Fruit Production

Fruit Production

– TREE FRUIT CARE AND PRODUCTION

Fruit Production

– BIOLOGY AND GROWTH OF FRUITS

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Fruit Production

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Fruit Production

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Fruit Production

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Fruit Production

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Fruit Production

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Fruit Production

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Fruit Production

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Fruit Production

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Fruit Production

– Plums

Fruit Production

– Apricots

Fruit Production

Fruit Production

– Cherries

Fruit Production

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Fruit Production

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Fruit Production

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Fruit Production

- PRODUCING TREE FRUITS AND NUTS IN THE HOME ORCHARD

Fruit Production

– Site Selection

Fruit Production

– Buying Trees

Fruit Production

– Planting the Home Orchard

Fruit Production

– **BIOLOGY AND GROWTH OF FRUITS**

Fruit Production

- Deciduous fruits are grown throughout Utah. The limiting factor in Utah for fruit production is the climate. The major tree fruits include apples, pears, plums, peaches, apricots, and cherries. While botanical characteristics differ somewhat with these fruits, their care and maintenance have many similarities.

Fruit Production

Fruit Production

- **Horticultural Classifications of Fruits**

Fruit Production

- Fruits are classified according to the way the seeds and flesh are created from the flowers. The major tree fruits in Utah fall into the following categories:

Fruit Production

- **Drupe** - a fruit derived from a single carpel, usually having a hard, stony endocarp and a fleshy pericarp: apricot, peach, plum, cherry, almond, date, pomegranate, avocado.

Fruit Production

- **Nut** - a fruit in which the carpel wall is hard or bony in texture.

Fruit Production

– **Pome** - a fruit in which the true fruits (core sections) are surrounded by an enlarged fleshy floral tube or receptacle: apples, pear, quince.

Fruit Production

- The following fruits and nuts are listed and classified according to their type:

Fruit Production

– **Common Name** **Family**
Scientific Name **Type of Fruit**

Fruit Production

- Cranberry Vaccineaceae
  Vaccinium macrocarpum berry

Fruit Production

– Japanese Persimmon Ebenaceae
  Diospyros kaki berry

Fruit Production

– Almond Rosaceae
  Prunus amygdalus drupe

Fruit Production

– Apricot Rosaceae
  Prunus armeniaca drupe

Fruit Production

– Date Oaknaceae

Phoenix dactylifera drupe

Fruit Production

– European plum Rosaceae
  Prunus domestica drupe

Fruit Production

– Jujube Rhamnaceae
  Zizyphys jujuba drupe

Fruit Production

– Nectarine Rosaceae Prunus persica drupe

Fruit Production

- Olive Oleaceae Olea europea drupe

Fruit Production

– Pistachio Anarcardiaceae
  Pistacia vera drupe

Fruit Production

– Pomegranate Punicaceae
Punica granatum drupe

Fruit Production

- Sour Cherry Rosaceae Prunus cerasus drupe

Fruit Production

- Sweet Cherry Rosaceae
  Prunus avium drupe

Fruit Production

– Citrus Rutaceae Citrus sinensis hesperidium

Fruit Production

– Mulberry Moraceae Morus nigra multiple fruit

Fruit Production

- Pineapple Bromeliaceae
  Ananas comosus multiple fruit

Fruit Production

- American Chestnut Castanea dentata nut Fagaceae

Fruit Production

- American Hazelnut Fagaceae
  Corylus americana nut

Fruit Production

- Butternut Juglandaceae
  Junglans cinerea nut

Fruit Production

– Eastern Chinquapin Fagaceae
  Castanea pumila nut

Fruit Production

– Filbert Fagaceae
  Corylus avellana nut

Fruit Production

– Pecan Juglandaceae
  Cara illinoensis nut

Fruit Production

– Shagbark Hickory Juglandaceae
  Carya ovata nut

Fruit Production

- Walnut
  Juglandaceae Juglans spp. nut

Fruit Production

– Apple Rosaceae Pyrus malus pome

Fruit Production

- Pear Rosaceae Pyrus communis pome

Fruit Production

– Quince Rosaceae
  Cydonia oblonga pome

Fruit Production

– Fig Moraceae Ficus carica synconium

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

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Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

– **Tree Growth and Development**

Fruit Production

Fruit Production

- To understand why certain practices are followed in fruit production, it is important to understand how fruit trees grow.

Fruit Production

- Growth Cycle

Fruit Production

– The yearly cycles must be interrupted by a period of cold. This is known as the rest period, or when the tree is dormant. Different fruit trees require different lengths of dormancy.

Fruit Production

Fruit Production

– Blossom and Fruit Development

Fruit Production

- More important than the growth cycle of the wood is the growth of the fruit buds
- Formation of the fruit is dependent on the flower.

