

Fruit Tree Pruning in Northern New Mexico

1. Why prune?

The basic goal of fruit tree pruning is to create a tree with strong structure that (A) makes the tree easy to work with, (B) minimizes potential problems, and (C) stimulates good fruit production and ripening.

- (A) Make the tree easier to work with
 1. For the purposes of pruning, thinning, harvesting, and pest/disease control in the home garden, trees should be low and wide (10-12' tall and 12-15' wide) with fruit and branches reachable from an 8' ladder
 2. Branching should be open enough so that you can reach all parts of the tree easily
 3. The structure should produce a tree that will bear and be easy to harvest for a long time

- (B) Minimize potential problems
 1. The tree should have enough shading of trunk and branches year-round that sunscald is minimized
 2. Branch angles must be wide enough to avoid included bark
 3. Branches must be the right lengths and spaced properly to avoid breakout from fruit load
 4. The canopy must be open enough to avoid promoting disease.
 5. Growth that is headed in the wrong direction—crowding walkways, toward fences or buildings or the ground, or too close to other trees in the orchard for ease of access--must be controlled

- (C) Stimulate fruit production & ripening
 1. Creating a tree with the optimal number of bearing branches and fruiting buds and spurs is important for good production over a long lifetime
 2. Enough sunlight penetration is necessary to ripen the fruit well
 3. Enough foliage must be maintained to produce good sized fruit

2. Which form to use?

There are three forms that fruit trees are typically trained to: (A) open center, (B) central leader, and

(C) modified central leader; and (D) tree sizes information

- (A) Open Center form
 1. The open center form is often recommended for stone fruits—apricots, cherries, peaches, and plums. It is also used in some areas for apples and pears.
 2. In this form, three or four main bearing branches are developed on a low trunk, separated by 6-8" vertically on the trunk and radiating in different directions. When the tree is planted, the central leader is removed at 3-4'. This creates a tree that is low, open, and easy to work with.

3. A serious drawback to this form in New Mexico is that it leaves the trunk and branches especially susceptible to sunscald.
4. Because the branches are all fairly close together on the trunk, the potential for breakout from heavy fruit load is higher.

(B) Central Leader form

1. The central leader form creates a tree with a central leader up to 8-10', with two or three tiers of branches coming off the trunk at 2-3' intervals.
2. This can be very productive for trees on strongly dwarfing rootstocks and is most commonly used for apples and pears.
3. It's hard to keep trees on semidwarf or standard rootstocks, and varieties that are very vigorous, small enough to work with easily.
4. It's hard to keep the top tiers from shading out lower tiers, and to create space for adequate sunlight penetration.

(C) Modified Central Leader form

1. The modified central leader form is a compromise that is recommended for trees on semidwarf and standard rootstocks, especially in home orchards. In this form, a central leader is allowed to grow up to 6-8', with four to six main bearing branches coming off of this, separated vertically on the trunk by 12-18" and radiating in different directions.
2. The central leader is cut off above the last bearing branch. Some growers leave a small "crown" of branches on top to further shade the trunk and top branches. This "crown" is cut back annually to keep the branches short.
3. This form shades the trunk and spreads out the fruit load better than the open bowl form, while creating a lower tree that is easier to work with and produces less shading than the central leader form.
4. When creating this form, don't cut the leader back on new trees as is recommended for the open center form.
5. Having top and bottom bearing branches coming off to the south and southwest adds better shading for the trunk and branches

(D) Tree Sizes

When you buy a fruit tree, you're really buying 2 trees that are grafted together. The tree above ground is the scion--it's what will produce the kind of fruit you want. The tree below ground, or rootstock, is used to control the tree size and some other characteristics.

Rootstocks whose genetics will produce smaller trees are used to produce semidwarf and dwarf versions of the variety you want. Even standard trees are grafted, onto rootstocks that produce a full sized tree.

If trees aren't labeled dwarf or semidwarf they are probably on standard rootstocks and will get full sized. You can always ask the nursery staff about the rootstock if you see a tree you like

that's not labeled; they should be labeled and if everyone asked, perhaps they would be more likely to do so.

Trees grown on semidwarf rootstocks can get 15-20' tall unpruned, depending on the type of tree and exact variety of rootstock. Standard trees can get 18-30' tall, depending on the type of tree. In order to have a tree that is easy to work with, you should plan on pruning it every year.

