Unit D: Fruit and Vegetable Crop Production

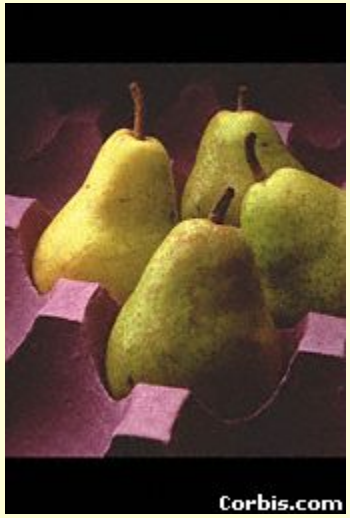
Lesson 4: Growing and Maintaining Tree Fruits

Terms

- Bud scars
- Budding
- Double dwarf trees
- Dwarf trees
- Fruit thinning
- Fruiting habit
- Grafting
- Heading back (tipping) pruning
- Modified-leader pruning system
- Open-center (vase) pruning system
- Rootstock
- Scion
- Semi-dwarf trees
- Standard trees
- Suckers or watersprouts
- Thinning-out pruning

How Should a Fruit Orchard be Planned and Laid Out?

- Explain how to plan and lay out the orchard.



Planning and Layout

- The best size orchard to plan is determined by available space, fruit production, pollination requirements, spaced required, spraying equipment, time from planting until bearing, and average useful life of the tree.
  - Keep in mind that more fruit can be harvested from a small, well-cared-for orchard than from a large, poorly cared-for planting.
- Select a site where easily worked, deep, and well-drained soil is present.

Planning and Layout

- Plant varieties that are winter hardy and developed for your area.
  - Most fruit trees are developed by budding or grafting.
  - **Grafting** is attaching a shoot of a desired variety onto a stock or rootstock
  - **Rootstock** is the root system and base of the tree on which the fruiting top is attached.
  - **Scion** is the name given to the fruiting shoot attached to the rootstock.
  - **Budding** is similar to grafting except a bud shield is used instead of a shoot as the scion

Budding and Grafting Cont.

- Grafting can be used to alter the mature size of a tree.
- **Standard trees** are full size trees reaching a height of 6 meters and taller.
- **Double dwarf trees** are 1.2 to 1.8 meters tall.
- **Dwarf trees** are typically 2.4 to 3 meters tall.
- **Semi-dwarf trees** are 3.6 to 4.8 meters tall.
- The larger the tree, the greater the potential yield but the more work is required to spray, prune and harvest fruit.

Planning and Layout

- Some tree-fruit varieties are self-pollinators.
  - They are pollinated by pollen from their own flowers or by pollen from another tree of the same variety.
  - Check with suppliers to see if the varieties you want to plant need to be planted with a “pollinator” variety.

Planning and Layout

- Family preference and fruit flavor should be considered when selecting what will be planted.
- When planning the orchard for pollination purposes, group trees of the same type together.
  - Plan the orchard as a part of the total home landscape.

PRODUCTION, TREE LIFE, AND START OF BEARING OF VARIOUS FRUIT TREES

Fruit Tree	Years from planting to bearing	Useful life in years	Estimated production per tree at		
			3 years	6 years	10 years
Apples					
Dwarf	2 to 4	10 to 15	0 to 2 pecks	1 to 2 bushels	3 to 5 bushels
Semidwarf	3 to 4	15 to 20	0 to 2 pecks	1 to 3 bushels	4 to 10 bushels
Spur type	3 to 4	15 to 20	0 to 2 pecks	1 to 3 bushels	4 to 10 bushels
Standard	4 to 6	15 to 20	none	0 to 2 bushels	5 to 15 bushels
Apricot					
Standard	3 to 5	15 to 20	0 to 1 peck	1 to 2 bushels	2 to 4 bushels
Nectarine					
Standard	2 to 3	10 to 15	1 to 2 pecks	1 to 3 bushels	3 to 5 bushels
Peach					
Standard	2 to 3	10 to 15	1 to 2 pecks	1 to 3 bushels	3 to 5 bushels
Pear					
Dwarf	3 to 4	10 to 15	0 to 2 pecks	1 to 2 bushels	1 to 3 bushels
Plum					
Standard	3 to 5	15 to 20	0 to 2 pecks	1 to 2 bushels	3 to 5 bushels

Apple Tree

Apricot Tree

Plum Tree

Peach Tree

Pear Orchard

How Should Fruit Trees be Planted?

