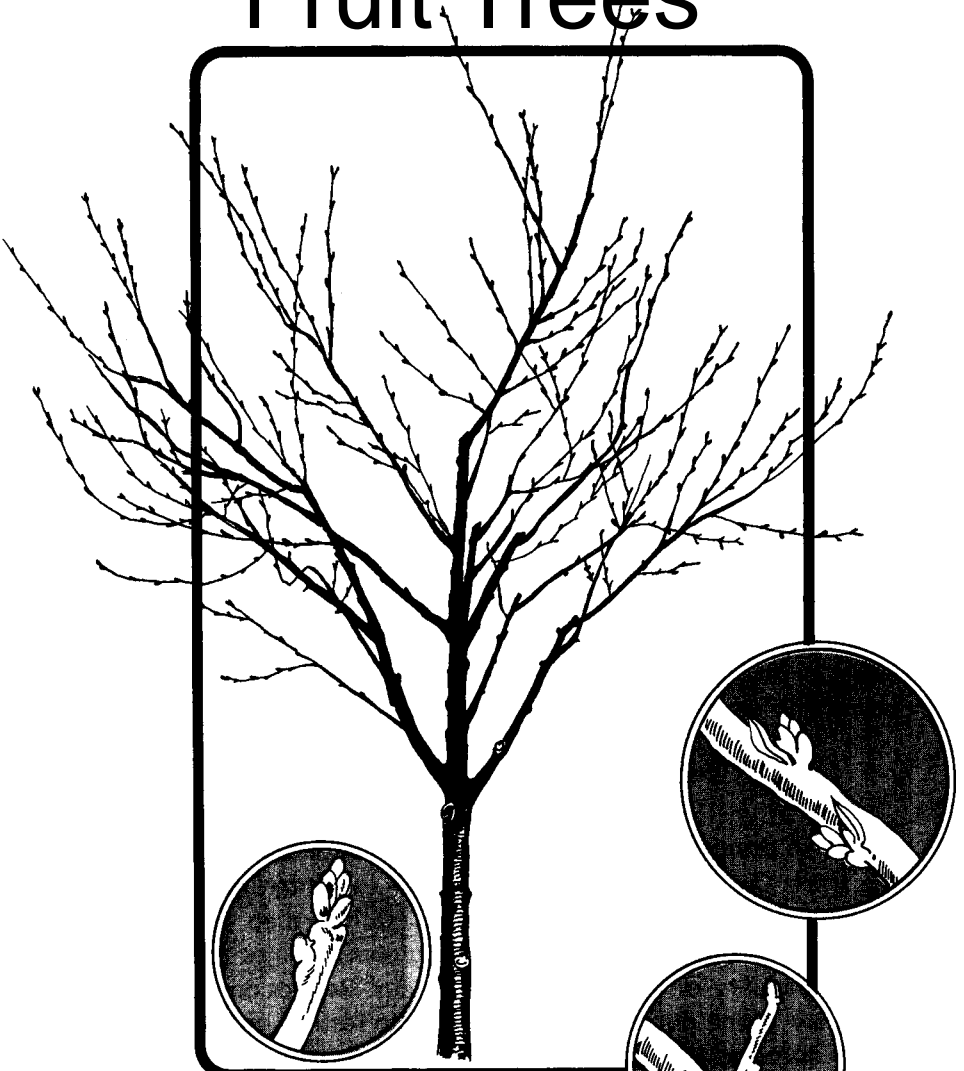
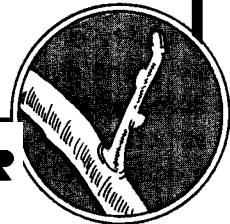


PRUNING Fruit Trees



Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Kenneth R. Bolen, Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural Resources.



Pruning Fruit Trees

Donald H. Steinegger
Extension Horticulturist

Productive fruit trees with an abundance of high quality fruit don't just happen. They result from good cultural practices, including pruning. Pruning is often neglected either due to a lack of pruning skills and knowledge or a fear that one is going to injure or kill the tree.

Here is a list of pruning objectives:

1. Obtain maximum light exposure for both leaves and fruit.
2. Provide uniform distribution of fruiting wood along the scaffold branches.
3. Control size and vigor of the tree.
4. Reduce limb breakage.
5. Produce high quality fruit of desired size.

A major requirement for the backyard gardener is a small tree open enough to allow effective spraying with home equipment and ready gathering of fruit. Pruning, combined with growing dwarf fruit trees will help accomplish this requirement. Although pruning is essential in development and maintenance of fruit trees, excessive pruning in young fruit trees will delay fruiting.

TIME OF PRUNING

Most pruning is done during the dormant season (no leaves on the tree). Cultivars (varieties) susceptible to winter injury are pruned in late spring before growth begins, rather than in January or February. Regardless of the cultivar grown, do not prune any tree before January or winter injury will occur. Besides dormant pruning, you may prune during July and August to restrict growth; to remove water sprouts; and to remove diseased or damaged wood. Once the basic structure of a fruit tree is developed, avoid pruning until fruiting occurs. All technical terms used in this circular are illustrated in Figure 1.

