



## Pruning and Training Deciduous Fruit Trees for the Dooryard<sup>1</sup>

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Proper pruning and training of fruit trees is necessary to obtain maximum yields of high quality fruit throughout the life of the home orchard. *Pruning* is a general term which refers to selective removal of plant parts to obtain a desired growth or developmental response. However, for fruit trees, pruning usually refers to mature, bearing trees and is done primarily to increase production of high quality fruit and limit tree height and spread. Pruning is necessary to maintain tree health, vigor and productivity throughout the life of the home orchard.

*Training* should begin at planting and may consist of light pruning along with various other horticultural practices such as spreading, bracing or bending of limbs and shoots. The primary objective of training is to develop a strong tree framework of optimum size and shape.

The many benefits of pruning and training may be summarized as follows:

- Aid in the establishment of newly planted trees.
- Promote development of a strong framework.
- Enhance early productivity.
- Aid in the development and maintenance of desirable tree size and shape.

- Increase fruit size and enhance fruit quality.
- Promote flower bud development throughout the tree canopy.
- Increase tree vigor and promote development of new fruiting wood needed to maintain productivity.
- Reduce the tendency for biennial bearing.
- Reduce incidence and spread of certain diseases.
- Facilitate other horticultural practices, such as spraying, thinning and harvesting.

### PRUNING

#### When to Prune

Almost all pruning of deciduous fruit trees may be classified as dormant pruning and should be done during the late winter or very early spring (before bloom). Since pruning may reduce cold hardiness, it is important to delay pruning until the likelihood of extreme cold passes. Some summer pruning or training may be necessary, especially for young trees. However, summer training should be limited to snipping, pinching, or rubbing away young, succulent growth. Extensive pruning should not be done during

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the growing season except to remove diseased or damaged wood.

### Tree Response to Pruning

Pruning removes food reserves and reduces leaf surface area, thereby decreasing the tree's ability to harvest sunlight. Hence, pruning reduces tree size, and is considered a dwarfing process.

Although dwarfing to the whole tree, pruning may stimulate shoot growth near the pruning cut and may be considered locally invigorating. Therefore, pruning may be used not only to limit tree size, but also to modify the level and distribution of vigor within the tree canopy.

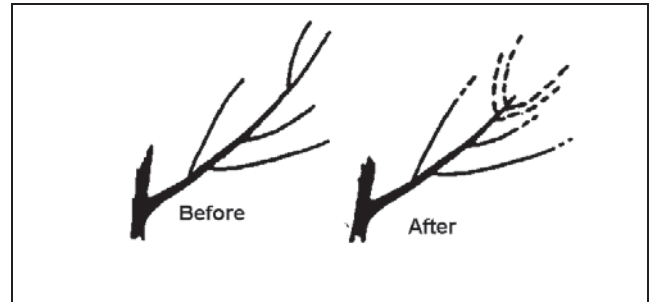
### Types of Pruning Cuts

Three basic types of pruning cuts are used for pruning and training trees in the home orchard:

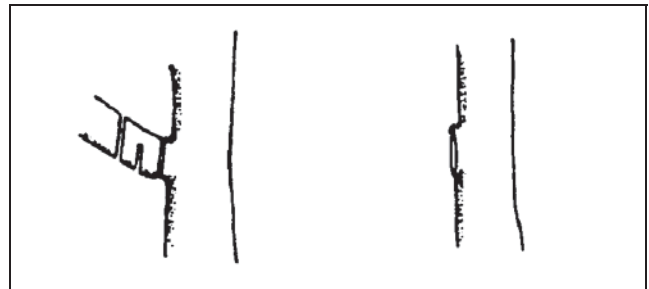
1. Heading-back cuts which consist of cutting a terminal shoot back to a bud on 1-year-old wood (Figure 1).
2. Thinning-out cuts which are the complete removal of shoots or limbs at their points of origin (Figure 2).
3. Cutting-back to lateral shoots, which consist of cutting terminals back to existing lateral shoots or branches (Figure 3).

Heading-back cuts stimulate growth from one to several buds located just below the cut and are used to stiffen branches and promote growth of lateral shoots. Heading-back cuts encourage development of many lateral shoots just below the pruning cut. Heading-back cuts should be made about  $\frac{1}{4}$ " inch above the uppermost bud from which growth is desired.

