Greenhouse
Garden Center & Gift Shop

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SUMMER PRUNING OF FRUIT TREES

For best size control and fruit production on Apple, Apricot, Mulberry, Nectarine, Peach, and Plums, prune during the summer months.

For height control, cut new growth back to the desired size in June. The remaining stubs will re-sprout quickly. In early September, cut back again just below the newest sprouts. This method is called double-heading. It is OK to prune at any time during summer to keep the tree at its desired size. Double-heading is simply less time-consuming.

Most of us were originally taught to prune in winter. More recently, authorities tell us to prune in the fall. The latest research has proven that summer pruning is most effective because these fruit trees do not grow during the fall. Therefore, any foliage remaining after summer pruning will gather energy during the fall season for the next year's crop. Heavy winter or fall pruning eliminates wood that has already stored ample energy, leaving underlying wood with less potential for fruiting.

It as also thought that trees should be pruned when dormant because less sap leaks out. Now we understand that this leaking is actually beneficial to the trees as a natural defense mechanism.

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Training AND Pruning

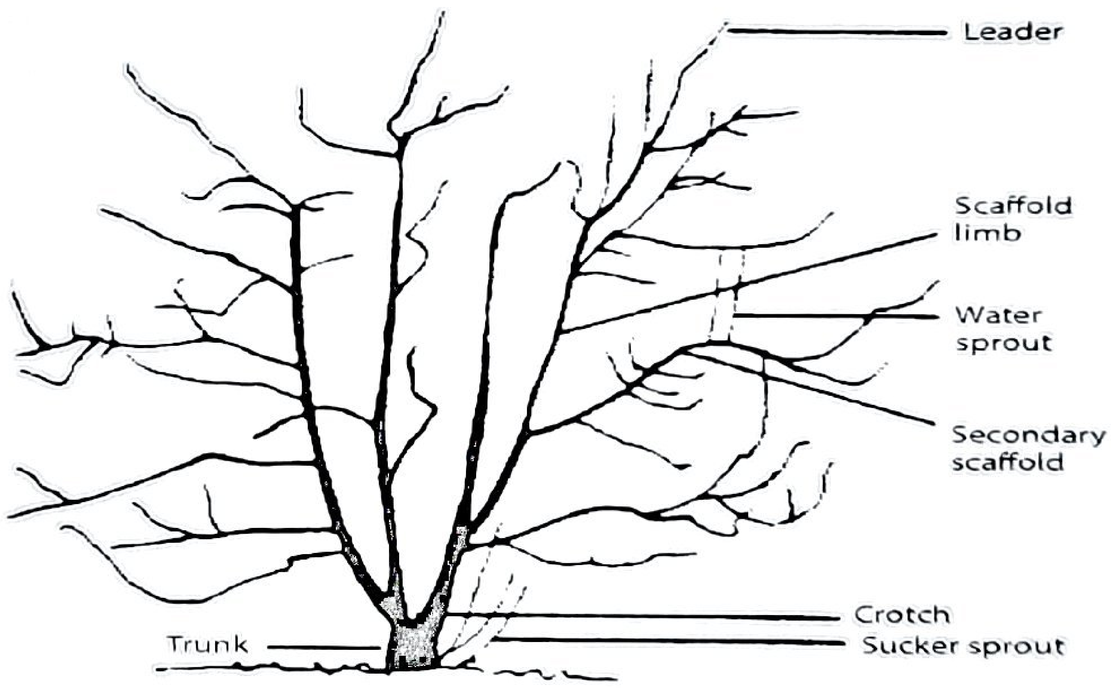
The basics

Why train fruit trees?

- Training develops a strong tree structure that can support heavy crops without limb breakage.
- Training helps bring a young tree into production at an early age.

Why prune fruit and nut trees?

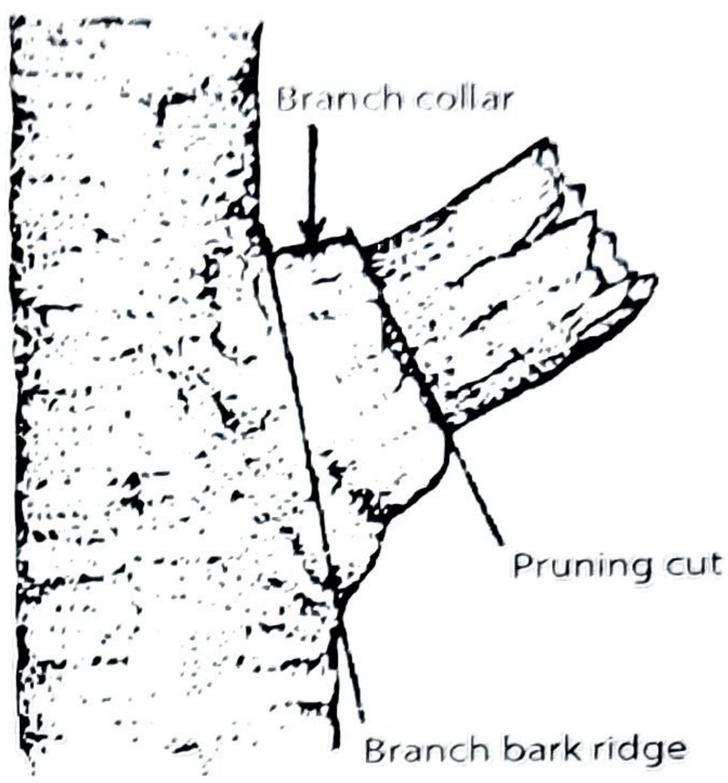
- Pruning reduces overall tree size.
- Pruning makes trees earlier to spray and harvest
- Pruning young trees can improve structural strength and induce branching.
- Pruning mature trees can increase their production and improve fruit quality.
- Pruning reduces the need to prop up fruit-laden branches.