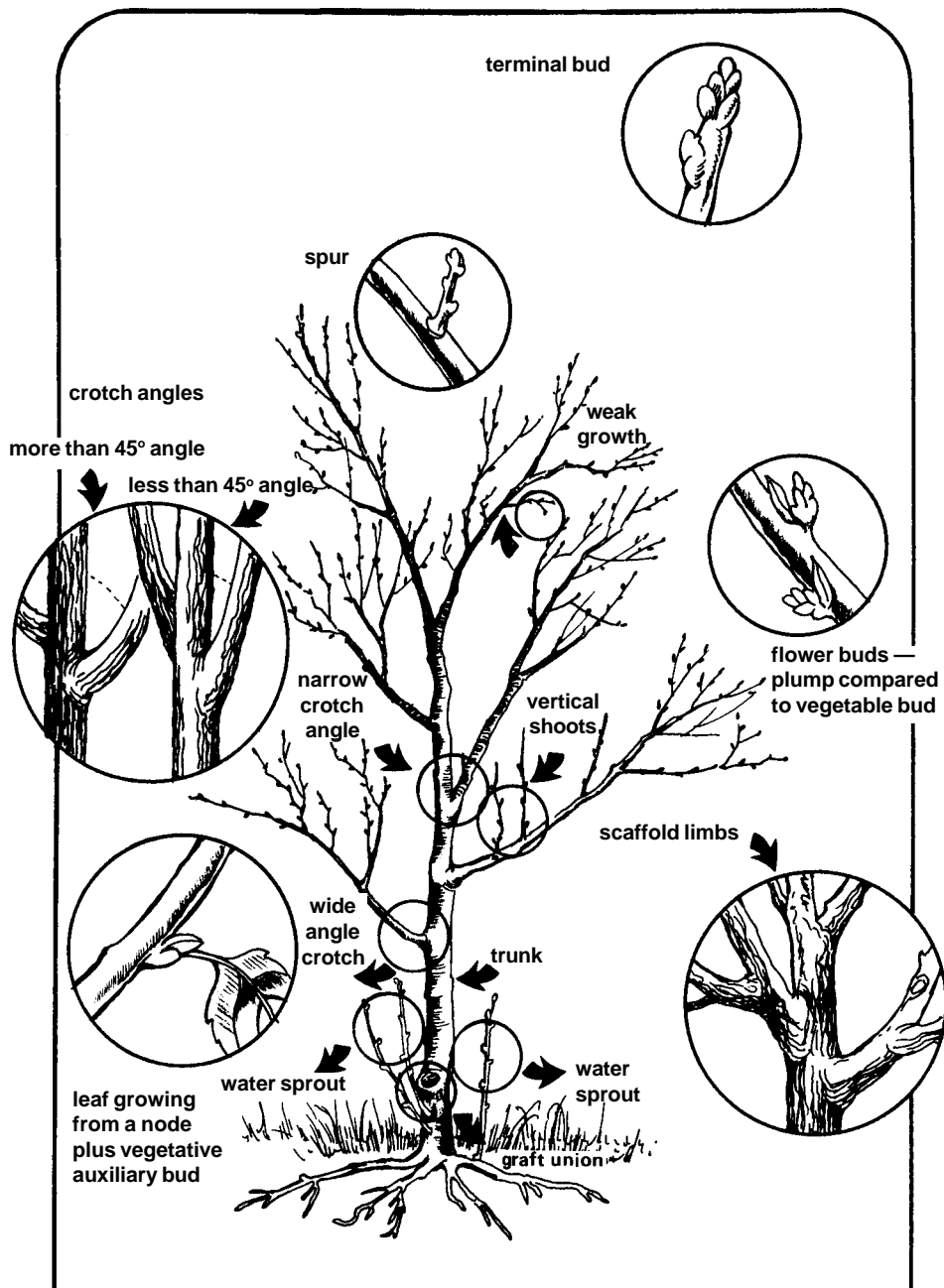


Figure 1. Parts of a Fruit Tree

PRUNING EQUIPMENT

Hand pruning equipment:

1. Hand shear—scissors cut.
2. Curved saw.
3. Swivel-blade orchard pruning saw.
4. Lopping shears.

Three tools are essential for pruning: a hand shears for cuts up to one-half inch in diameter; a lopping shears for cuts up to one inch in diameter; and a curved saw or swivel-blade orchard pruning saw for larger cuts (Figure 2).

TYPES OF PRUNING CUTS

There are basically two stages in the life of a tree that require radically different approaches to pruning. Pruning during the first four or five years establishes the basic framework of the tree and is referred to as **training**. Pruning which is done once fruiting occurs is called **renewal**. The two basic types of pruning cuts used in training or renewal are *heading back* and *thinning out*.

In *heading back*, a branch or shoot is shortened (Figure 3). Older wood is headed back to an outward growing lateral. Heading back encourages lateral growth or branching.

In *thinning out*, entire shoots or branches are removed back to a lateral branch, scaffold branch, or the main trunk (Figure 3). Since the entire shoot or branch is removed, no lateral growth from that shoot or branch is possible.

Utilize *heading back* to slow growth and discourage competition with the leader; to overcome unequal growth of two scaffold branches; to direct branches; and to encourage lateral growth. *Heading back* cuts are made in one- or two-year-old wood. Cuts in two-year-old wood usually result in good lateral growth but relatively little extension growth. For vigorous growers such as Red Delicious, cut into two-year-old wood. Utilize *thinning out* cuts to remove undesirable growth such as upright branches that compete with the leader and branches that will be structurally weak because of narrow crotch angles.