- Describe how fruit trees should be planted.

Planting

- Mail-order fruit trees are sold bare root packed in moist peat moss.
- On arrival, unpack and place the roots in a tub of water, for no longer than two days.
- If planting is delayed, plant the trees temporarily in a trench covering the roots with loose soil.

How to Plant

- When weather and soil conditions permit, dig a hole large enough to accommodate the roots extended in their natural position.
- Remove any broken, damaged, dead, or diseased root parts.
  - Shortening a long root is better than bending it around the hole.
- Spread out the roots and hold the tree in the hole with one hand.
- Work in loose soil around the roots with the other hand.

How to Plant

- Fill the hole half full, firm the soil, and water.
- Finish filling the hole, firm again, and water again to remove air pockets.
- Trees should be planted so that they are about 5 centimeters deeper in the soil than they were in the nursery.
  - Apple trees grafted high on dwarfing rootstocks should be planted 17 to 25 cm deeper than they were growing in the nursery.

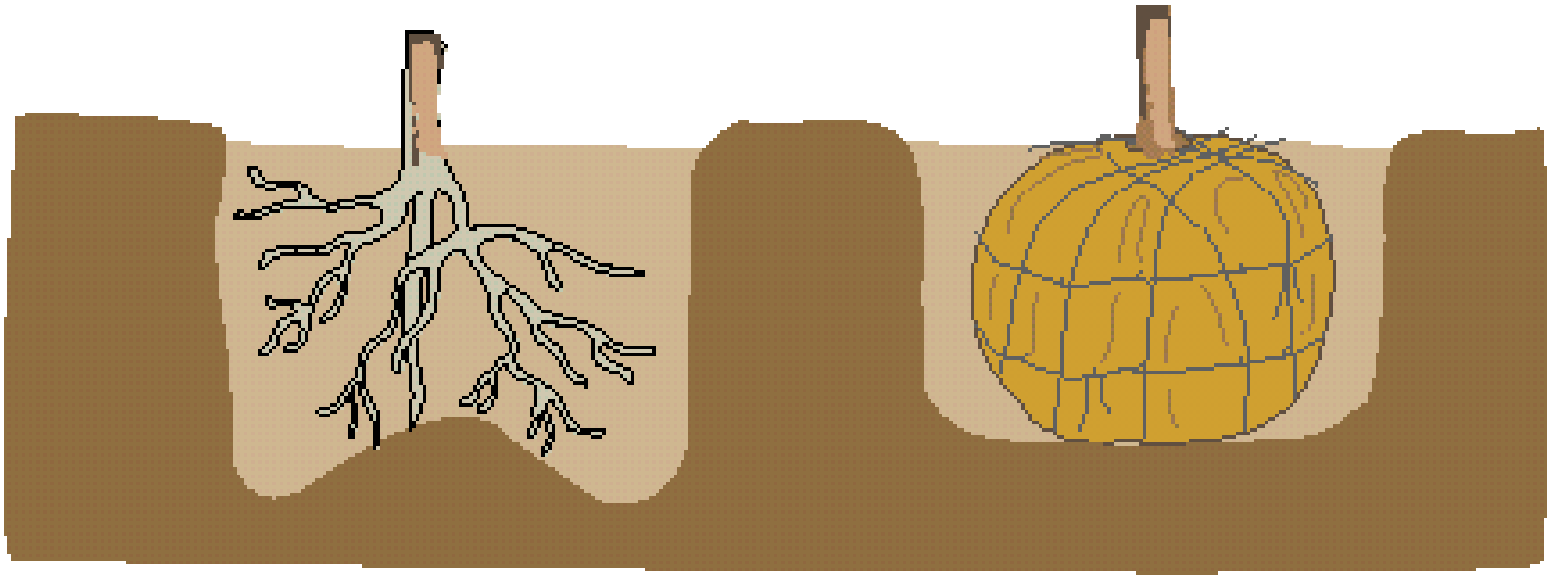
How to Plant

- Leave a saucer shaped surface with a collar built around the edge of the saucer.
  - This serves as a catch basin for watering the tree.
- Fill the basin with mulch (wood chips, saw-dust, or ground corncobs).
- Apply 151 grams of mixed fertilize such as 10-10-10 to each tree.
- Spread the fertilizer in a circular band from 30 to 60 cm from the trunk.