Basic terminology

- **Branch collar**—The raised tissue at the base of every branch. It contains specialized cells that seal off pruning wounds from wood rot fungi.
- **Crotch angle**—The angle formed between the trunk and a limb. The strongest crotch angle is 45 to 60 degrees.
- **Crown**—The base of the trunk where the tree meets the soil.
- **Heading (or head cut)**—A pruning cut that removes only part of a branch.
- **Lateral branch**—A side shoot off of another branch, usually at a more horizontal angle.
- **Leader**—The uppermost portion of a scaffold limb. In a central-leader trained tree, only one leader is left in the center of the tree. Multiple-leader trained trees usually have three to five leaders per tree.
- **Scaffold limb**—A large limb that forms a tree's framework.
- **Shoot**—The length of branch growth in one season. The bud scale scars (ring of small ridges) on a branch mark the start of a season's growth.
- **Spur**—A short shoot that fruits.
- **Stub**—A short portion of a branch left after a pruning cut. Avoid leaving stubs.
- **Sucker sprout**—A 1-year-old shoot that grows from the root.
- **Terminal**—The end of any shoot.
- **Thinning cut**—A pruning cut that removes an entire branch from its point of origin.
- **Vertical branch**—A branch that grows upright.
- **Water sprout**—A 1-year-old shoot that grows within the tree.

Save the branch collar, and don't use wound dressings.
Prune so that you don't leave a stub (figure 2), and also so that you don't make a wound larger than necessary (as occurs with a "flush cut"). Cut just outside the branch collar (the raised tissue at the base of every branch). Its specialized cells seal off pruning wounds from wood rot fungi. Make your pruning cut at an equal and opposite angle from the branch bark ridge.



There's no clear evidence that wound dressings reduce wood rots in pruning wounds. Early tree training helps you avoid large pruning wounds low in the tree, which might become infected.

General rules for training

- Start training at planting time.
- Remove unwanted shoots in summer when they're small.
- Train more by limb positioning than by pruning.
- Follow the training program consistently, as often as necessary, so that you complete proper training as soon as possible.

Manage your fruit trees actively

The best ways for homeowners to control the height of a fruit tree are to plant a tree on a dwarfing rootstock, prune well, or use a trellis system. Keeping the tree's height low allows for easier harvesting and pest management. As a homeowner, you may have inherited fruit trees on your property from previous owners. You can either choose to manage them or replace them with a variety, rootstock, or training system that controls the overall height of the tree. A post-and-wire trellis system is a popular way to keep fruit trees at a manageable height (see "Espalier training").

Untended fruit trees can become infestation sites for serious insect and disease pests. Untended trees can make it difficult for your neighbors to control key pests. If you are using an untended fruit tree mostly for shade, perhaps you should replace it with a nonfruiting shade tree.

General rules for pruning

- Prune all fruit and nut trees at planting time to balance the top and branches.
- Prune young trees very lightly.
- Prune mature trees more heavily, especially if they've shown little growth.
- Prune the top portion of the tree more heavily than the lower portion.
- Prune when all danger from fall or early winter freeze has passed, but before full bloom in spring. Sweet cherry trees may be pruned in August when there's less danger of bacterial infection.
- In a mature tree, thin out more of the shoots that grow toward the end of a well-pruned branch. This increases fruit size and quality on the remaining shoots (figure 3).
- To reduce the height of a tree that's too tall, cut limbs at the top of the tree to a lateral branch that is the height you desire (figure 4). Leave the branch collar but don't leave stubs. Stubs won't heal and could be a starting point for wood rot fungi.
- Thinning out and heading back (figure 11)
- Thinning out results in long, flexible limbs that bend down when loaded with fruit. Heading back causes limbs to branch laterally and stiffen. Light heading stimulates branching when you train young trees.
- Bend nearly vertical limbs 45 to 60 degrees from vertical to stimulate fruit production earlier in the life of the tree. Bend limbs to the desired angle and secure them in place by using weights, tying them with twine, or using notched limb spreaders in the crotch of the branch. Keep the bent limb in the desired position for one growing season to allow the branch to stiffen and stay at that angle. Take care to bend but not break the branch.

The thicker and more upright a limb is, the more benefit it receives from bending. Bending helps keep a tree small and manageable by channeling the tree's resources into fruit instead of shoot growth.

- Clean or sterilize your pruners and saws between trees. When removing dead material sterilize between each cut.

Tree training systems

Open center training (figure 5).

Choose three or four shoots to form main scaffold branches the first winter. Remove other shoots that might form competing limbs. Or head them by removing one fourth to one-third of their length if they're long and not branched.

When you remove large limbs, first cut part way through the branch on the underside, then make the top cut. Don't leave stubs.

To keep a tree small, prune moderately every year.