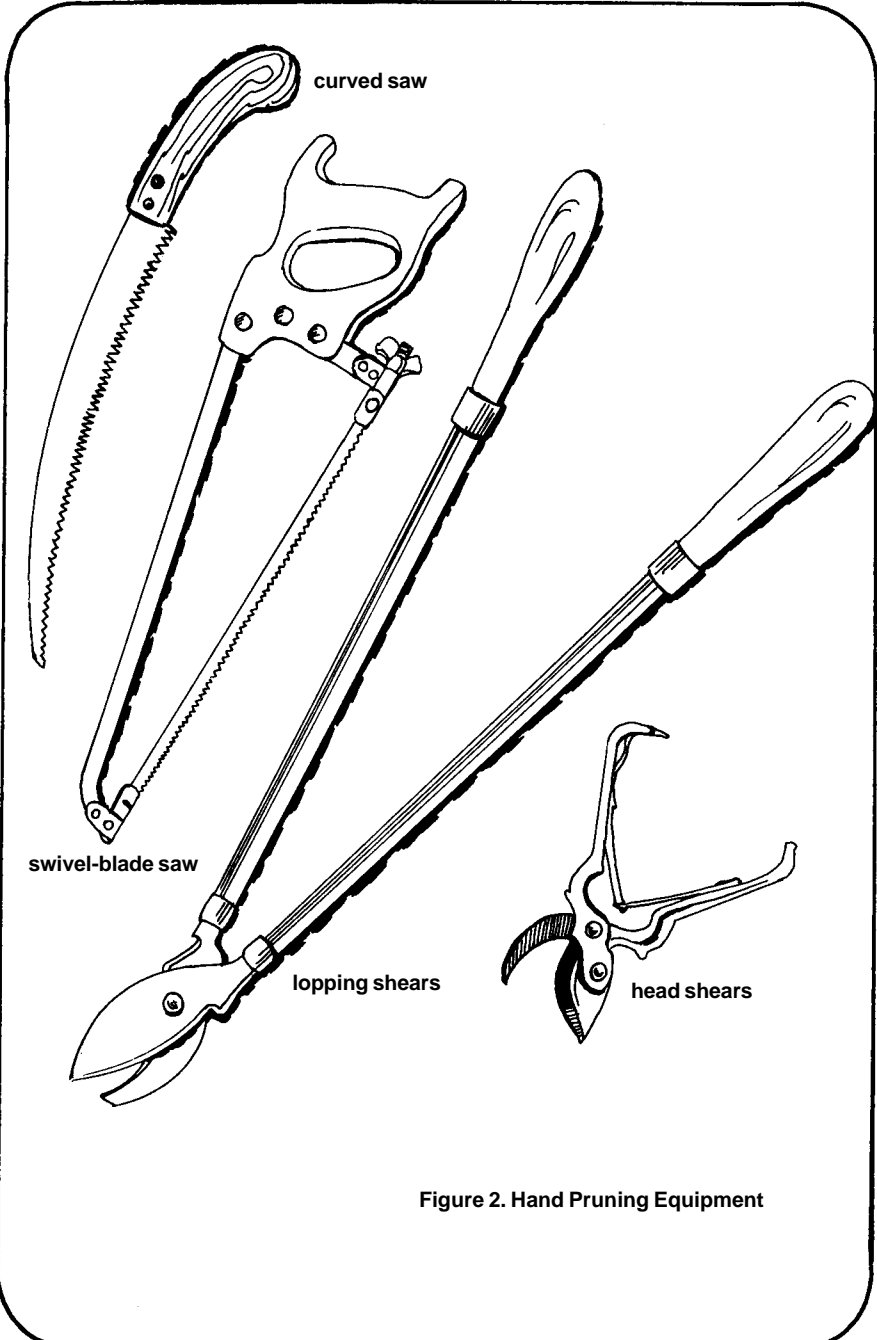
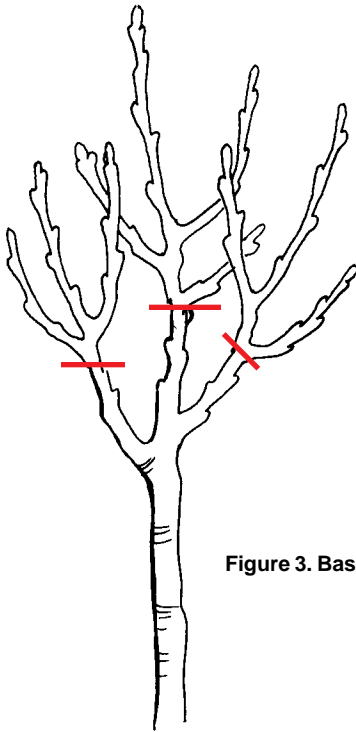
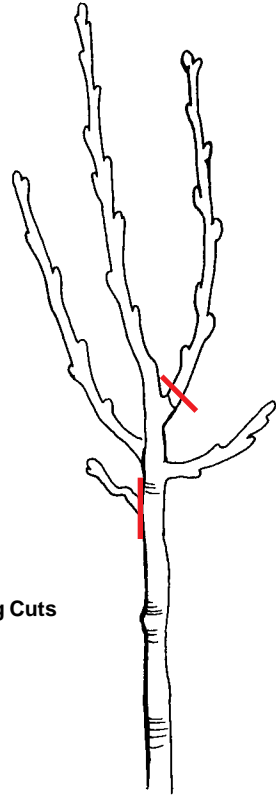


Figure 2. Hand Pruning Equipment



a. heading back



b. thinning out

Figure 3. Basic Pruning Cuts

TRAINING SYSTEMS

There are many training systems. Each system has advantages and disadvantages depending on site, purpose, and fruit cultivar. Some systems are adapted to free standing trees while others relate to trellis or supported trees. The *modified leader* is the most versatile and most readily learned training system (see references at the end of this circular for literature on other methods). Any fruit tree, regardless of root stock, can be trained to the *modified leader* system. In training fruit trees remember these two basic concepts:

1. Excess pruning delays fruiting and development of desired structures.

2. Branches spread to a 45-55° angle with the central leader are structurally stronger, vegetatively less vigorous, and more fruitful than more upright branches.

MODIFIED LEADER SYSTEM

Pruning at Time of Planting

1. Pruning injured root tissue back to sound wood.
2. Prune long roots back so they fit into the planting hole without bending.
3. Head back whips (Figure 4).
 - a. Standard trees to 44 inches.
 - b. Semi-dwarf trees 36-40 inches.
 - c. Dwarf trees 29 to 30 inches.

Branched Trees at Time of Planting

1. Prune selected branches (if not prepruned at the nursery) back to about half their length and remove branches that form narrow angles with the trunk or are less than six inches from other branches (Figure 5).

Second Year Dormant Pruning

1. Retain scaffold branches (up to 4) that are spaced 6 to 10 inches apart vertically (Figure 6) and are broad angles (45° or more).

2. Lowest scaffold branch should be 20 to 24 inches above ground. If possible, have the lowest scaffold branch pointing to the southwest.

3. Save one upright growing branch at top of central axis. This serves as the leader (Figure 1).

4. Maintain dominance of the leader. The leader should be two times as long as the longest side lateral. Begin to spread lateral branches.