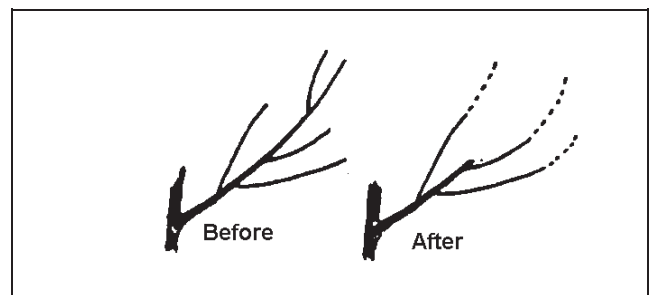
Thinning-out cuts are used to reduce crowding from adjacent limbs, remove weak, nonproductive or diseased wood, and limit tree size. The 3-saw cut is a type of thinning cut used to remove large limbs. The first cut is made on lower side half way through the limb. The second cut is made from the upper side slightly farther out on the limb. The limb will break under its own weight while making this cut. The remaining stub is removed by making a third cut close to the trunk.



**Figure 1.** Heading-back cuts. Broken lines indicate new growth which occurs after pruning.



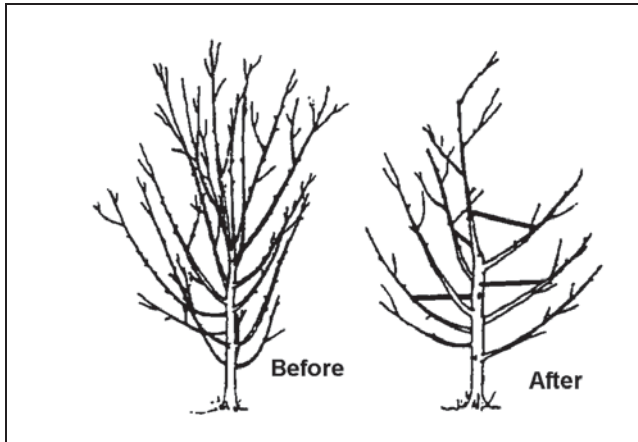
**Figure 2.** The 3-saw cut.



**Figure 3.** Cutting back to a lateral shoot.

Cutting-back to lateral shoots can be used to direct growth, stiffen branches, reduce crowding, remove diseased or nonproductive wood, limit tree volume and regulate vigor. Cutting back to a lateral shoot is locally invigorating but does not stimulate the development of new lateral shoots below the cut.

Smooth, clean pruning cuts heal quickly and minimize the likelihood of invasion from pathogens. Before making any cuts, become familiar with the various types of pruning equipment, their uses and limitations, and the basics of equipment maintenance. Be sure your equipment is properly adjusted and in good working order.



**Figure 4.** Fruit tree trained in the modified central leader system, before and after dormant pruning.

## TRAINING SYSTEMS

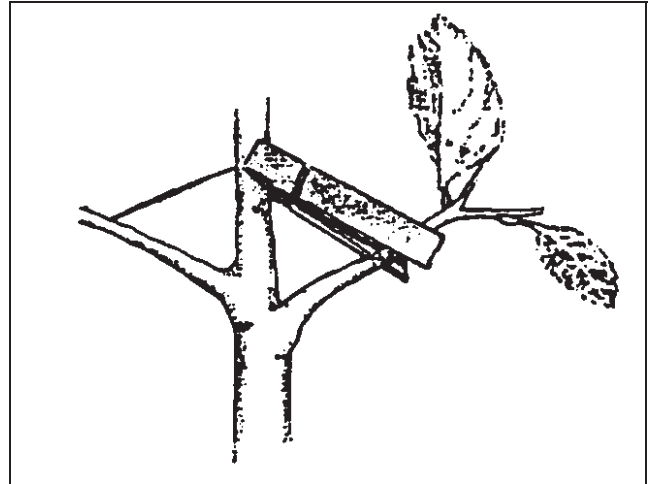
### Begin Training at Pruning

Untrained fruit trees usually do not develop growth habits suitable for production of high yields of quality fruit. Tree training should begin at planting to minimize the need for later corrective training which may delay fruit production in young trees. Some shoot tissue should be removed at planting since many roots are lost or damaged while digging and transporting trees. This helps the tree become established and begins the training process. Generally about  $\frac{1}{3}$  to  $\frac{1}{2}$  of the top should be removed at planting. The manner in which this is done depends on the training system selected.

### The Modified Central Leader System

Trees trained to the modified central leader system usually have five to seven well-spaced scaffold limbs 6" to 10" apart on the central leader radiating from the tree axis in different directions (Figure 4). This training system is relatively simple, produces a strong tree framework and is well suited for dooryard apple trees grown in Florida.

If possible, plant 1-year-old unbranched trees which are about 4 to 6 feet tall with well-developed root systems. At planting, head-back the central leader to about 32 to 36" above the soil surface. This will stimulate development of lateral shoots, some of which will later become the leader and major scaffold limbs, the structural framework of the tree. Typically, two or three exceptionally vigorous lateral shoots will develop just below the heading-back cut. When these



**Figure 5.** Wooden toothpicks or clothespins can be used to spread young shoots as they develop during the growing season.

shoots are 8" to 10" long, select one to continue developing the leader and remove the other one or two competing lateral shoots. Remove all lateral shoots within 20" of the soil surface. Select four to six of the remaining shoots with wide crotch angles, preferably greater than  $45^\circ$ , evenly distributed radially around the trunk and vertically spaced 6" to 8" apart, to form the scaffold limbs. In some cases, only two or three lateral shoots can be selected the first year with additional shoots being selected higher on the leader the following growing season.