3. Tree Biology

In order to understand how, when and where to prune, it's important to know something about tree biology. Trees use energy for two things—growth and defense. Because pruning cuts create wounds, they require the tree to spend energy to repair them. By taking out active growing wood, pruning also removes energy from the tree. For these reasons it's important not to over-prune the tree in any one year. It's recommended not to remove more than 25-30% of the canopy of younger, vigorous trees. Older trees, like older humans, don't recover as well from injuries as younger trees do, so it's recommended not to prune out more than 10-15% of the canopy on old trees. Large cuts take longer to repair and remove more energy from the tree; avoid having to remove large branches by establishing the basic form as early as possible.

Trees don't heal the way we do. They seal off open wounds and grow new wood over them to keep disease organisms from invading the tree. Also important for sealing of wounds: do not use "pruning paints" as these can interfere with the tree's natural process of damage control.

At the base of each branch is a group of cells that will seal off the wound; these cells are contained in the "branch collar". The branch collar usually pokes out a bit from the trunk; cutting flush will damage this collar and interfere with the tree's natural process. The branch collar is often accompanied by a raised ridge of bark between the branch and the trunk, on top of the branch. This is the "branch bark ridge". When a branch grows too tight to the trunk it can enclose this branch bark ridge, creating what is called included wood. This interferes with the connection between trunk wood and branch wood, producing a weaker attachment to the trunk. When the branch grows long or is laden with fruit, it can split out due to this weak attachment. Pears and some apples have a strong tendency to produce branches that go up instead of out, creating tight angles that can lead to included wood as they grow.

Fruit buds tend to form best on branches that grow on 45-60% angles out from the trunk or larger branch. It's important to control the angles that branches grow from the trunk in order to avoid break outs and to stimulate fruiting, either by pruning out branches that are too tight or spreading them with wooden or plastic spreaders when they are young.

Trees set fruit from buds that grow on young branches and on fruit spurs. Fruit spurs are short stubby branches that develop over time and can produce a good crop of fruit for anywhere from 3-10 years, depending on the type of tree. Learn to recognize fruit spurs and don't prune them off while they are bearing well. Peaches and nectarines are an exception; they bloom on year-old wood and don't develop fruit spurs.

Branches that tend to grow straight up off a branch are called watersprouts; they will not set fruit well and should be removed.

Branches growing down are also problematic, as they are often in too much shade to produce fruit or beneficial leaves. Remove these branches.

Branches that grow from below the graft are called suckers; these are coming from the rootstock and will not produce the kind of fruit you want. They should also be removed.

Branches that rub together can create wounds in the bark, which can form openings for disease infection. Removing crossing branches on an ongoing basis will prevent this, and try to avoid this problem by observing which branches are likely to rub in the future, pruning one or both to prevent rubbing.

Sunscald, a common problem in the southwest, happens when the sap under the bark warms and liquefies on a sunny winter day, then expands when it freezes again at night. **IMAGE peach tree branch**. This damages the bark and interferes with nutrient flow and growth. It occurs frequently on the south and southwest sides of the trunk and main branches, especially on younger trees with thinner bark. Along with pruning to shade the bark on the southwest side, you can also paint the trunk with exterior white latex paint that's mixed 50/50 with water, to keep the bark more reflective and therefore cooler in the winter months.

4. How to prune

Tools to Use

Because the way cuts are made is important, the tools used to make them are equally important. In order to make clean cuts, use high quality tools and keep them clean and sharp. You wouldn't want a surgeon to use dirty, cheap tools when operating on you; don't do this to your trees.

Pruners come in two forms: bypass or anvil type. The blades of bypass pruners slide past each other, making a clean cut. Anvil pruners have a blade that closes on a flat surface, which tends to smash the branch on the bottom and dull the blade more quickly; these are not recommended. Most good hand pruners are designed to cut branches up to $\frac{3}{4}$ -1" in diameter. If the branch is larger than that, it's usually best to use a lopper, which is simply a pruner with long handles, giving you more leverage to cut branches up to 2" or more. Again, use a bypass, not an anvil lopper. Pruning saws, as opposed to carpenter saws, cut on the pull stroke, giving you good control of the cut.

Cuts to Make

There are two types of cuts employed in pruning fruit trees: heading and thinning cuts. A heading cut removes the end of a larger branch just beyond a smaller branch or just above a bud. This directs more energy into the smaller branch or bud, to produce growth in a different direction or to stimulate the formation of fruit buds. Heading cuts are used to direct growth out away from the tree as well as to shorten branches. These cuts are "suggestions" for how the tree should direct its energy; sometimes the tree will comply and sometimes it will direct energy into other branches or buds. Heading cuts made just beyond a bud tend to produce a proliferation of branches coming out from dormant buds near the bud you want to stimulate. Remove the new branches you don't want to keep in the summer. Cuts to a smaller branch don't tend to stimulate as many dormant buds to sprout, as long as the smaller branch is at least $\frac{1}{3}$ - $\frac{1}{2}$ the size of the larger branch in diameter. When making heading cuts, place the cut about $\frac{1}{4}$ " past the bud or smaller branch, cutting at an angle as shown.