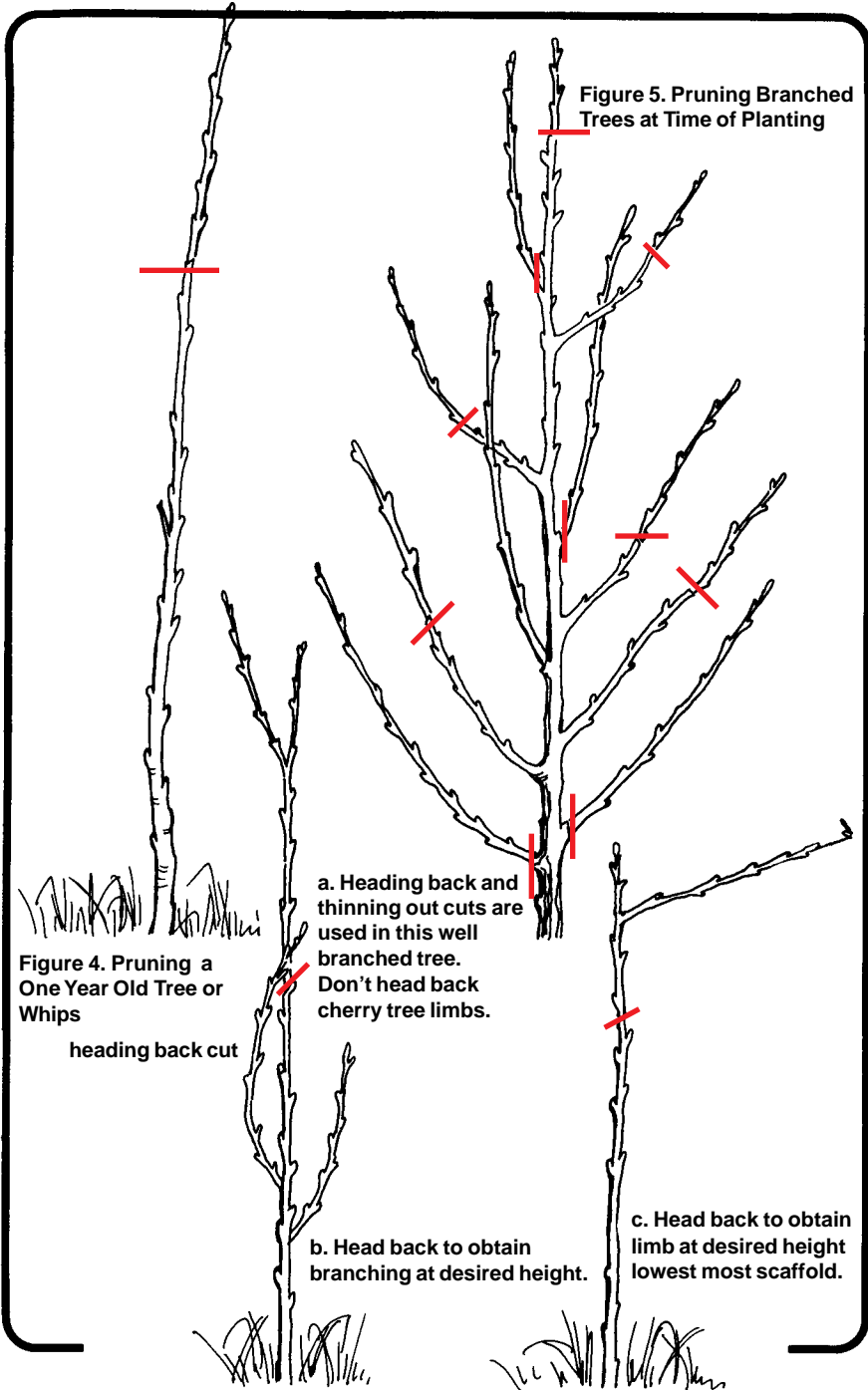


Figure 4. Pruning a One Year Old Tree or Whips

heading back cut

a. Heading back and thinning out cuts are used in this well branched tree. Don't head back cherry tree limbs.

b. Head back to obtain branching at desired height.

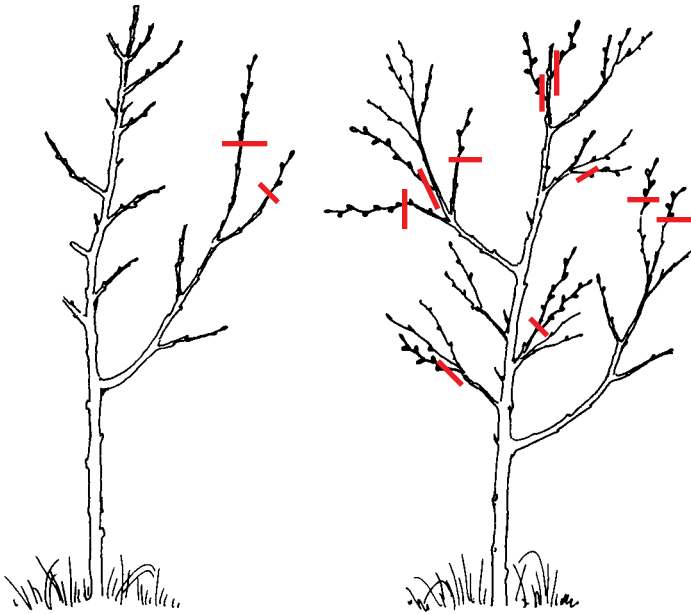
c. Head back to obtain limb at desired height lowest most scaffold.

Figure 5. Pruning Branched Trees at Time of Planting

Third Year Dormant Pruning

1. Retain two or three additional laterals (Figure 6).

2. Maintain dominance of leader. Laterals should not be longer than leader. Some of the scaffold branches will have rebranched by now so save two or three of these laterals. Treat each of the scaffold branches as a young tree. That is, don't allow laterals of the scaffold branch to compete with the leader of that branch. Don't prune short fruiting branches known as spurs (Figure 1).