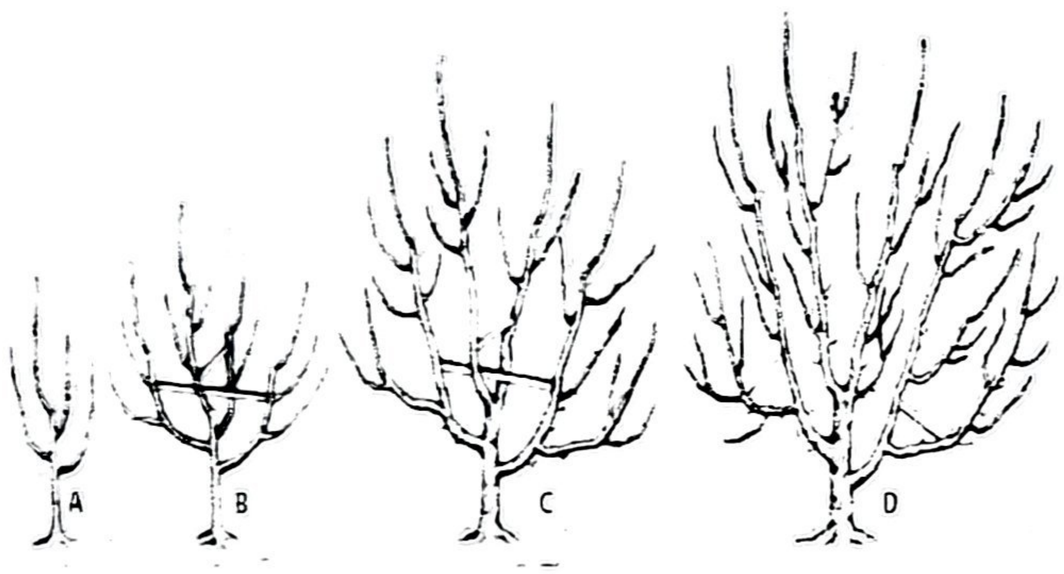


Figure 5

Figure 6

Figure 5. It takes four winters to train trees to an open center (gray indicates removed or headed shoots).

- A: The first winter, choose three or four shoots to form main scaffold branches. Remove or severely head all others. Scaffold branches should be at least 8 inches apart on the trunk for a strong tree structure.
- B: The second winter, choose one or two more.
- C: By the third winter, scaffold selection should be complete.
- D: The fourth winter shows a good open center. Four main scaffold limbs evenly distributed around the trunk are enough; a fifth limb crowds.

Figure 6. It takes four winters to train trees to a central leader (gray indicates removed or headed shoots).

- A: The first winter after planting, choose a vigorous shoot high on the tree. Cut off the top to stimulate branching if it's 2 feet long or longer. Head all other vigorous shoots more severely.
- B, C, and D: Repeat the process the following three winters so that no side branches become vigorous enough to compete with the central leader.

Central-leader training (figure 6)

If a new tree has few or no branches at planting, head it at 24 to 30 inches above ground. To train trees to a central leader, choose a vigorous shoot near the center of the tree after planting.

During spring or early summer, remove shoots near the leader that will compete with it (because of their upright aspect and vigor) (figure 7). In the dormant season, head the leader by one-third, and tie down or remove competing shoots.

Each year, spread limbs that are too upright (figure 8). Repeat the process in the following two seasons so that no side branches become vigorous enough to compete with the central leader.

Some apple varieties have wide-angled limbs naturally and don't need heading or spreading if they're supported. Other varieties with narrow crotches or upright limbs—or both—do require spreading. The central leaders of non-supported trees need annual heading to develop short, stout limbs.