How to Plant

- Nursery or garden center fruits trees typically will be larger.
  - They are either balled and burlaped or container grown.
- Remove the twine from the balled and burlaped tree and the container from the container grown tree.
- Use the same planting procedure as with the bare root tree.

Planting a Bare Root Tree



Bare root
Hole mounded on bottom

Balled and burlapped
Flat on bottom

(Courtesy, Interstate Publishers, Inc.)

How is the Orchard Maintained?

- Discuss how to maintain the orchard.

Orchard Maintenance

- Orchard maintenance begins with the care of young trees.
- Young fruit trees have difficulty competing with weeds and grass for nutrients and water.
- An area extending 0.9 meters in all directions from the trunk should be cultivated and mulched.

Orchard Maintenance

- At least the first year watering is needed to supplement rainfall.
- Water once a week if at least 2.5 centimeters of rainfall does not occur.
- Mature tree maintenance includes fertilization, pest control, fruit thinning, and pruning.

Fertilization

- Fertilize in early spring as the buds begin to swell.
- Broadcast the fertilizer in a circular band starting about 0.9 meters from the trunk and extending out to the spread of the branches.
- If the tree is heavily pruned, reduce or omit the fertilization for that year.

Fertilization

- Nitrogen is the nutrient required in greatest amount, but must be applied with care.
  - Too much causes excessive vegetative growth, less fruit set, and less flavor.
  - Too little nitrogen causes slower shoot growth and smaller, lower quality fruit.
- Soil levels of phosphorus and potassium similar to a garden are recommended along with a pH of 5.6 to 7.0.

Fertilization

- Ammonium nitrate is a good nitrogen fertilizer choice if phosphorus and potassium levels are already sufficient.
- To determine the need for nitrogen, measure the previous year's shoot growth.
  - This measurement is done in early spring before the buds open.
  - Last year's growth will be a more intense color (bright red or yellow) starting with the **bud scars** (compressed scars that circle the twig) and extend to the tip.

Fertilization

- Apples, plums, and apricot need 90 to 226 grams of mixed fertilizer (such as 10-10-10) per year of tree age with a maximum of 4.5 kilograms per tree.
- Peaches and nectarines need 226 to 453 grams per year of tree age with a 4.5 kilogram maximum.
- Pears do best without fertilizer because of the danger of fire-blight disease.
- If you fertilize, limit it to 90 grams per year of tree age with a maximum of 1.8 kilograms.

Pest Control

- Pest control is essential to the successful harvest of fruit trees.
- Fruit trees differ in the severity of insect and disease attacks and the length of time from bloom to harvest.
- Generally speaking, the flowers and fruits must be protected from insects and diseases by sprays applied from blossom time until harvest.
- Some varieties also require a dormant oil spray to prevent borer damage.

Fruit Thinning

- **Fruit thinning** is hand picking during late May and in June of misshaped, damaged, diseased, and excess fruit.
- The results will be larger, higher quality fruit.
- Trees not thinned will have potential limb breakage and lower fruit bud set for next year.
- In some cases the tree may go to alternate year bearing.

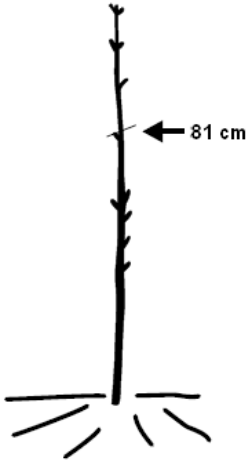
Pruning

- Pruning is a skill acquired through knowledge of the plant to be pruned, practice, and observation of the results of pruning.
- Primary purposes of pruning are to:
  - Improve the size and quality of the fruit
  - Develop a strong tree framework capable of supporting the fruit load
  - Shape the tree
  - Adjust or partially control size of the tree to facilitate spraying and harvesting.