Fourth or Fifth Year Dormant Pruning

1. Maintain balance between the several parts of the tree (Figure 7). Do not let lower branches outgrow the upper portions of the tree, nor the upper branches grow and shade out the lower branches.
2. Keep the leader dominant.
3. You should have six scaffold branches.
4. Wait until trees are bearing before the leader is headed back to a well placed outward growing lateral.

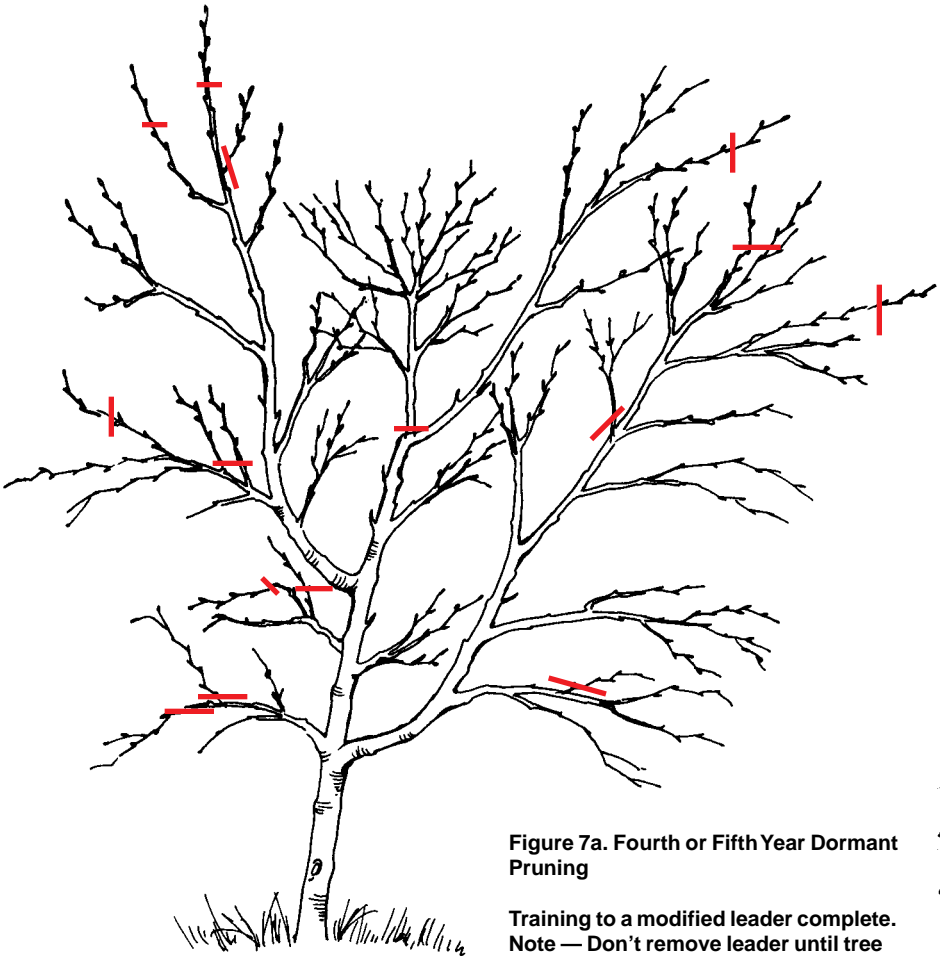


Figure 7a. Fourth or Fifth Year Dormant Pruning

Training to a modified leader complete. Note — Don't remove leader until tree begins to bear.

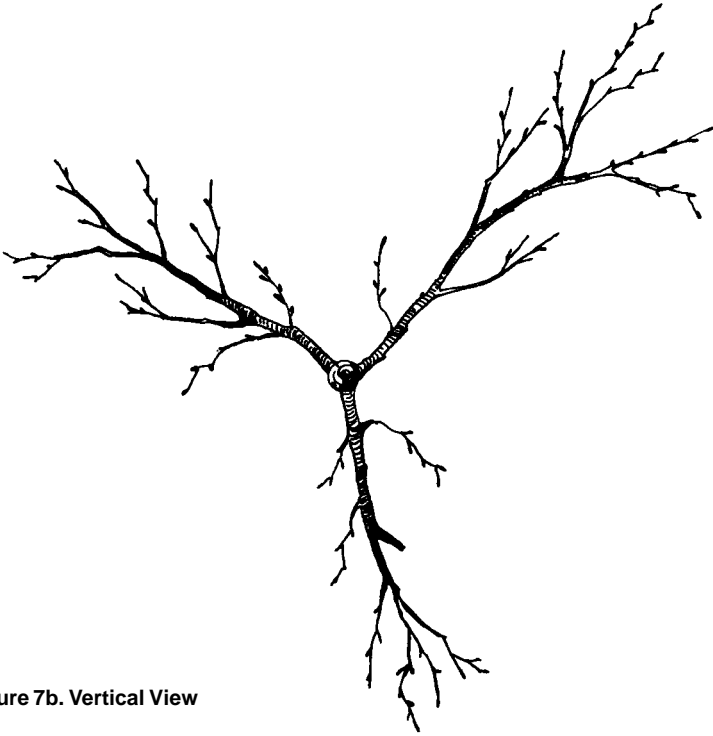


Figure 7b. Vertical View

Showing desired distribution of scaffolds

PRUNING BEARING FRUIT TREES

1. Annual pruning is necessary to maintain tree shape and size.
2. Removal of large limbs is unnecessary if tree was properly trained.
3. Remove dead, diseased or damaged branches each year.
4. Remove water sprouts if these were not removed in early summer (Figure 1).
5. Remove the weakest of crossing or closely parallel growing limbs.
6. Remove limbs growing towards the center of the tree. Thin out branches to increase light penetration.