Fruit Production

- – There are two basic types of flowers,

Fruit Production

- those of pome fruits such as apples and pears

Fruit Production

– those of stone fruits such as peaches and cherries

Fruit Production

- **Stone Fruit Development**

Fruit Production

Fruit Production

– **Pome Fruit Development**

Fruit Production

- In an apple the true fruit is the core section

Fruit Production

- This contains five ovules in which the seeds are formed

Fruit Production

- The part we eat is an enlarged floral tube or receptacle

Fruit Production

– Many floral parts are visible in a cross section of a mature apple

Fruit Production

– The following diagram is a longitudinal and cross section of an apple.

Fruit Production

Fruit Production

- In peaches and other stone fruits, development of the fruit is somewhat different

Fruit Production

– The ovary matures after pollination to produce the fruits

Fruit Production

– A single carpel matures with a strong endocarp, or pit

Fruit Production

- This is surrounded by a fleshy pericarp which is the fruit we eat

Fruit Production

- The following diagram shows the section of Cherry flower.

Fruit Production

Fruit Production

- **Longitudinal Section of Cherry Flower**

Fruit Production

- The ovary matures after pollination to produce the fruits

Fruit Production

Fruit Production

– **Longitudinal Section of Peach Fruit**

Fruit Production

Fruit Production

- Fruiting Habit

Fruit Production

- Common fruit buds and their locations are:
- Apple - terminal with some lateral, on spurs
- Pear - same as apples
- Peach - lateral, never terminal, on year-old wood
- Apricot - mainly on lateral spurs, also on year-old wood
- Sweet Cherry - lateral, never terminal, on spurs and shoots
- Sour Cherry - lateral, mostly on shoots, not

Fruit Production

- – Apple - terminal with some lateral, on spurs

Fruit Production

- Pear - same as apples

Fruit Production

Fruit Production

– Peach - lateral, never terminal, on year-old wood

Fruit Production

– Apricot - mainly on lateral spurs, also on year-old wood

Fruit Production

- Sweet Cherry - lateral, never terminal, on spurs and shoots

Fruit Production

– Sour Cherry - lateral, mostly on shoots, not as many on spurs as with sweet cherry

Fruit Production

- plum and cherry flower buds are borne laterally and the terminal bud is generally a leaf bud

Fruit Production

– with apple and pear, a terminal flower bud frequently forms so further elongation of the spur is forced out of a straight line.

Fruit Production

- These differences in fruiting habits help determine the management of a tree

Fruit Production

- Apples are produced on spurs which need to be encouraged and developed

Fruit Production

- Peaches are borne on one year wood which requires constant renewal to keep an adequate area of prime fruit-producing wood.

Fruit Production

– the fruiting habits of apples

Fruit Production

– the fruiting habits of peach

Fruit Production

– the fruiting habits of tart and sweet cherries

Fruit Production

– the fruiting habits of European plums

Fruit Production

- **GROWTH AND PRODUCTION FACTORS**

Fruit Production

– **Bud Differentiation**

Fruit Production

– Bud differentiation refers to the formation of flower or shoot parts in buds. It usually occurs, during the summer, preceding bloom the following spring.

Fruit Production

– Apple - early June to early July
– Pear - late June to early July
– Peach - late July
– Apricot - early August
– Sweet Cherry - late June to July
– Sour Cherry - July
– Plums - late July to August

Fruit Production

Fruit Production

- How a tree is treated under different conditions will influence whether a bud differentiates into a shoot or flower

Fruit Production

- Factors which affect flower bud formation include the following:

Fruit Production

- Carbohydrate Accumulation
- Higher starch levels are correlated with initiation of flower buds

Fruit Production

- Factors responsible for high starch levels are
- adequate nutrients
- good leaf surface
- high light intensity
- proper moisture supply.

Fruit Production

- Nitrogen Supply
- Low nitrogen reduces tree metabolism so fewer carbohydrates are produced, though high nitrogen levels stimulate vegetative growth over fruit bud formation.

Fruit Production

Fruit Production

- Adequate Foliage
- Each fruit requires a certain number of leaves to grow and mature it
- If there are not enough leaves it will affect carbohydrate status and fruit production

Fruit Production

Fruit Production

- Biennial Bearing
- No fruit is borne on spurs which bore fruit during the past season

Fruit Production

- Excessive Pruning
- This causes invigoration and more vegetative growth.

Fruit Production

- There are many other reasons why a tree may fail to produce fruit:
- Winter injury to dormant flower buds
- Frost damage to flowers
- Unfavorable weather which prevents bee activity during the period of flower receptivity
- Temperatures too low for pollen-tube growth
- Poor pollen distribution or insufficient cross pollination

Fruit Production

- Scoring

Fruit Production

Fruit Production

– Proper **scoring** before bud initiation can promote fruiting the next year. Scoring includes making a small (blade width) cut around the tree that injures the cambial tissue, which keeps carbohydrates near the spurs, by blocking it from moving into the roots.