Thinning cuts remove a branch at its base, where it meets the trunk or a larger branch. These are used to create more space in the tree and to remove branches that are growing in the wrong direction. When removing a branch, cut just past the branch collar; don't leave a long stub and don't cut flush to the trunk.

If the branch is large enough that the weight of it could cause it to fall, tearing bark off below the branch you're trying to cut—our native one-seed junipers are notorious for doing this-- use a three-part cut to remove it. Then cut the main part of the branch off a bit further out from that. Your last cut will be made just beyond the branch collar, to remove the last part of the branch.

You will use both heading and thinning cuts to create and maintain the form of the tree and direct its growth over time. Once they are developed, maintain the main bearing branches, cutting them back as needed to stimulate secondary branching and for size control. Prune secondary bearing branches and smaller branches to maintain fruit production, sunlight penetration, and shading.

In the early years, if branches are growing in places where you know they will ultimately be removed but they are not causing any problems to branches you will keep, you can cut these "temporary" branches back halfway or so to let them keep producing energy to help the tree get rooted and grow on, removing them after one or two years while they are still fairly small.

5. When to prune

Working with the energy patterns of the tree by pruning at the right time helps trees seal the pruning cuts properly, as well as helping to create the best form and fruit production. In late summer and fall, trees store energy that is produced in the growing season in the roots, trunk and branches. They use this energy the following spring to make new growth and start sealing off wounds.

Dormant Pruning

Pruning in late winter, just before trees come out of dormancy, means they can start to seal off the pruning cuts quickly. Pruning in the fall or in early winter leaves these cuts open to winter injury longer. Because they also use stored energy to make new wood, the response to dormant pruning is often to produce a lot of growth from the area near the pruning cut. This gives you many choices to use in creating the form you want. Another benefit of pruning during the dormant season is that it's easy to see the structure of the branches. Dormant pruning in the Santa Fe area is usually best done mid-February through March. Don't prune when the temperature is below freezing; it's not good for the tree or the person pruning.

Summer Pruning

Because summer pruning removes leaves that would produce energy to be stored for growth the following year, it is often used to help restrict the size of the tree once it starts to mature. This is best used for trees that are growing vigorously; trees that are not growing well may be too stunted by summer pruning. Summer pruning is also used to remove water sprouts, suckers, and small branches that need to be thinned out; most summer pruning is directed to year

old or new shoots. A healthy tree is producing a lot of energy in the summer, so it can seal off pruning cuts quickly at this time. Removing some vegetative growth by shortening year-old branches can also help stimulate development of flowers and fruit spurs. Summer pruning is best done after the new leaves have hardened off and before the end of July; the stunting effect will be reduced if it's done too late in the season. Don't prune when the temperature is over 80 degrees or when trees are under drought stress.

Remove dead, damaged, or diseased wood when you see it. If you are cutting diseased branches, clean your pruners in between cuts and before moving to another tree to keep from spreading the disease. Use alcohol or non-bleach disinfectant wipes; bleach can seriously damage blades of pruning tools.

6. Tips

Before starting to prune, spend time observing your tree. Think into the future. How will branches look as they grow, getting longer and thicker? Are the bearing branches in the right places. How do you keep the form open enough while producing enough shade to prevent sunscald? Which branches are heading in the wrong directions? Which will rub or produce too much shade as they grow? Are there branches growing too tight to the trunk, producing narrow crotches? Can I spread these branches to create better angles or should I prune them off? Are there branches growing down toward the ground that should be pruned off? Where are the fruit spurs? Doing this exercise with a friend can sometimes help you see things you might otherwise miss.

Create a plan to prune efficiently. Remove the largest branches first, then smaller branches, then the smallest. Don't get hung up on removing every tiny branch that might come off. Don't remove more than 30% of the canopy in young healthy trees. Keep track of how much wood you're removing as you prune. Prune slowly, methodically. Remember—***you can always take off more, but you can't take off less.*** Pruning is an on-going process and doesn't happen in just one season. Observe the tree's responses to your pruning and let that guide you the next year.