

WHAT ARE TRAINING AND PRUNING?

Training is the practice of directing tree growth to a desired shape and form; it is usually performed on young trees. Pruning is the removal of a terminal portion of a branch or a whole branch to adjust or maintain tree structure. Pruning is part of the training process, but training also uses other techniques like clothespins, branch spreaders, tying, etc. Mature trees need to be pruned regularly.

PURPOSE OF TRAINING AND PRUNING

The purpose of training and pruning is to maintain desired tree shapes that are capable of early production of large, high-quality crops with balanced vegetative and reproductive growth.

TIME OF TRAINING AND PRUNING

The training practice starts immediately after planting the trees in the ground. It is a common mistake—especially among home gardeners—to leave newly planted trees untended for several years (Figure 1). This neglect will delay fruiting and make training and pruning more difficult in the future because the buds on two- or three-year-old wood respond differently than buds on one-year-old wood.

Branching Angle

For central leader system training, the branching angles are more important than in high-density trellis systems since the base scaffolds support heavy crops once they start to bear fruit. Narrow crotch angles are very weak, and branches connected in this way break easily from the trunk (Figure 2). Branches at a 45 to 60° angle from the trunk will be stronger and support heavier crops than those with narrower angles.



Figure 1. A five-year-old apple tree without any training or pruning; it is crowded with multiple trunks that have narrow crotch angles and could break easily when bearing a heavy crop.

Central Leader System

If growers or home gardeners do not want to use high-density planting, the central leader system still is a good training system for apples and pears.

The central leader system always has a central leader with either permanent or temporary branches. The central leader is the main leader, or dominant shoot, in the center of the tree. There are three to five branches for the first tier, three to four for the second tier, and one or two branches for the third tier. These branches can be scattered throughout the central leader at various spacings. However, it is preferred to have equal spacing between branches. To start the process, use a one-year-old,

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Figure 2. The weak connection of a narrow angle between the branch and trunk.

barerooted, unbranched whip with a trunk diameter of 1/2 to 5/8 inches, or plant well-feathered trees.

After planting, the whip should be headed down to about 30 inches, which will balance the size of the aboveground and the damaged root system during digging and transportation. If you head back too low, it may induce excessive vegetative growth, and the branches will be too low in position. If you cut off at 36 inches, it will result in short branches with weak growth, which will be hard to use as a framework structure. Also, make sure there are five to seven good buds under the cut. If the buds around that height are damaged, adjust the cut height to ensure there are several good buds under the cut.

If well-feathered trees are planted, select three to four well-spaced branches as scaffolds and cut the branches back 1/3 or 1/2 of their length after planting, making sure that their lengths are roughly equal. These branches should be spaced several inches apart on the trunk, but they should not be next to each other. If these scaffold branches are too close, they could choke the central leader in the future. Remove the branches below 24 inches and top the central leader 24 inches above the first tier of branches.

The First Growing Season After Planting

Several weeks after planting, new shoots will emerge below the cut, and the first one will be used as the future central leader. If the second and third shoots are too strong and compete with the first one, then they should be removed (Figure 3). For the rest, the good ones will be used as scaffolds. If the branching angle is too narrow, use wooden clothespins to push the branches flat (Figure 3). When the new shoots are 4 to 6 inches long, put the clothespins on top of the young shoots and leave them there for the season; the branches should achieve the desired wide angle. Using clothespins to push the branching angle early on is easier than using branch spreaders later.

By the end of the first growing season, select three to four well-spaced scaffolds with good branching angles that are evenly spaced around the trunk, and remove all other branches below 24 inches or that have narrow angles. If clothespins were used, these selected branches should have good crotch angles. If some grew too vigorously with narrow angles, branch spreaders should be used the next spring to push them to 45 to 60°. If the tree is weak without enough useful branches, cut the