Fruit Production

Fruit Production

– **Pollination**

Fruit Production

– Pollination is the transfer of pollen from the anther to the stigma. The transfer of pollen from the anther to the stigma on the same tree is self pollination. The transfer of pollen from the anther of one variety to the stigma of another is cross pollination.

Fruit Production

– Some kinds of fruit fail to set a crop unless the flowers are pollinated and fertilized by pollen from another variety. Such varieties are said to be **self-unfruitful**. Varieties which set fruit with their own pollen are said to be **self-fruitful**.

Fruit Production

- Honeybees and bumblebees accomplish pollen transfer in deciduous fruit trees. Pollen is seldom transferred by any other means. The importance of these insects cannot be overemphasized, and they should be encouraged and protected. Spraying with insecticide during bloom is not recommended. Keep in mind that bees do not fly when temperatures are below 40 degrees F, when winds are present, or when rain occurs. Dandelions and other blooming weeds should be eliminated as

Fruit Production

– Apples

Fruit Production

- No apple variety is sufficiently self-fruitful. A few varieties produce no viable pollen. These varieties are not only self-unfruitful, but will not pollinize other varieties. When any one of these is planted, it should be planted with two other varieties that produce good pollen.

Fruit Production

- Red sports of Delicious, McIntosh, Jonathan, Northern Spy, and Rome are incompatible with the parent variety. If two or more sports of the same variety are planted, a good pollinizer for them should be included in the planting.

Fruit Production

– Any of these cultivars will satisfactorily pollinate most kinds of apples provided that their periods of bloom overlap by a day or more.

Fruit Production

- Early Bloom   Midseason Bloom
  Late Bloom
- Transparent   Cortland
  Early McIntosh
- Lodi   Delicious
  Greenings
- McIntosh   Jonathan
  Golden Delicious
- Idared
  Northern Spy
- Rome Beauty

Fruit Production

– Pears

Fruit Production

– Pears require cross pollination. Bartlett is the most popular canning variety. Bartlett and Seckel are cross-incompatible. Bosc, Comice, and Anjou are favored as cross pollinators for Bartlett. Asian pears can also be used for pollination.

Fruit Production

– Cherries

Fruit Production

- Cherries are generally self-unfruitful. Cross-incompatibility exists among the Bing, Emperor Francis, Lambert, and Royal Ann varieties. Black Tartarian, Schmidt, Stella, Windsor, and Van are effective pollinators of commonly grown varieties. Stella is a dark-fruited cherry variety. It has the distinction of being self-fruitful so may be successfully planted alone and still produce a crop.

Fruit Production

Fruit Production

- All varieties of tart cherries commonly grown are self-fruitful. Full crops can be expected from planting one variety. Montmorency is the most popular tart cherry.

Fruit Production

– Plums

Fruit Production

- Plums vary in their requirements for cross-pollination, depending upon both species and variety.
- European Plums

Fruit Production

– At least two varieties should be included in a planting. A few varieties, including Stanley and Monarch, are self-fruitful, but set better crops when another variety is included. Albion, Archduke, Bradshaw, Brooks, Diamond, Grand Duke, Hall, Imperial Epineuse, Italian Pond, President Tragedy, and others are consistently self-unfruitful. Pollinizers for European varieties should be chosen from other varieties in this group.

Fruit Production

- Japanese Plums

Fruit Production

- – Most varieties are self-unfruitful. Santa Rosa, Satsuma, Elephant Heart, Burbank and Abundance, the most common varieties grown, are self-unfruitful but are dependable pollinizers for each other. European varieties are unsatisfactory as pollinizers for Japanese varieties.

Fruit Production

– Damson Plums

Fruit Production

- Shropshire and French Damson, the two most common varieties of this species, are self-fruitful and will produce good crops without cross pollination.

Fruit Production

– Peaches and Nectarines

Fruit Production

– Practically all peaches and nectarines are self-fruitful and do not require pollinization. The exceptions are J.H. Hale, Stark Halberta, and Stark Honeydew Hale, which require pollinization. Any other peach variety with the exception of the very early ones will pollinize J.H. Hale.

Fruit Production

– Quince

Fruit Production

– All varieties are sufficiently; self-fruitful.

Fruit Production

Fruit Production

– Apricots

Fruit Production

- Self-fruitful except for Perfection which requires a pollinizer.

Fruit Production

– **Fertilization**

Fruit Production

- Nitrogen fertilizer is the one most required in Utah. Observing the shoot growth is the best way for the home fruit grower to manage nutrition of his trees. In early winter look at the shoot growth of the past season. The previous year's shoots are usually a more intense color than older wood. Two-year-old and older wood has heavier bark that is beginning to develop a dull or grayish appearance.

Fruit Production

– Measure the length of the year's shoots on several branches and determine the average length. The following table suggests average length of shoot growth for healthy trees. Increase the fertilization rate if shoot growth is below average, and decrease the rate if growth is above average.