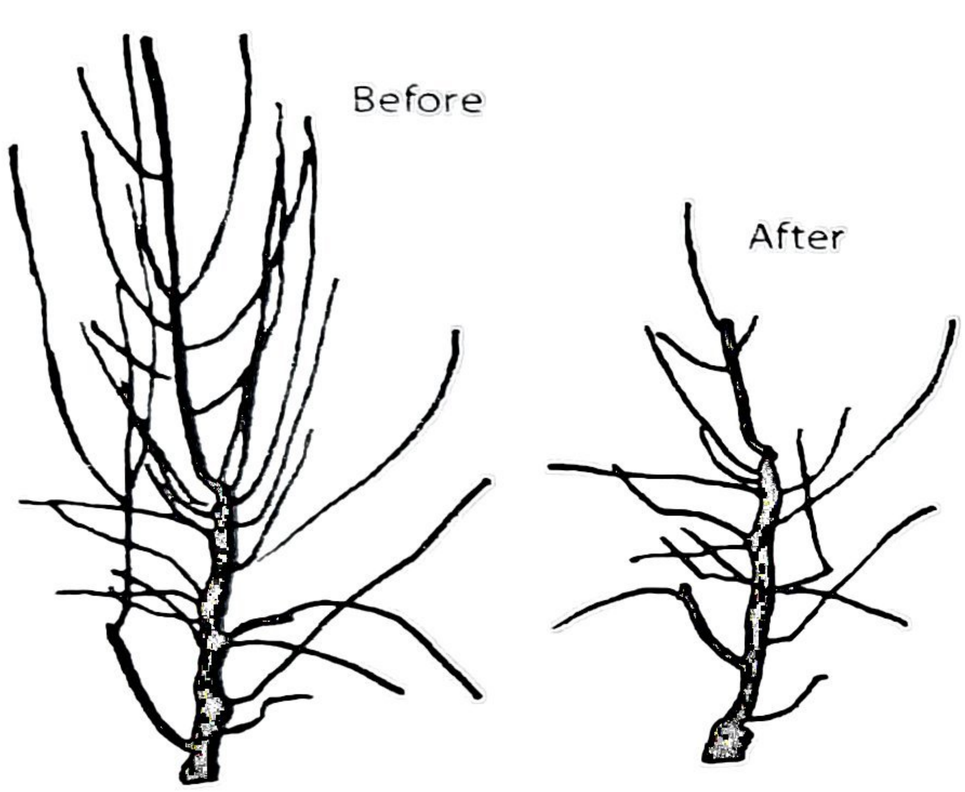


Figure 7

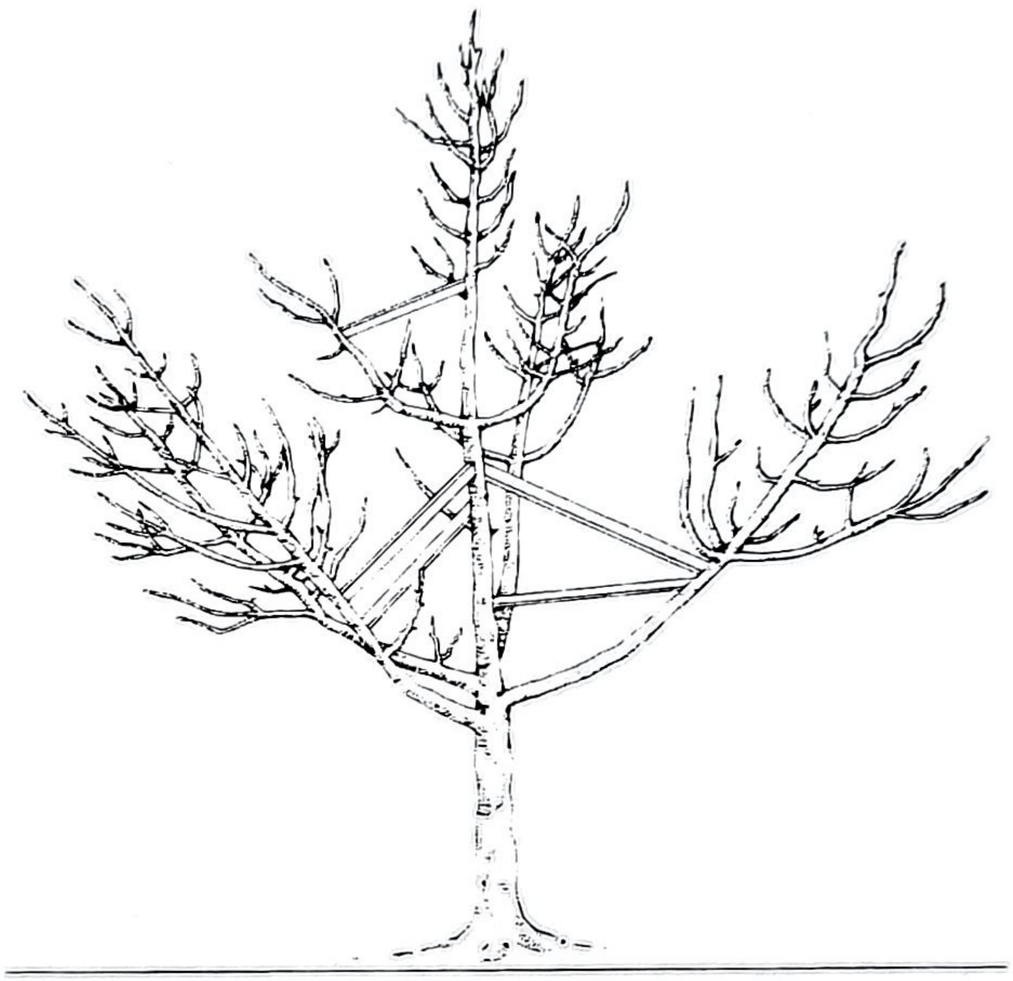


Figure 8

Figure 7. The highest portion of a scaffold limb is Called the leader. Thin it to an upright side shoot. Head that shoot and remove all upright shoots that might compete. To avoid overgrowth in the treetop, repeat this process annually.

Figure 8. While the tree is young, spread branches that make very narrow angles with the main trunk. If these limbs are allowed to grow to a productive age without being spread, they usually break away from the trunk, often splitting the entire tree.

Modified central-leader training

A modified central-leader training system follows the same steps described for central-leader training (figure 6). The central leader causes the lateral branches' angles off the trunk to be wider, which increases the crotch strength and helps induce early fruit production. Once you've chosen and established the main scaffold branches (figure 1), the central leader is no longer necessary. You can remove the central leader in the third or fourth year of growth. Now, you'll be training the tree to a multiple-leader system.

Espalier training

Espalier training develops trees in two dimensions only. In a home garden, you might use it to save space and to enhance the aesthetic appeal of your fruit trees. It also creates a tree form that is easier to pick, prune, and spray thoroughly for pests.

You can grow dwarf apple trees on a post and wire trellis in a hedgerow. Posts may extend from 6 to 10 feet above the ground.

Treated posts are best, but sound, untreated 4 x 4 cedar posts may work well. Anchor the end posts against another post driven several feet into undisturbed soil at an opposing angle.

Use galvanized wire, 12-gauge or heavier. The lowest wire should be about 4 feet above the ground, with higher wires at 2-foot intervals. Tie the main trunk to these wires, using a loop big enough to allow the trunk to grow without being girdled. If you attach the trunk to the trellis wire with 3⁄8-inch box staples, it will graft to the wire and not girdle.

If you use individual posts at each tree, make sure they extend at least 6 feet above the ground, and drive or sink them at least 2 feet into the ground. Wooden tree stakes should be 2 inches or more in diameter.

When training the tree, select buds to form the branches at the proper height and cut off the tree just above them. As these buds grow—and before they've produced enough wood to become stiff—fasten the shoots that grow from them to training wires or sticks with green tie tape, masking tape or other suitable material (figure 9).

Palmette is a specific pattern of espalier training. Develop the lowest branches first, angling them at about 30 degrees at the start. Widen this to 45–50 degrees when they're as long as you want them (figure 10).