7. Remove severely shaded branches.

8. See Figure 11, Page 16.

For cultivars that bear heaviest in alternate years, do heavy pruning just before the heavy bearing season. Use pruning tools made for the purpose and keep them sharp and clean. To disinfect pruning tools, use either a 70% denatured alcohol solution or household bleach at one part bleach to nine parts water. Either use a sponge or dip equipment into these solutions.

PRUNING NEGLECTED TREES

The two primary objectives in pruning neglected trees are:

1. To reduce tree height.
2. To thin out branches.

Here is a step-by-step procedure for pruning a neglected tree:

1. Lower the height of the tree where necessary. Up to four or five feet of growth can be removed in one tree in one year. The final cut in the top should be just above an outside lateral branch. Subsequent pruning in the tree top will consist largely of annual water sprout removal (Figure 8).

2. Remove undesired, large branches from the interior of the tree if necessary. It is usually best to remove all branches at once rather than distributing the cuts over a period of years as is done in top removal. However, if more than four branches must be removed, remove half one year and half the next (Figure 9).

3. Prune low hanging branches and dead, diseased, or broken branches wherever they exist in the tree.

4. Head back lateral branches that are too long in order to bring the tree to a desired breadth. Prune upper branches to shorter lengths than those lower on the tree (Figure 10).

5. Thin out branches in all parts of the tree. Remove under hanging branches, vertically growing shoots, water sprouts, and other weak growth. Thin the outer areas of the tree first, the interior last. Light is needed to develop fruiting wood in any part of the tree (Figure 11).

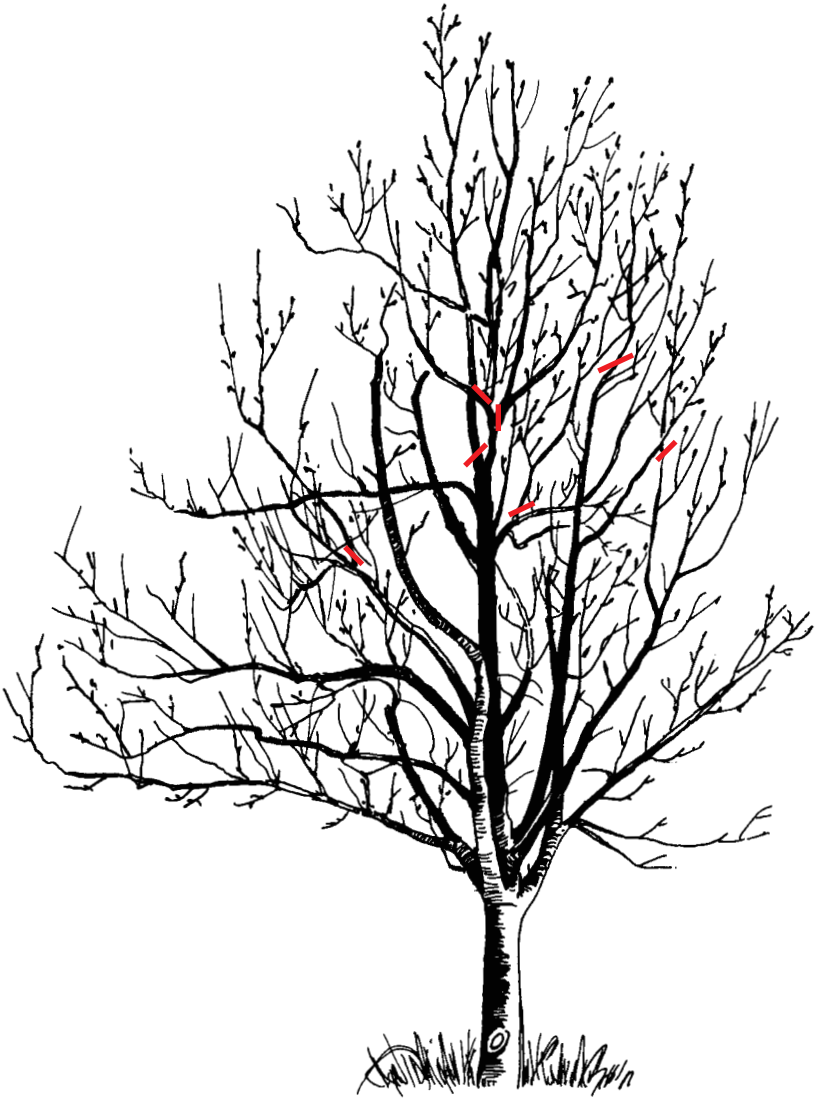


Figure 8. Lowering the Height of a Neglected Tree



Figure 9. Removing Undesired Interior Branches from a Neglected Tree

6. Complete rejuvenation of the neglected tree may take up to three years of rather severe pruning. However, peach, plum, and cherry trees can often be pruned back and thinned out in one year.

7. Follow annual moderate pruning once the tree has been rejuvenated.

Fruit Thinning

Most fruit trees bear too many fruit. Small, poor quality fruit is the result. Excessive fruit loads reduce next year's crop and may lead to alternate year