Fruit Production

Fruit Production

Fruit Tree
Young trees up to 6 yrs. old

Fruit Production

Apple, dwarf, and semidwarf
10 to 20

Fruit Production

Apple, standard, and spur types
10 to 20

Fruit Production

Peach, nectarine, and apricot
10 to 24

Fruit Production

Sour cherry and plum
10 to 20

8 to 12

Fruit Production

Fruit Production

Fruit Production

- Pears frequently do best without fertilizer because of the damage of fire blight disease which attacks young, vigorous growth.

Fruit Production

- Apply the nitrogen to the soil in a band below the outer edge of the branches. For young trees the width of the fertilizer band may be up to two feet near the tree trunk. For mature trees, the band may be two to three feet wide and eight to ten feet away from the tree trunk.

Fruit Production

– Nitrogen fertilizer may be spread on the soil (or snow) anytime from December until early March.

Fruit Production

Pounds of Nitrogen (per tree) for Fruit Trees

Fruit Production

Age of Trees
Actual Nitrogen
Ammonium Nitrate (34-0-0)

Fruit Production

When planted

Fruit Production

1 - 3 years
1/4 - 1/2
3/4 - 1 1/2

Fruit Production

3 - 8 years
1/2 - 1
1 - 1 2/3

Fruit Production

Mature trees
1 minimum
3 minimum

Fruit Production

Large apple or cherry

1 1/2 - 3

4 1/2 - 9

7 1/2 - 15

Fruit Production

Fruit Production

Fruit Production

- It takes a lot of barnyard manure or other organic fertilizers to supply enough nutrients for adequate tree growth.

Fruit Production

- Iron chlorosis is not caused by the lack of iron in the soil, but because the iron is made unavailable by alkaline soil conditions. It is greatly aggravated by overwatering especially in the early spring.

Fruit Production

- The best control of iron chlorosis for fruit trees growing in western soils is an iron sequestrene compound, sold as Iron Sequestrene 138 or Ferriplus.

Fruit Production

– **Frost and Frost Protection**

Fruit Production

– Spring frosts limit fruit production more than any other factor. Little can be done to control the frosts.

Fruit Production

– The home orchardist can provide only a limited amount of protection against freezes that can damage buds, blossoms, and small fruit.

Fruit Production

– **Covering:** Blankets or quilts can insulate small trees from some frosts. They trap heat rising from the soil and maintain a few degrees of protection. Covering with one layer of plastic does little or no good unless a heat source is placed beneath it. Electric bulbs may help if just a light frost is expected.

Fruit Production

- **Sprinkling:** Considerable freeze protection can be supplied with application of water. However, most sprinklers apply too much water to the trees and can damage the limbs and branches. <u>Sprinkling is not recommended for homeowners.</u>

Fruit Production

- The following information indicates the temperatures that buds and blooms can withstand at their different stages of development.

Fruit Production

MINIMUM TEMPERATURES (F) FRUIT BUDS CAN WITHSTAND

Fruit Production

Fruit Production

- Bud scales separating, small green tip showing on apples. Pear and cherry inner bud scales showing at tip.
  Delicious 14-16 degrees Pears 18 degrees
- Goldens 14-16 degrees
  Cherries 21 degrees
- Romes 14-16 degrees

Fruit Production

- Delayed dormant. Bud scales widely separated but still attached. Squirrel ear leaves on apples showing. Pear and cherry blossom buds exposed.
- Delicious	20-22 degrees	Pears	23 degrees
- Goldens	20-22 degrees
  Cherries	25 degrees
- Romes	20-22 degrees

Fruit Production

– Pre-pink. Buds are widely separated. Flower parts show no color. Flower cluster still stuck together. Delicious 23-26 degrees Cherries 28 degrees
– Goldens 23-26 degrees
Apricots 23 degrees
– Romes 23-26 degrees
Peaches 23 degrees
– Pears 24 degrees

Fruit Production

- All buds showing color and separated in cluster. Primary leaves fairly well developed on apples.
- Delicious 24-26 degrees Cherries 28 degrees
- Goldens 24-26 degrees Apricots 25 degrees
- Romes 24-26 degrees Peaches 25 degrees
- Pears 27 degrees Italian prunes 23 degrees

Fruit Production

- Full Bloom.
- Delicious 27-28 degrees Bartlett pears 28 degrees
- Goldens 27-28 degrees Anjou pears 30 degrees
- Romes 27-28 degrees Apricots 28 degrees
- Cherries 28 degrees Italian prunes 27 degrees
- Peaches 27 degrees

Fruit Production

– Pruning increases a plant's usefulness by removal of unwanted limbs and wood. It is a skill acquired through knowledge of the plant to be pruned, practice, and observation of the results of pruning. The primary purposes of pruning are to:

Fruit Production

- Improve the strength of the tree so it will carry a load of fruit
- Facilitate cultural and harvesting operations
- Adjust or partially control size and shape of trees