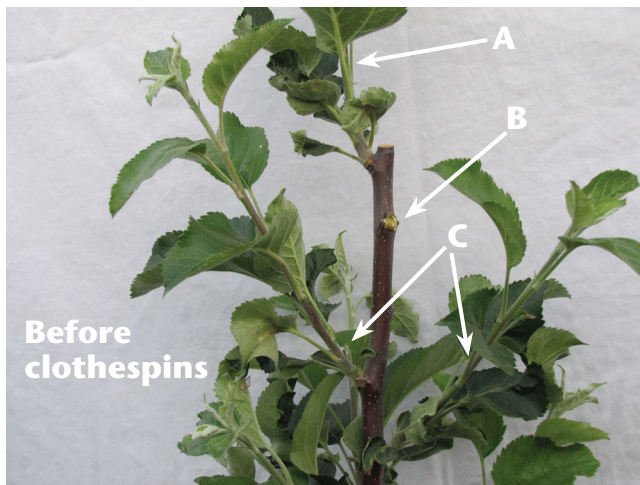


Figure 3. Using clothespins to widen branching angles, before (left) and after clothespins (right): A. central leader, B. strong and competitive shoot with narrow angle next to central leader has been removed, C. useful shoots for permanent branches.

central leader short to try to get enough branches for the first tier by the end of the second year.

The Second Growing Season After Planting

The main objective during the second growing season is to develop a second layer of scaffolds, which should be 24 to 36 inches above the first layer established during the first year after planting. Remember to use clothespins to widen the crotch angle of the new shoots. Select branches that do not lie directly above any first-tier scaffolds, but that instead fill the space between scaffolds of the first tier. Remove shoots that compete with the central leader and other undesirable shoots. Branch spreaders, weights, or ties should be used for scaffolds with narrower crotch angles to widen them to 45 to 60°. The spreader can be made of a wooden board with a V or sharp nails on each end. Do not push the branches more than 60° or there could be suckers growing on top of the branch. The spreaders can stay in place for one or two years until the branches are able to keep their position. The limb spreaders, weights, or ties should be used before or during the winter pruning process.

After the Second Growing Season

During winter pruning, keep three to four branches with wide crotch angles for the second tier. Cut back 1/4 of the new terminal growth of the scaffolds. Keep using limb spreaders or ties if necessary. Remove diseased or broken branches. Always maintain the central leader as the highest point of the tree. If you have enough good-angled branches for the second tier, cut the central leader 24 inches above the second tier of branches to stimulate the third tier of branches.

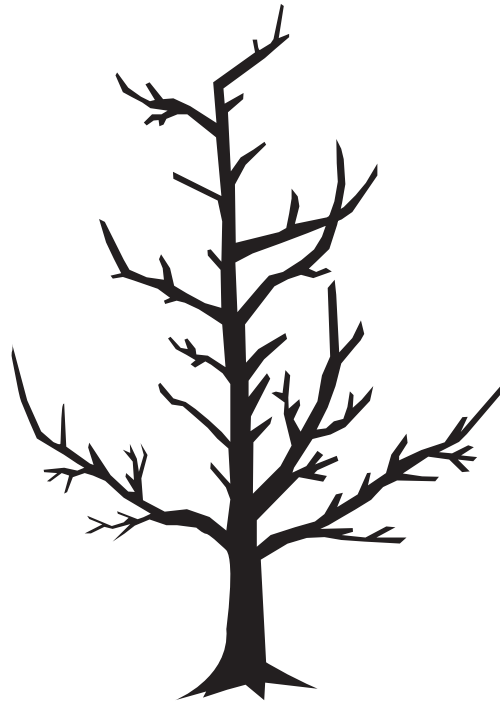


Figure 4. A model central leader tree structure.

Three or Four Years After Planting

Similar to year two, use clothespins to position the young shoots. Remove upright, competitive, and other undesired shoots during the growing season. Keep the central leader's dominance as the highest point of the tree. All other branch terminals should be lower than the central leader. The mature tree should be maintained with a pyramid shape (Figure 4) with a dominant central leader. The first-tier scaffolds should be the strongest

and longest, and the second and third tier of branches should be shorter in length and smaller in diameter.

Successive Years

Continue to prune these trees each winter by removing weak, hanging, and overcrowded branches. Once the trees start to bear fruit, stop pruning the terminals of the scaffolds. After a few more years, lower the central leader to the third tier of branches. Since New Mexico has intense sunlight, try to select a south-facing branch to shade the trunk and avoid sunscald.

Nowadays, high-density planting with dwarfing rootstocks is becoming increasingly popular with training systems like vertical axe, super spindle, and tall spindle. These high-density plantings require more trees per acre and tree supports or trellises, which means increased early investment. However, these trees are precocious and give better early return.



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