Head the central leader just above where you want branches, and develop one or two higher pairs of branches, keeping them shorter and slightly more spreading than the lower pair. It's best to have at least 18 inches vertically between branches.

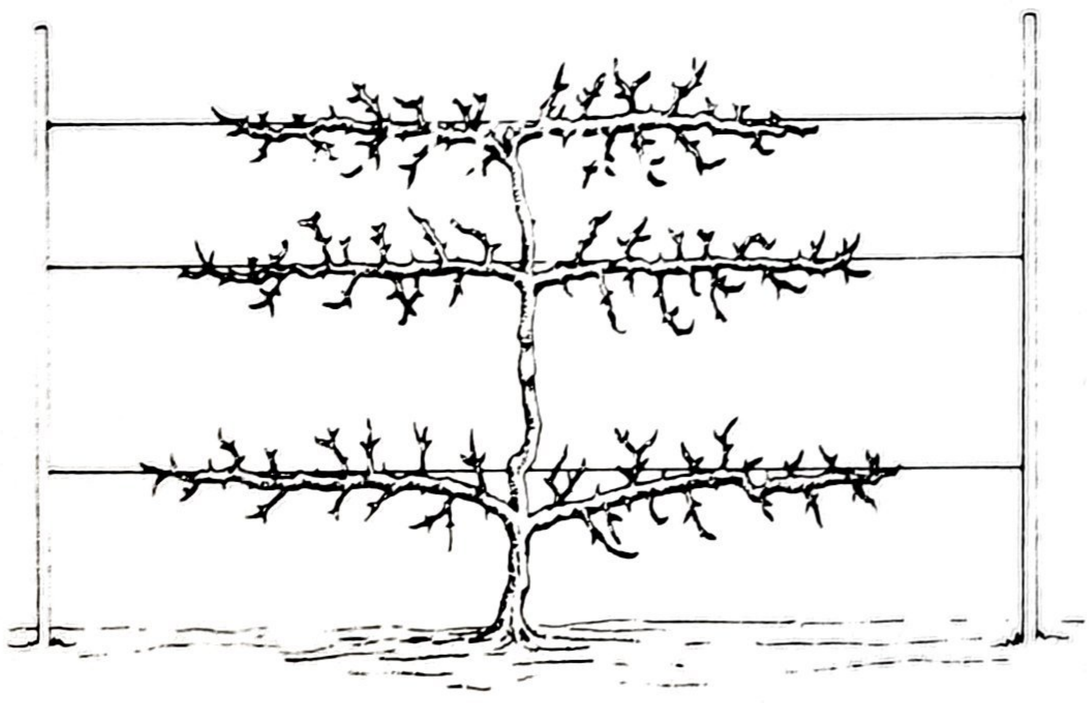


Figure 9. Espalier training

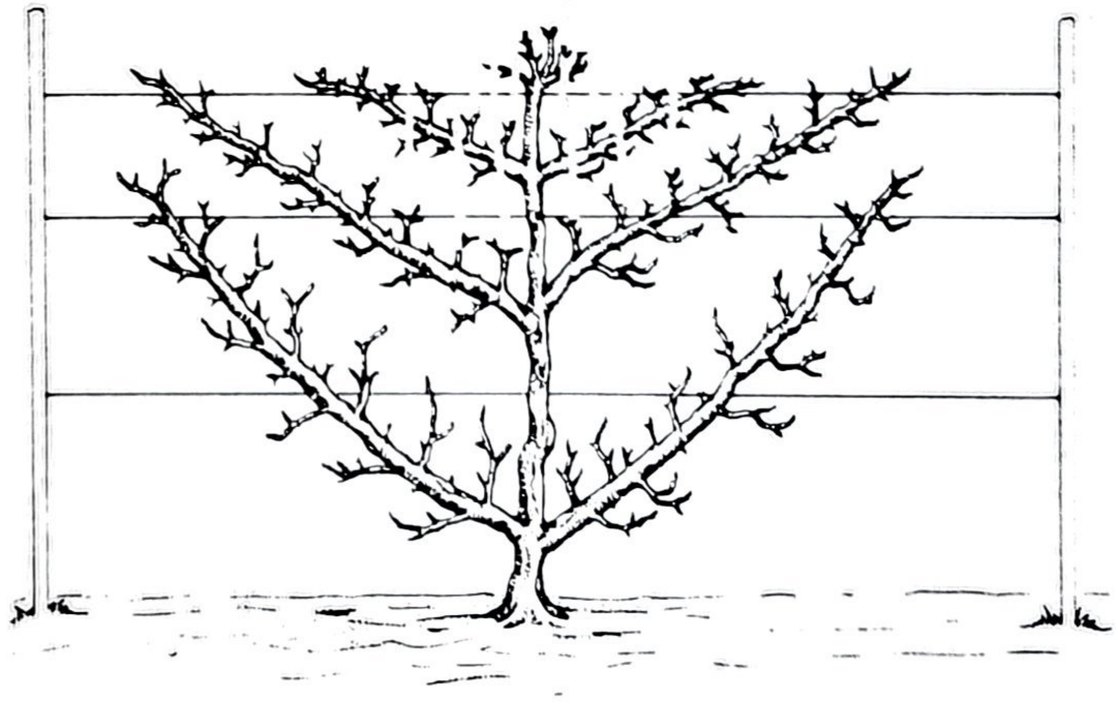


Figure 10. Palmette training

Fruiting Habits

Figure 12. One-year-old wood is the wood that grew during the previous summer: peach (left), apple (right).

Figure 13. The fruit spurs on a mature apple tree bear the fruit crop.