Fruit Production

- Fruit trees, if unpruned, become tall, dense, and unmanageable. Production tends to be limited to the outer edges and the top where there is more sunlight. The interior of the tree becomes a tangled mass of branches with very little productive fruiting wood. An unpruned tree is also difficult to spray and harvest. Though unpruned trees may bear fruit, their size, color, and quality are inferior.
- Pruning cannot "ruin the tree." If an unwise

Fruit Production

- There is no "right" or "wrong" system of pruning. Using basic pruning principles and an understanding of plant growth, you can develop pruning systems to fit your own needs. Pruning is basically dwarfing. Although some growth is stimulated by the practice, total plant size is reduced.

Fruit Production

– A major consideration in pruning is that each tree is an individual, and no two trees grow and develop exactly alike. This can be especially frustrating in trying to develop a desirable framework in young trees. Probably the best solution is a compromise -- know the ideal and modify it enough to suit the individual tree, but still develop the general shape of the system selected.

Fruit Production

– Annual pruning is important throughout the life of the tree. While the tree is young, annual pruning is needed to develop the desired tree structure. Severe pruning of young trees tends to keep them from being productive and may delay the start of bearing. Pruning of young trees should be moderate, the objective being to develop a well-shaped, structurally strong tree. As the tree grows older, annual pruning is necessary to keep the tree productive and to prevent it from becoming too large or

Fruit Production

- <u>Clean up the tree</u>. This includes removing the following:
- Dead, diseased, and broken branches
- Water spouts and suckers
- Branches that rub or cross
- Weak, drooping, and uproductive branches

- <u>Let the light in</u>. Remove branches that:
- Compete with other branches for light
- Shade the center of the tree

Fruit Production

– When to Prune

Fruit Production

- – Light pruning may be done any time of the year, but heavy pruning should be done in late winter or early spring. Pruning before this time increases danger of cold injury.

Fruit Production

– Removal of watersprouts and suckers during the summer is preferred over cutting them out during the dormant season. Watersprouts invite insect and mite pests and make trees harder to spray.

Fruit Production

- Corrective Pruning

Fruit Production

- Trees not properly shaped when young, and trained trees that have not been pruned for several years, usually develop the following conditions:

Fruit Production

- They have too many branches.
- The trees are tall.
- Lateral branches are long.
- The tree is too dense and sunlight does not penetrate the interior of the tree.

Fruit Production

– First, select five to eight of the better branches for scaffolds. These will usually be the larger branches with wide-angle crotches. The other branches arising from the trunk should be removed over a three-year period, cutting out about one-third each year. Spreading this branch removal over a three-year period reduces the shock to the tree. Excessive pruning at one time may upset normal bearing for several years.

Fruit Production

- Long or tall scaffolds should be shortened. Some thinning out of these selected scaffolds probably will be needed.

Fruit Production

– Do not fertilize trees during this corrective pruning period. The corrective pruning will provide enough stimulation of growth.

Fruit Production

– Make pruning cuts next to the branch collar, and do not leave stubs. If latent (nongrowing) buds are present on the stub, they may start growing and fill up the open area. If no latent buds are present, the bark on the stub usually dies leaving the wood to rot before healing can begin.

Fruit Production

Fruit Production

– *A pruning cut by the branch collar like the one shown on the left heals quickly while a stub cut like the one on the right heals slowly. Wound compounds painted on pruning cuts usually do little good.*

Fruit Production

– Training the Home Orchard

Fruit Production

- The modified-leader system is suggested for apples, pears, European-type plums, and sweet cherries. The open-center system is suggested for peaches, nectarines, and Japanese-type plums. Apricots and sour cherries may be trained to either of these systems, but the open-center system is easier to develop and maintain.

Fruit Production

– <u>Modified-leader</u>

Fruit Production

- An ideal semi-dwarf or spur-type apple tree trained and pruned to the modified-leader system has these characteristics:

Fruit Production

- One main trunk 8 to 10 feet high with an open center above.
- Lowest branch 24 to 48 inches from the ground.
- 5 to 12 scaffold branches. The branches should be spaced 18 to 24 inches apart vertically along the trunk.
- Scaffold branches should form two tiers, each having 4 to 6 branches.
- The crotches of the scaffold branches forming a 40 to 90 degree angle with the

Fruit Production

– The number and spacing of scaffold branches and the height of the modified leader varies with the type of tree (dwarf, semi-dwarf, or standard), the type of fruit (apple, cherry, pear, or plum), and the number and spacing of scaffolds. Properly shaped, a modified-leader tree has low and well-spaced branches, well-distributed fruiting wood, and is close enough to the ground to make pruning, spraying, and picking easier.