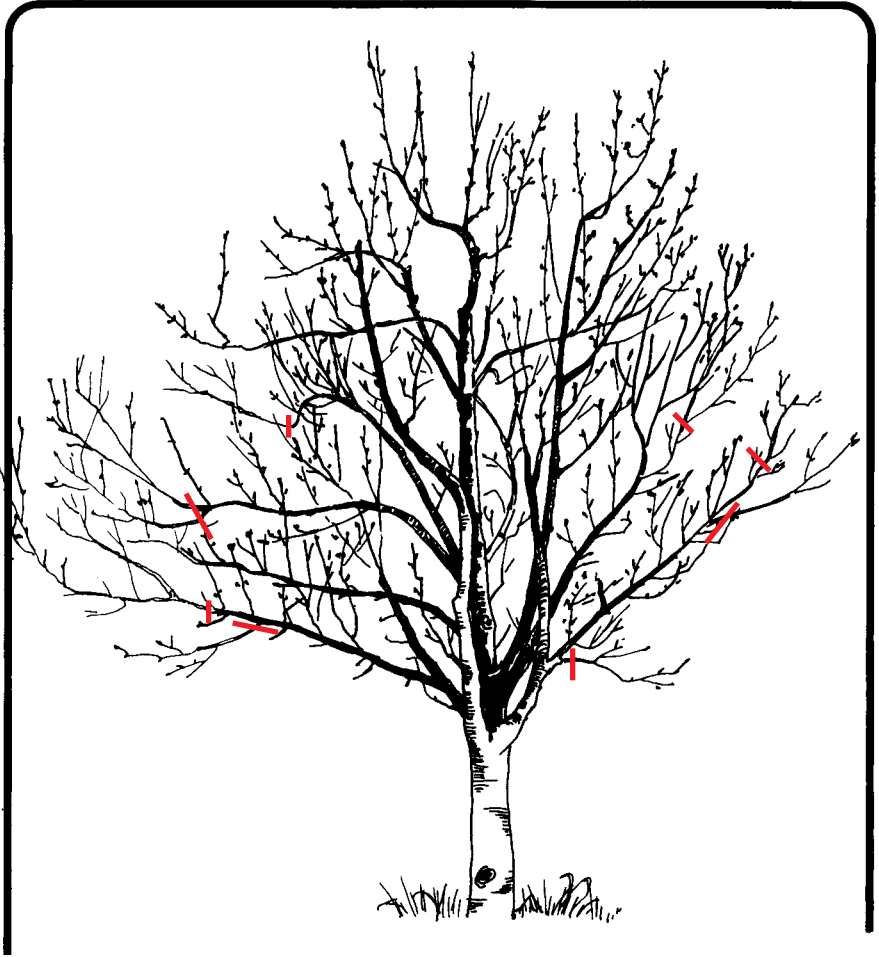


Figure 10. Reducing the Breadth of a Neglected Tree

bearing. Although chemicals are available for thinning, backyard gardeners should use hand thinning. For maximum size in apples, developing fruit should be spaced at least six inches apart (Figure 12).

Tart cherries don't require thinning. Plums should be thinned to two to three inches between fruit. Leave six inches between peaches on a limb.

Spreading — A Training Technique

Spreading scaffold branches of young fruit trees can help bring about earlier fruit production and improve tree form. The technique involves bending