Figure 12 shows the difference in fruiting habit between peach and apple. Peaches bloom only on 1-year-old wood; apples usually bloom on spurs or shoots from 2-year-old wood. Figure 13 shows a mature apple tree's fruit spurs, which bear the fruit crop. Cherries, plums, pears, and apples produce their fruit on spurs.

Spurs require good light exposure in order to be fruitful. Thinning cuts that open up the tree to light penetration help to keep fruitful spurs throughout the tree canopy.

Pruning tools Figure 14.

Long-handled pruning shears (loppers) are the most useful tool for almost all pruning jobs.

Hand pruners are useful for training young trees.

If you need to make large cuts, use a pruning saw.

If you must use a ladder, use only a sturdy stepladder. Set it firmly on the ground to prevent accidents.

Applying the basics - fruit trees

Apple

Semi-dwarf trees

You can train a semi-dwarf tree to a central leader or develop it as a multiple leader tree, depending on the tree's vigor. Central leader training is best for weak-growing varieties on poor soil. Train vigorous varieties with multiple leaders (three or four lead branches) (when trained to central leaders, they may become too tall). When they're 4 to 6 inches long, spread these shoots using spring-type clothespins placed in the crotches of the branches. On a windy site, support the tree with a sturdy stake for the first year.

In the following years, spread or tie out the lead limbs to about 30 degrees from vertical. Weigh down the side limbs that arise from these or spread them to horizontal to stimulate early production. As the tree begins to bear fruit, limbs may require propping or tying to prevent breakage.

"Spur type" trees

This type of apple tree forms many small spurs on young growth rather than the usual long shoots and leaf buds (figure 15). This is how it got its name. Because these trees fruit at a young age and are smaller than standard strains of the same variety, they make ideal home orchard trees.

Each spur bears a flower cluster. The leaves are close together, the tree branches are less frequent, and the tree grows slowly.

Spur type trees are available on both vigorous and dwarfing rootstocks. If you grow them on vigorous rootstocks, they may not require artificial support until they are in production.

Because they branch sparsely, leave more branches in a spur type than in a tree of standard growth habit. To train them to a central leader, space the lower set of limbs several inches apart vertically on the leader and reduce their number to four or five (figure 6).

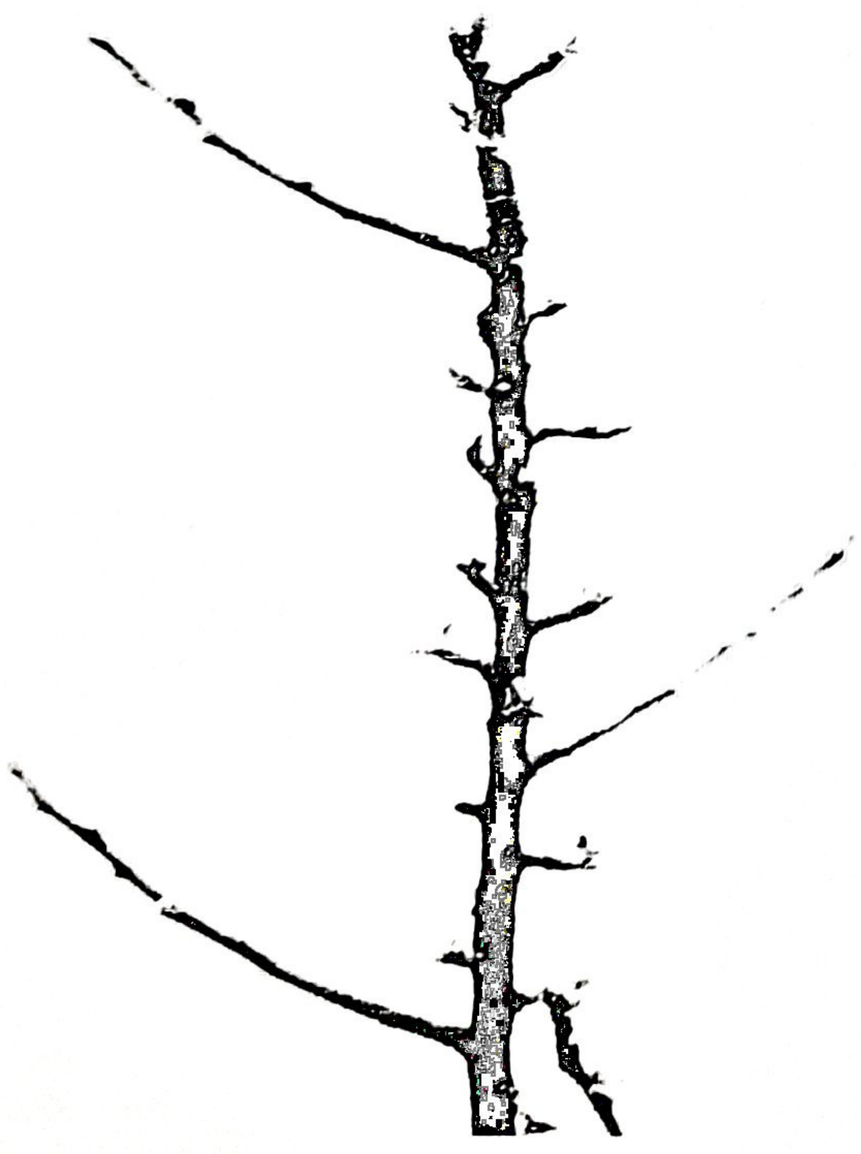


Figure 15. On this central leader of a 2-year-old, spur type Delicious apple strain, notice the many short spurs with blossom clusters. Extensive fruit thinning is required to allow this tree to grow and ripen the remaining fruit.