Fruit Production

- Open-center
- An ideal standard peach tree trained and pruned to the open-center system has these characteristics:
- A single trunk 18 to 30 inches high.
- 3 or 4 scaffold branches, all located 6 to 8 inches apart vertically near the top of the trunk and kept about equal in size by pruning.
- All scaffold branches forming a crotch

Fruit Production

– Developing Good Angles and Strong Crotches

Fruit Production

– Under some situations trees need to have their branches spread. This helps develop strong crotch angles. In the illustration below, the wide-angle crotch on the right is stronger than the narrow angle crotch on the left.

Fruit Production

Fruit Production

- **LESS THAN 40 DEGREES**
  40 TO 90 DEGREES

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

Fruit Production

– Branch spreaders are helpful in training young trees to the modified-leader system. Boards with a nail in each end, stiff wire, metal rods, or welding rods sharpened at each end make satisfactory branch spreaders.

Fruit Production

- Apple and pear branches tend to curve and grow straight upward even though the crotch forms a satisfactory angle. Spreaders help to keep the branches growing at the desired angle.

Fruit Production

Fruit Production

– Espalier

Fruit Production

– The training of fruit trees to grow in various forms, including picturesque shapes on walls or other permanent structures, is a technique of long standing in Europe. This method also makes it possible to grow fruit where the area is very limited, as on a small home lot. Through proper pruning and fastening of shoots or branches in place, the grower may develop any design desired. There are many systems for training trees. Good pruning books are available, and you can consult one of them

Fruit Production

– **Size Control**

Fruit Production

- – Trees can vary in size by variety, type of growth habit or by the variations in rootstock or interstem.

Fruit Production

- Variety size refers to the mature plant size. For example, Red Delicious trees are usually larger than Rome Beauty, all other growth factors being equal.

Fruit Production

– **Spur type** apple trees develop long limbs with few side branches but many fruiting spurs. These trees are more open than standard trees and grow to about three-fourths of the size of a standard tree. The characteristic of this tree is the shorter internode length between buds which results in many more fruiting spurs per limb than a non-spur tree. Spur varieties may ripen later than standard varieties. They are not available for all varieties.

Fruit Production

- Many cultural factors help determine ultimate tree size including soil type and fertility, soil moisture, pruning and training, and fruit production during early growth.

Fruit Production

- Rootstocks and interstocks are other ways of producing size-controlled trees. **Dwarfing rootstocks** are clonal which impacts the dwarfing tendency to the variety. A number of rootstocks provide a wide range of dwarfing.

Fruit Production

- **Interstems** are a graft between the rootstock and scion wood of the tree. The advantages of this type of tree are that the correct rootstock can be selected for soil conditions and anchorage without sacrificing dwarfing. Interstems are not very common.

Fruit Production

– Apples

Fruit Production

– Standard apple trees are produced by planting seeds, growing the seedlings for two years, and grafting on the desired variety. Dwarfing rootstocks must be propagated vegetatively by rooting the shoots of specific rootstocks in stoolbeds. The East Malling Research Station in East Malling, Kent, England, played a leading role in selecting dwarfing rootstocks from wild, small-growing apple species. Therefore, most of the common dwarfing rootstocks carry the designation M.

Fruit Production

– Pears

Fruit Production

- Pears may be satisfactorily dwarfed by grafting the variety scion on Quince A rootstock. Although most trees available to the home orchardist will be that combination, Old Home x Farmingdale rootstock will be satisfactory and may be found in nurseries.

Fruit Production

– Stone Fruits

Fruit Production

– Dwarf cherries, peaches, and plums are available. Various seedling and clonally propagated rootstocks are used to produce the dwarfing effect. The degree of dwarfing varies widely. Stone fruit dwarfing is not as satisfactory as in apples and pears, and compatibility problems between stock and scion may produce a short lived tree.

Fruit Production

– **Winter Injury**

Fruit Production

– There are several categories of winter injury. They include the following: blackheart, crotch and trunk injury, crown and collar injury, winter sunscald, trunk splitting, and dieback of twigs and young branches. Symptoms of the effects on trees are as follows:

Fruit Production

– Blackheart

Fruit Production

– The pith is usually killed and the heartwood is darkened, turning a shiny brown while the cambium and bark remain alive. With blackheart, the tree usually continues to grow and may form new sapwood and bark. Blackheart is found in apples, peaches, plums, pears, and cherries following severe winters.

Fruit Production

– Crotch Injury

Fruit Production

- – The bark, cambium, and sapwood in the crotches or forks may be killed when other portions of the tree are uninjured. Bark splitting may occur. Injury may extend several feet up the limb from the crotch.
- – Winter Sunscald

Fruit Production

– Sunscald on limbs may be caused in summer by excessive heat from direct sun rays. A similar injury may develop in winter on the southwest sides of tree trunks. Painting the exposed trunk with exterior latex paint is a good control measure for about two years. Tree trunk protectors or summer shades will also control the problem.