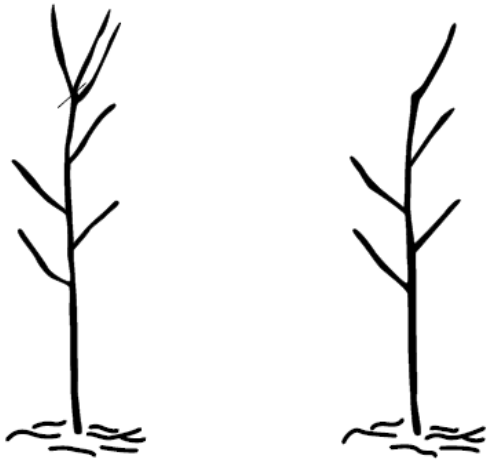
Pruning

- Unpruned trees tend to produce fruit only on the outer edges and the top where sunlight reaches.
- The interior of the tree becomes a tangled mass that is difficult to spray and harvest.
- The **modified-leader pruning system** calls for the selection of five to nine scaffold branches spaced 10 to 20 cm apart vertically around the trunk.

Modified-leader Pruning System

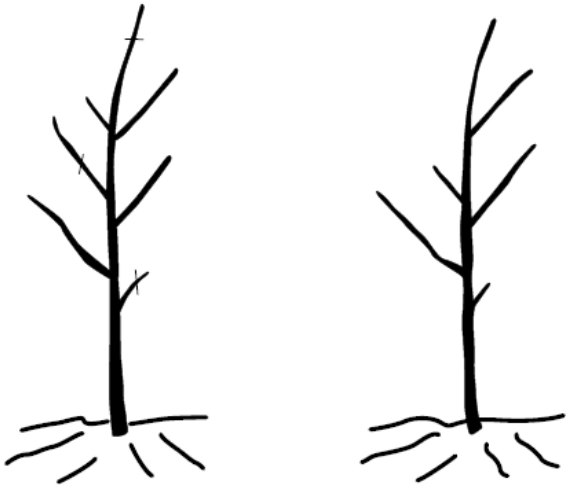


Cut back the one year old whip to 81 centimeters the first spring to promote side-shoot production. Main scaffold branches will be selected from shoots that develop above 55 centimeters from the ground.



Shoots will develop at the top cut portion. Select one of these shoots, when they reach 15 to 25 centimeters, as the main leader. Lower buds will be selected as the permanent scaffold branches in the dormant season.

Newly set tree with side branches. Choose two permanent branches the first spring.



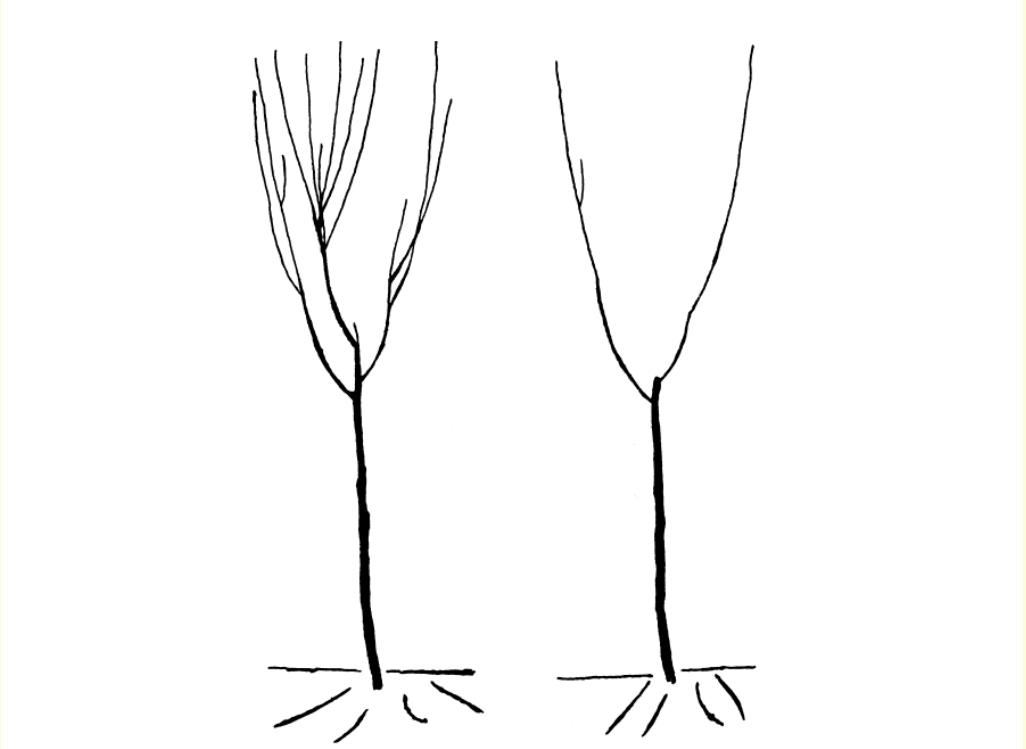
Young apple tree the second spring showing the choice of three main branches and stubbing back or removal of unwanted branches.