Figure 16a. This old apple tree is maintained at a height of about 12 feet by extending the branches horizontally, rather than vertically.

Figure 16b. This enlarged view shows how the slightly upward aspect of the entire main limb and the terminal part of the side limbs maintain a good balance between shoot growth and fruiting. Pruning consists of many small thinning cuts.

Standard trees and how to develop a modified branch system

Fruit trees on seedling rootstocks are excessively vigorous, so they are not as suitable for home orchards as trees on growth-controlling rootstocks. The branches of a mature, non-dwarf apple tree may spread over 40 feet in diameter and reach a height of 30 or 40 feet. If you choose to use a seedling rootstock, train them to the modified central-leader system.

It's best to have only four main scaffold limbs, spaced equally around the trunk and vertically several inches apart. Develop the main scaffold limbs to just a few degrees above horizontal. Make sure that all secondary branches also have a gradual upward aspect (figure 5).

Prune regularly and tie down upright limbs in the top to maintain a height of 12 to 15 feet.

Prune to make the lowest limbs the most vigorous and productive in the tree (figure 16).

Shorten, thin out, and bend down the upper limbs to accomplish this. Remove water sprouts (these grow straight up) and hangers (these grow straight down) from the permanent limbs to open a vertical space of about 3 feet between the lowest limbs and those above, so that light can penetrate. Water sprouts in apples produce no flowers or fruit. The best time to remove these in apples is June & July to prevent abundant shoots in the future.

Pear

Initial research shows promise for growing pears on a trellis, but most commercial pears are grown with a central leader or modified central-leader training system. If you feel adventurous, you can try growing trellised pears. The following recommendations describe the standard way to train pear trees.

Head pear trees at about 48 inches at planting. If the top is branched, keep three or four branches as leaders. Select these leaders early in the first summer and spread them. Do little or no pruning except to head and spread the leaders annually until the tree starts to bear.

Don't head side branches. Heading would maintain their upright position. Spread or weight all vigorous shoots except the lead shoots.

Open areas for your ladder between scaffold limbs of mature trees, and regularly reduce tree height to what you can reach from your ladder. Shorten or remove upper limbs so they don't shade the lower limbs. Thin out the branches of mature trees and do the heaviest pruning in the top.

Remove long shoots in the center and top but leave some short shoots and most spurs. Remove horizontal branches in the top so they won't produce suckers.

Sweet cherry

A planting site with some wind protection or afternoon shade will reduce stresses that allow diseases and insect to attack. At planting, head nursery trees at the height you desire for scaffold branches. Train sweet cherry trees to the open center system (figure 5) with three to five scaffold branches. Young sweet cherry trees often grow vertical limbs 6 to 8 feet without branching. You must head them to induce lateral branch formation.

Prune in summer to reduce the re-growth of vigorous trees. If a young tree is growing very rapidly, cut off a foot or more of new growth after about 3 feet of growth has been made in the summer. This will cause branching. You can hasten production by tying down or weighting limbs to horizontal.

To promote branching on trees not pruned in summer, head every shoot in winter to about 2 feet. After 5 or 6 years, stop heading and thin out crowded branches.

Bacterial canker, a common disease of cherry trees, frequently causes gumming and dead areas or "cankers" on limbs. If it infects the crown or trunk, it can kill the tree. If a gummy, dead area encircles most of a limb, you must cut off the limb. Cut back at least 12 inches from the exudation and check for staining or discoloration in the remaining portion of the tree. Sterilize your equipment. If discoloration is still present, cut back another 12 inches. Bacterial infection can enter through pruning wounds. To avoid this, prune in August.

Mature trees require little pruning except as needed to reduce tree height. If birds are eating a lot of the fruit, you may want to net the tree.

Sour cherry

Sour cherry wood is quite brittle, so give special attention to developing wide-angled crotches in young trees. Either select wide-angled shoots to form limbs or spread shoots to widen the angles. Three main scaffold limbs are enough for a sour cherry tree. The modified central-leader system helps form wide-angled scaffold limbs without having to spread them.

In the first and second summers, remove excess shoots so that all new growth is on the permanent scaffold limbs. In mature trees, only occasional thinning out of excess branches is needed to keep a good balance of light and fruitfulness throughout the tree.

Peach

Like cherries and plums, peaches like to have some wind protection or afternoon shade. Cut off peach trees about 48 inches above the ground at planting. Train trees to the open center or vase type system (figure 5). Develop no more than three or four main scaffold limbs. Select shoots that have the widest angles where they attach to the trunk and that are not all at the same height. Peach limbs with poor crotches split out more frequently than limbs of many other fruit trees.

Remove scaffold limbs that may compete with the three or four originally selected. Do this in the spring of the second year and again in the third year if necessary. Head the scaffold limbs in the first and second dormant seasons to cause branching until there are 6 to 8 secondary scaffold branches and 12 to 16 tertiary branches.

Peach trees bear only on 1-year-old shoots (figure 12).

Every year, prune enough to stimulate new shoot growth for the following year's crop. Peach trees branch readily, so they will have too many weak shoots unless you prune them properly. Thin out shoots, leaving those of moderate vigor. Remove all weak or very strong shoots.

Prune hardest in the top and near the ends of the major limbs. Cut top limbs back to side shoots to stiffen them and reduce tree height. Peach trees crop more consistently and have larger fruits if they're pruned heavily. Commonly, up to 50 percent of the previous season's growth is removed each year.