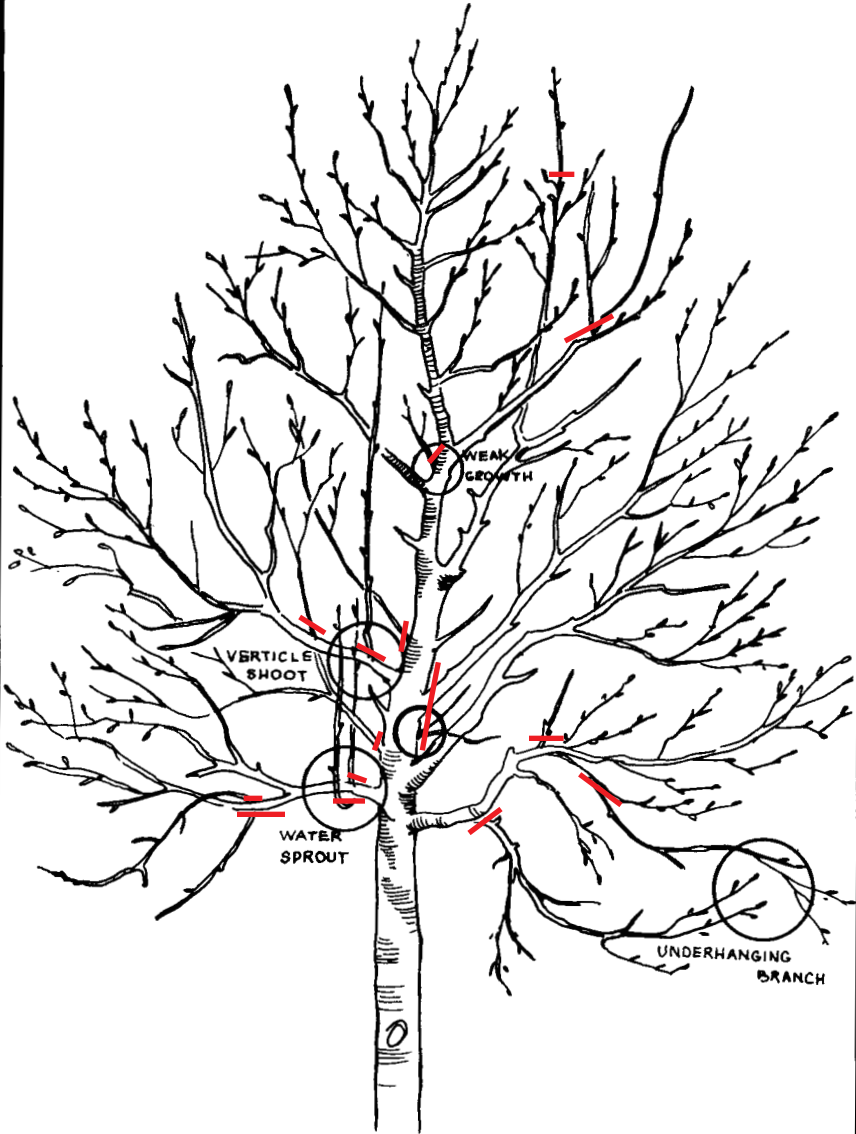


Figure 11. Thinning Out Undesired Growth from a Bearing or Neglected Fruit Tree

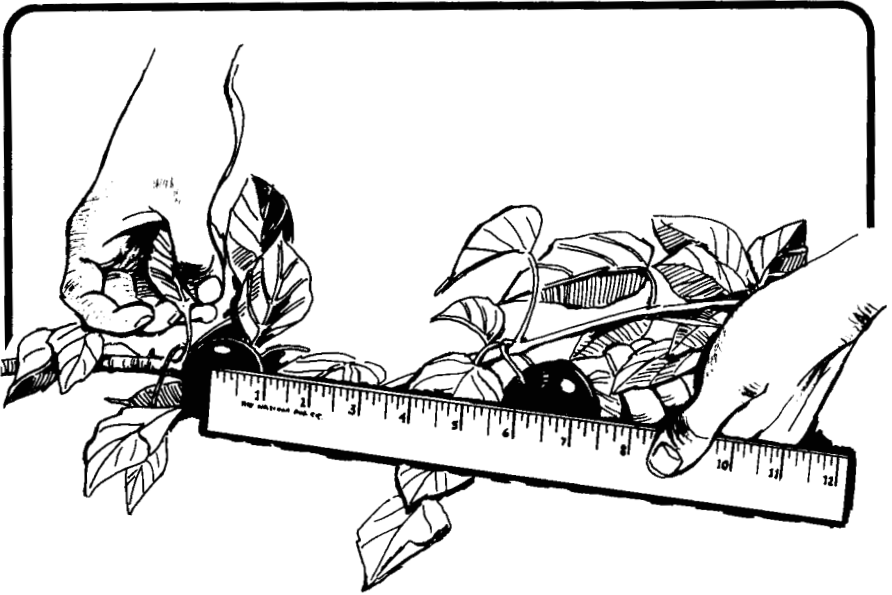


Figure 12. Fruit Thinning

upright growing branches down to near horizontal position and holding them there. Vigorous growing lateral branches can usually be positioned during the first growing season. Young branches can be held in place by using clothes pins, while branches two to three years of age can be bent into an appropriate position and held there with properly cut lengths of wood. One method is to use wood pieces $\frac{3}{4}$ " to 1" square cut to desired length. Pound a nail in each end. Cut the head off of each nail at an angle leaving sharp point. The pointed nail in each end is used to hold the spreader in place (Figure 13). Inspect trees frequently and replace spreaders which have been dislodged. Spreader may be removed after two or three years. You may not be able to position older branches into the desired angle the first year. Spreader of increasing length can be used over a period of several years until the desired angle is obtained.

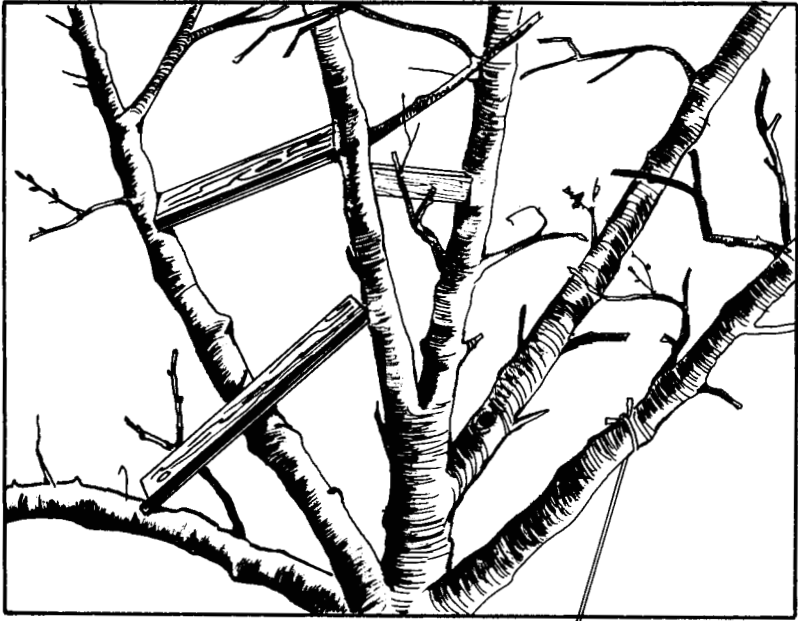


Figure 13. Spreading Branches to Obtain Desired Branch

Use spreaders or tie down branches

GENERAL PRUNING GUIDE

There are variations in growth habit within a given type of fruit such as between Delicious and Jonathan trees as well as between fruits like apple and pear or peach and cherry. These differences call for adjustments in your pruning procedures even though all are being trained to the modified leader system.

Differences in cultivars of a given fruit type need not be researched by the backyard gardener. Through experience you will adjust your pruning practices to handle the more upright growing Delicious compared to the broad angled McIntosh. You will spend more time and effort obtaining a good fruiting structure in Delicious than in McIntosh.

Different types of fruit trees (apples, pears, plums, peaches, and cherries) differ sufficiently in growth habit to require somewhat different approaches in training and in obtaining adequate fruit production and quality.

Pears

Most pears form narrow, angled crotches (they are upright growers like Delicious apples). To obtain a spreading growth habit, prune back selected scaffold branches to an outward growing lateral or bud. Avoid heavy pruning which induces development of water sprouts and overly vigorous terminal growth which then is subject to fire blight.

Peach

Unlike apple and pears, peaches bear fruit only on one-year-old wood (terminal growth). Annual pruning is essential to promote growth of new wood for the following year's crop. To reduce winter injury on peaches, don't prune until danger or severe cold weather is past (mid-March to early April).

Tart Cherries

Some fruit is produced on annual shoots but most occurs on fruit spurs. In training to the modified leader system, use spreaders to develop an open tree. Once the tree is in fruit only very light pruning is required. The overhead canopy or top of the cherry tends to become very dense. Keep this open to permit light to reach the interior of the tree. Failure to do this will result in loss of fruit wood in the interior of your tree.

Plums

Most types of plums grown in Nebraska are similar to tart cherries in fruiting habit. Scaffold branches may be closer together in plum than apple although one should maintain a sufficient interval between them to allow for air movement and spray penetration. Only light pruning and thinning is required to maintain crop size and quality. Don't remove too much wood at any one time or too many water sprouts will develop.

Apricots

Since fruit wood, (spurs) are short-lived, annual heading back and thinning out is necessary to develop young productive spur growth. Apricots should be pruned similar to peach trees. Flowers and fruit are frequently killed by frost, so prune after danger of frost is past.