When planting branched trees, select scaffold limbs from existing lateral shoots which have wide crotch angles and are properly positioned along the leader as outlined above. Remove all unwanted lateral shoots at their point of origin. Head back the remaining lateral shoots by about  $\frac{1}{2}$  to  $\frac{1}{3}$  of their length. The top lateral, which will form the leader, should be headed back but left longer than other lateral shoots. If small unbranched trees are planted, head back and allow only one vigorous lateral shoot to form the leader. Remove other lateral shoots as they develop. Wait until the second growing season to begin developing scaffold limbs.

Limbs with wide crotch angles are stronger and can support more fruit than upright limbs with narrow crotch angles. As young shoots develop, wooden clothes pins or round wooden toothpicks can be used to spread young shoots and develop wide crotch angles (Figure 5). If clothes pins are used, they should be removed about the time the tissue hardens (early to mid-July) to prevent girdling of young

shoots. As shoots continue to develop, additional limb spreading is desirable.

Spreaders of varying lengths can be fashioned from large, stiff wire or pieces of wood with sharpened nails extending from each end (Figure 6).

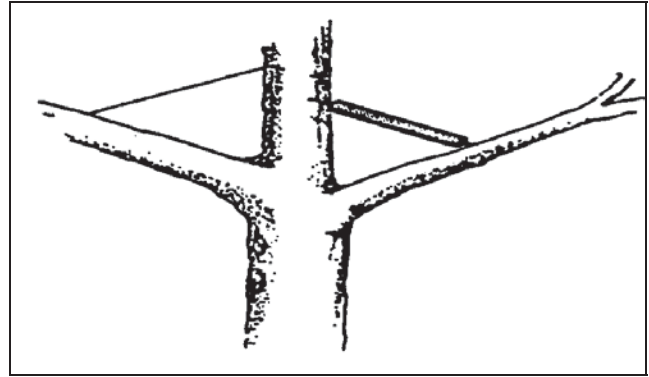
During late winter or early spring following the first growing season, continue selecting and developing scaffold limbs. Remove any shoots originating from the main trunk which are not needed for scaffold development. Head back existing scaffolds slightly to encourage branching and spur development. Shoot and limb spreading which encourages wide crotch angles will also help maintain leader dominance and promote fruiting at an earlier age. If more scaffold limbs are needed, head back the central leader about 20" above the highest permanent lateral shoot. This will stimulate the development of lateral shoots from which additional scaffold limbs will develop. Continue to select laterals for scaffold limb development as described previously. After five to seven properly positioned scaffold limbs have been selected, continue to remove shoots which compete with the central leader during each dormant pruning.

Once five to seven scaffold limbs have developed, dormant pruning consists primarily of selective removal of crowded or crossing branches, water sprouts, root suckers, and other growth which interferes with light penetration and air movement in the tree canopy. Sometimes it is necessary to remove some of the weaker growth from the interior of the tree.

Some heading-back cuts to scaffold limbs are necessary during the first few years to encourage branching and fruit spur development. As trees begin to bear fruit, use thinning cuts and heading-back cuts to side laterals more than straight heading-back cuts. Tree height may be controlled by cutting back the central leader to the uppermost lateral shoot. Always remove dead, diseased, or damaged wood.

### The Open-Center System

The open-center, or vase-shaped, training system is the method of choice for most stone fruit trees grown in the southeastern United States. Peaches, nectarines, plums and apricots are commonly trained to this system. Open-center trees usually contain from three to five major scaffold limbs with no central leader (Figure 7).