Fruit Production

- Crown or Collar Injury

Fruit Production

– These terms refer to a winter killing of the bark at or near the ground surface. Applying the white paint completely to the soil line may reduce this injury.

Fruit Production

– Splitting of the Trunk

Fruit Production

– Longitudinal splits in the trunk, often to the pith, may occur in extremely cold weather. The cracks usually draw together when the temperature rises, and the bark calluses over. Cracks are quite common on sweet cherry trees.

Fruit Production

– Die Back of Young Branches and Twigs

Fruit Production

- In a severe winter, this is common with many kinds of fruit trees. The injury occurs frequently on young, vigorous trees and seems to be an inherent characteristic with certain tender varieties.

Fruit Production

– Injury to Leaf and Flower Buds

Fruit Production

– The leaf and flower buds of fruit trees can be damaged or killed by extreme low temperatures. Flower buds of some varieties of apples will withstand -31 degrees F to -40 degrees F. Peaches and some stone fruits are damaged at about 5 degrees F.

Fruit Production

– Killing of Roots

Fruit Production

- Roots are not as hardy as parts of the tree above ground. Roots of the apple may be killed at temperatures ranging from 10 to 25 degrees F. A very sudden drop in temperature after a warm winter day rarely kills roots, but a long, continued cold period when the ground freezes may cause root injury.

Fruit Production

- A heavy blanket of snow, a heavy mulch, or a good cover crop during the winter tends to protect the roots.

Fruit Production

Fruit Production

– **Irrigation**

Fruit Production

– Proper irrigation is a critical part of producing high quality fruit. Irrigation water should not be applied just near the base of the tree. Under favorable growing conditions, tree roots will extend ten to fifteen feet into the soil and spread out fifteen to twenty feet from the trunk in all directions. Young trees should have a doughnut-shaped basin around them so water will not collect around their trunks.

Fruit Production

- Tree fruits prefer 3 to 6 feet of bare soil around their base. Trees should be watered deeply every 14 to 21 days. Trees in lawn areas often suffer from crown and root rots because of shallow, frequent irrigation.

Fruit Production

Fruit Production

– **Thinning**

Fruit Production

– Peach, apricot and apple trees often set more fruit than they can mature to a desirable size. Thinning allows for an increase in size of the remaining fruit on the tree and improves fruit color and quality. Thinning induces regular annual bearing in certain apple varieties. Thinning fruits also permits more thorough spraying for effective disease and insect control.

Fruit Production

– Apples and Pears

Fruit Production

- Apples should be thinned as soon as possible after the fruit has set. If full benefits are to be obtained, first thinning should be completed within 20 to 25 days after full bloom. Some spurs should have all developing fruit removed to encourage return bloom next year. If too many fruit survive the June drop, thin again.

Fruit Production

– About 6 to 10 inches between fruits is recommended. With varieties of Delicious apples, where greater size of individual fruits is important, the greater spacing is preferred. The center apple of a cluster is usually the largest and the best apple to leave.

Fruit Production

– Peaches

Fruit Production

- Peach thinning should be done regularly and vigorously. The sooner peach trees are thinned after bloom the larger the fruit will be at harvest. Final fruit size will not be increased if thinning is done after pits begin to harden.

Fruit Production

- Peach tree thinning can be done by hand. Removal of the smaller fruits encourages continued enlargement of big fruit. Leave one fruit for every six inches of branch.

Fruit Production

- Thin apricots in a similar manner to peaches. Leave one fruit for every three inches of branch.
- <u>Plums</u>

Fruit Production

– Thinning plums is usually limited to the large Japanese varieties. The primary concern here is to facilitate insect and disease control. Plums are usually thinned by hand to about four inches apart.

Fruit Production

Fruit Production

Fruit Production

– **Harvesting**

Fruit Production

- Home grown fruits and nuts should be harvested and used at just the right time, "the peak of perfection," direct from the orchard or garden.

Fruit Production

– Apples

Fruit Production

– Apples should be harvested when the fruit is fully colored for the variety. A few sound (not wormy or damaged) fruit will begin to drop from the tree. The seeds will have a dark brown coat. With apples which are not red, the ground color should show a considerable yellowing. Tasting is also a good indicator of maturity. When harvesting an apple, carefully separate the fruit from the spur. The spur is productive over many years, so don't tear the spurs from the tree.

Fruit Production

– Pears

Fruit Production

– Pears will not ripen properly on the trees. If they turn yellow on the tree, the center will be brown and soft and have a gritty texture to the flesh. Pears should just begin to turn from a dark green color to a light yellowish green. Dark brown seeds indicate maturity. The flesh should give a little if squeezed. A few sound fruit drop from the tree. Stems should separate easily from the spur with an upward twist of the fruit. At 70 degrees F, summer pears will ripen in a few days off the tree.

Fruit Production

– Peaches

Fruit Production

– Watch for the ground color, not the amount of red. It should be yellow and have lost its green color. The flesh should give somewhat under pressure when squeezed. The fruit should separate easily from the tree with a slight twisting motion.