Pruning

- As growth occurs, a well-spaced, well-distributed framework develops to support the weight of a large fruit crop.
- Apple and pear trees use this system.

- The **open-center (vase) pruning system** requires the selection of 2, 3, or 4 scaffold branches, all located close together vertically around the trunk.
  - The open-center technique used with peach trees allows good light penetration for fruiting of inner branches.

Open-center Pruning



Select two or three side branches on the main trunk about 30 to 55 centimeters from the ground. Remove all the remaining top portion of the tree. This will produce an open center type tree.

Pruning

- **Heading back (tipping) pruning** refers to cutting the tips of the current season's growth during the growing season and into the previous season's growth during the dormant season.
  - This technique encourages the growth of lateral (side) branches.
- **Thinning-out pruning** is the removal of an entire branch, shortening of a branch, and reduction of the number of laterals growing from branches.
  - The general effect of thinning-out is a more open, easier to manage tree.

Pruning

- Annual pruning is needed to keep the trees productive and prevent trees from becoming too large and too dense.
  - The amount of annual pruning from the most severe to the least severe is peaches, apples, and pears

Pruning

- The **fruiting habit** is the location where fruit is borne …laterally along the branch or terminally at the tip on one-year-old twigs or on fruit spurs produced on older wood.
  - When you prune keep in mind where the fruit is borne.
  - Apples and pears produce most of their fruits terminally on spurs from two year old or older wood.
  - Peaches bear on lateral buds on one-year-old twigs.

Pruning

- Light pruning may be done any time of the year, but heavy pruning should be limited to the latter part of the dormant season.
  - Summer pruning has a dwarfing effect on the tree.
- **Suckers or Watersprouts** are rapidly growing young shoots arising from the roots, trunk, or scaffold branches.
  - They grow straight upward and should be removed whenever they occur.

When and How Should the Fruit Trees be Harvested?

- Explain when and how to harvest tree fruits.

Harvesting

- Tree fruits (except pears) develop maximum flavor and quality when allowed to mature on the tree.
- Since all the fruit on a tree does not mature at the same time, several pickings are frequently necessary.
- Pears develop maximum flavor and quality when ripened off the tree.
  - When a few pears on a tree start to mature, harvest all of the fruits and place them in a cool, dark place.

Harvesting

- Fall and winter apples for storage should be harvested just before they mature to extend the storage life.
  - When the first apples on a tree are mature (ready to eat), harvest the rest of the apples for storage.
  - Ideal storage conditions are about 1°C temperature, 90% humidity, and reduced light or darkness.
  - For the home gardener probably the best storage conditions available are to keep the fruit in a plastic bag in a refrigerator if available.
    - Close the bag loosely or punch one or two small holes in it for slow air exchange.

Harvesting

- In commercial storage, oxygen levels are reduced and carbon dioxide levels are increased to extend storage time and hold freshness.

- Peaches, and summer apples have short storage lives even under ideal conditions.
- Fall apples and pears have somewhat longer storage lives.
- Winter apples have the longest storage lives.

Harvesting

- Peaches are commonly stored by freezing.
- Home orchards are harvested by hand.
  - The larger the tree, the more difficult the harvesting and the more care that needs to be exercised with the use of ladders.

Review/Summary

- How should a fruit orchard be planned and laid out?
- How should fruit trees be planted?
- How is the orchard maintained?
- When and how should the fruit trees be harvested?