**Figure 6.** Larger limb spreaders will be needed to maintain wide crotch angles as scaffold limbs develop.

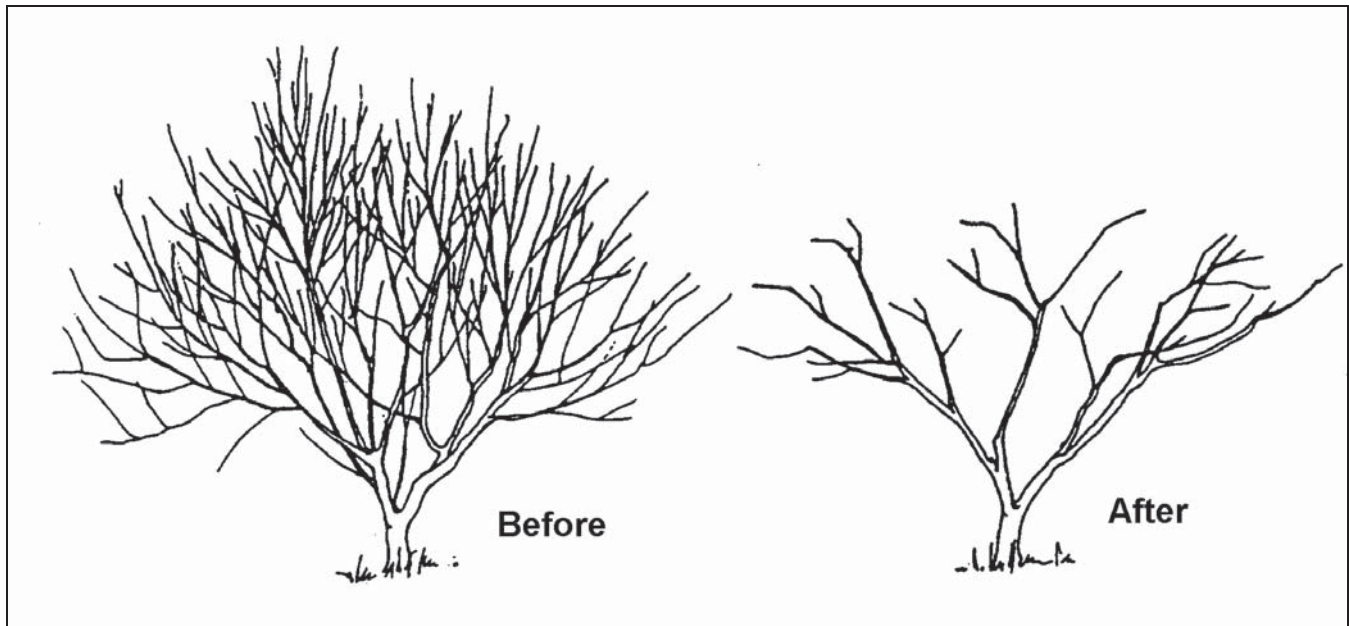
At planting, prune the central leader of young trees to a height of 30 to 36" above the soil line. This helps reestablish the root:shoot ratio and encourages the development of lateral shoots from which primary scaffold limbs can be selected.

Larger trees usually have several side branches. Remove all side branches less than 18" from the soil line. Head back the remaining side branches to 2 to 4" stubs containing several buds each.

During the first summer, select three to four lateral shoots evenly distributed around the tree trunk and spaced at least 4 inches apart vertically with crotch angles as near 45° from the tree trunk as possible. Remove root suckers, water sprouts and unwanted lateral shoots as they develop. Summer pruning should consist of removing young succulent growth by pinching or rubbing young shoots as they develop. Large pruning cuts should not be made during the summer. The key to successful summer pruning is to direct growth into the desired portions of the tree while removing as little leaf surface area as possible.

Selection of primary scaffold limbs should be completed during the following dormant season. The remaining scaffold limbs should be headed back 24 to 36" from the trunk to stimulate lateral shoot development. Head back to an outward-growing bud to encourage a spreading habit of growth. Remove vigorous upright growth, downward-growing shoots, and other growth which competes with scaffold limbs.

During the second growing season continue to direct growth into scaffold limbs by removing suckers and water sprouts as they develop.



**Figure 7.** Fruit tree trained to an open center or vase-shaped system before and after dormant pruning.

During the second dormant season select secondary scaffolds 18 to 24" from the origin of the primary scaffold. Head back secondary scaffolds to a length of about 24 to 36". Remove unwanted lateral shoots and vigorous upright shoots growing from the trunk and center of the tree.

During the third and subsequent growing seasons, selective removal of young succulent shoots may be required to keep the center of the tree open. As always, remove suckers and water sprouts as they develop.

Dormant pruning the third year should consist of selective thinning of crowded shoots and heading cuts to outside buds or laterals. Strive for a symmetrical, spreading habit of growth. In subsequent years as trees mature and come into bearing, prune selectively to stiffen scaffolds, adjust crop load and encourage a symmetrical, spreading habit of growth of manageable size with an open center. Fruiting wood should be thinned annually to reduce crowding and stimulate the production of new wood which bears next year's crop. Always remove damaged or diseased wood.

### Pruning Neglected Trees

Older trees which have been neglected for a number of years often develop a dense, bushy habit of growth. Such trees often become slow growing and produce poor quality fruit. The primary objective is to open up the interior of the tree to light. This will help with flower and fruit development and improve insect and disease control. Remove vigorous, upright shoots from the tree interior and root suckers from the base of the trunk if present. Select several scaffold limbs with wide crotch angles and remove the remaining limbs with thinning cuts. Shorten the scaffold limbs by about  $\frac{1}{4}$  their length using heading cuts and by cutting back to lateral shoots. Remove any diseased or damaged wood.