Fruit Production

– Plums

Fruit Production

- With Japanese and European type of plums, the taste test is probably the best way to determine maturity. They should just begin to soften and be sweet and juicy.

Fruit Production

– Apricots

Fruit Production

- – Apricots must be completely yellow over the entire surface of the fruit but not too soft. They should be picked while slightly firm.

Fruit Production

– Cherries

Fruit Production

- Cherries should ripen fully on the tree. They must be juicy and sweet but still firm. Don't break off the spurs when you pick cherries because that is where the blooms will form for next year's harvest.

Fruit Production

– Almonds

Fruit Production

- Harvest in the fall by knocking or shaking them from the trees. Moisten the outer husks if they do not open easily, and crack open the softer, inner shells. Dry the kernels out of the sun in a well-ventilated, dry place.

Fruit Production

– Hazelnuts (Filberts)

Fruit Production

– Once ripe nuts have fallen to the ground, gather them up every day so that they will not be harvested by squirrels. Dry by putting in mesh bags and hang by the furnace. They will also dry if you put a few layers in a cardboard box at room temperature. When dry, they will crunch when bitten.

Fruit Production

– Walnuts

Fruit Production

- Walnuts will fall to the ground as they ripen. When they fall, they should be gathered and husked promptly, then spread thinly in a shady place to dry. English walnuts require faster drying than blacks so they won't mildew. Mesh bags hung by the furnace work well. Drying temperatures shouldn't exceed 100 degrees F. They are dry enough when the membrane between the halves breaks when it is bent. The husks of English walnuts fall free from the nuts when they

Fruit Production

- **PRODUCING TREE FRUITS AND NUTS IN THE HOME GARDEN**

Fruit Production

- Quality fruit may be produced in the home garden in Utah. It is important for you to know that the process is not always easy nor is it without expense or problems. Fruit trees need careful attention to soil and water management, pruning, and insect and disease control to produce good crops. Poorly cared for trees serve as a source of disease and insect problems for other homeowners as well as commercial orchards.

Fruit Production

– **Site Selection**

Fruit Production

– Ideally, trees should be planted in deep, rich soil with good water and air drainage. Fruit can be grown on a wide variety of soil types. Poor soil can be improved by fertilization and cultural practices. However, extremely heavy or poorly drained soils should be avoided if possible. Trees should be located where they will get full sun. Trees should not be planted in lawns or areas where they receive excessive water.

Fruit Production

Fruit Production

Fruit Tree
Years from planting to bearing
Useful life in years

Fruit Production

3 yrs
6 yrs

Fruit Production

Apple

Dwarf

Semidwarf

Spur type
Standard

Fruit Production

2 - 4

3 - 4

3 - 4
4 - 6

Fruit Production

10 - 15

15 - 20

15 - 20

15 - 20

Fruit Production

0 - 2 p

0 - 2 p

0 - 2 p
none

Fruit Production

1 - 2 b

1 - 3 b

1 - 3 b
0 - 2 b

Fruit Production

3 - 5 b

4 - 10 b

4 - 10 b

Fruit Production

Apricot
3 - 5
15 - 20
0 - 1 p
1 - 2 b

Fruit Production

Nectarine
2 - 3
10 - 15
1 - 2 p
1 - 3 b

Fruit Production

Peach
2 - 3
10 - 15
1 - 2 p
1 - 3 b

Fruit Production

Pear
3 - 4
10 - 15
0 - 2 p
1 - 2 b

Fruit Production

Plum
3 - 5
15 - 20
0 - 2 p
1 - 2 b

Fruit Production

Sour Cherries
3 - 5
15 - 20
0 - 1 p
2 - 4 p

Fruit Production

Sweet Cherry
4 - 7
15 - 20
none
0 - 3 p

Fruit Production

Fruit Production

- b = bushel   p = peck

Fruit Production

– **Buying Trees**

Fruit Production

- Obtain the best nursery stock available. Buy only from reputable nurserymen who guarantee their plants to be true to name, of high quality, and packed and shipped correctly. Beware of "basement bargains". High prices do not necessarily mean high quality, but good, well-grown trees are not cheap.

Fruit Production

- One-year-old trees are usually preferred. A common mistake is to select oversized or ready-to-bear nursery trees. Younger trees bear almost as soon, are easier to keep alive, and develop into more healthy, vigorous trees than do the oversized stock. The older trees cost nurserymen more to grow so must be sold for a higher price.

Fruit Production

- – **Planting the Home Orchard**

Fruit Production

– Soil preparation is very important to the success of any home orchard planting. The ground should be spaded, tilled, or plowed 10 to 12 inches deep. Organic matter may be worked in at this time. You are usually better off to improve your soil than to haul in soil. Any soil amendment should be thoroughly mixed with the soil.