Branches from a Neglected Tree



Figure 12. Removing Undesired Interior Branches from a Neglected Tree

Reducing the Breadth of a Neglected Tree

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Figure 10. Reducing the Breadth of a Neglected Tree



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Excessive
branching as
a result of the
removal of the
central leader



Large tree
with good
light
penetration

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Pest Management

Best Defense

- Horticultural Management
 - Proper nutrition
 - Water
 - Pruning



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Tools of pest management

- ▶ Cultural methods
- ▶ Mechanical
- ▶ Biological
- ▶ Chemical



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Tools of Pest Management

- ▶ Cultural Methods
 - ▶ Crop refuse destruction
 - ▶ Pruning
 - ▶ Water management
 - ▶ Nutrition

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Pest Management

- Sanitation
 - Pruning
 - Rake leaves
 - Remove fallen fruit



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Thank You



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