Prune and plum

Train prune and plum trees to the open center system (figure 5) with three or four main scaffold limbs. Prune very lightly for the first 5 years.

Head only the limbs that will be permanent scaffolds, remove scaffold limbs that may compete with the three or four originally selected, and do little else. Weighting or bending limbs stimulates early production.

In mature trees, thin out the top every few years and remove dead limbs as they appear. Most plums and prunes have ample bloom every year, so you only need to prune enough to control height and spread, keep the trees fairly vigorous, and prevent limb breakage.

Japanese varieties (such as Santa Rosa, Redheart, and Satsuma) have many long, thin shoots, so heading is far more important in them than it is in most European varieties.

Almond

These trees are treated very similarly to plums and sour cherries. Develop 3 to 4 main scaffold limbs when young and as the tree matures then out excess small overcrowding limbs.

Walnut

Nurseries cut off walnut trees 4 or 5 feet above the ground. If they didn't make this cut, the tree won't grow much for several seasons. The lowest limbs of a walnut tree have a habit of drooping, so they should originate fairly high on the trunk, usually over 5 feet.

Select three to five main scaffold branches in the first and second growing seasons and remove excess branches at that time. Use a modified central-leader system to help form wide-angled scaffold limbs.

After the scaffold branches have developed, no further pruning is required. Pruning doesn't hurt walnut trees, but they're so large that it's difficult to prune the top (where pruning would do the most good). Pruning will invigorate most old, weak walnut trees.

When planting a fruit tree in the lawn area, having a traditional one trunk is best. This allows you to walk and mow under the tree with the branches starting around 4 feet off the ground. Pruning the top of the tree out when they reach 12-15 feet allows you to have a modified traditional. This allows for easier pruning, picking, spraying and netting.

Pruning an old, neglected fruit tree

A tree that hasn't been pruned for several years has a dense thicket of upright shoots in the top and many weak, pendulant (downward facing) spur systems further down (figure 17). It's best to prune the tree back into shape gradually over several years, rather than trying to do the whole job all at once.

After you identify the main scaffold branches, saw out any excess large branches. Cut areas for your ladder so you can place it in the tree's center. Climb as high on your ladder in the tree's center as you intend to pick and cut the main scaffold limbs down to the height that you can reach.

Remove limbs that overlap or hang down into other limbs. Thin out most of the upright shoots, leaving some of the smaller ones. Cut back weak, pendulant limbs. Gradually invigorate the spur systems by cutting back some and removing others. Keep the center of the tree fairly free of limbs so that light can penetrate.

Don't head shoots. Remove them entirely or let them bear fruit and rely on the weight of the fruit to bring them down. Thin off shoots on the inside of upright branches so that fruit will pull them to the outside.

Figure 17. In a poorly pruned tree, upper limbs shade out lower limbs, and a dense thicket of suckers appears in the top. Cut the drooping terminal portion to a more upright branch (arrows). Remove some of the suckers, cutting close to the limb; thin outside shoots on others so that they'll bend over with the weight of the fruit.

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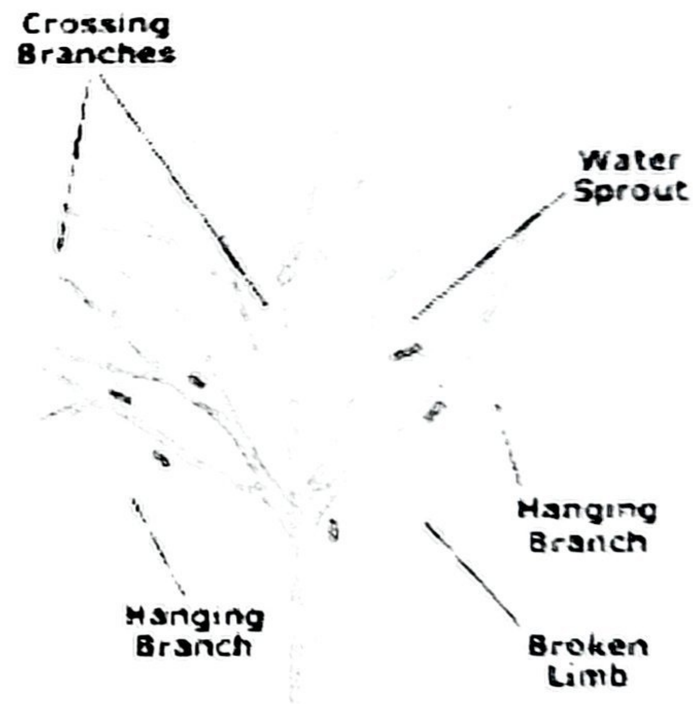
Pruning a Large Tree Limb

Most trees and shrubs can be pruned throughout the year. Make sure that you have sharp blades and some liquid cleaner/sterilizer to spray on your blades between cutting your limbs to prevent disease transfer. The best time to remove a limb from a tree is winter, except in the cases of maples, birches, and other trees that produce copious sap. For such trees summer is a better time. If you can easily reach the limb with a ladder, there is no reason not to tackle the job yourself. However, if you're thinking about climbing up into the branches to remove a limb, don't. This is a dangerous task best left to professionals who have the proper training and equipment.

You can ensure your own safety by following a few precautions. Be certain your ladder rests on a firm base; if the ground is soft, set the ladder on some planks. Lash taller ladders to the tree and have someone hold the base of the ladder while you work. But keep other spectators away. And note where the limb will fall, making sure its drop won't injure people or plants. If its fall might damage a valued shrub, say, tie a rope around it, pass the rope over another limb higher in the tree, and lower the cut limb slowly to the ground.



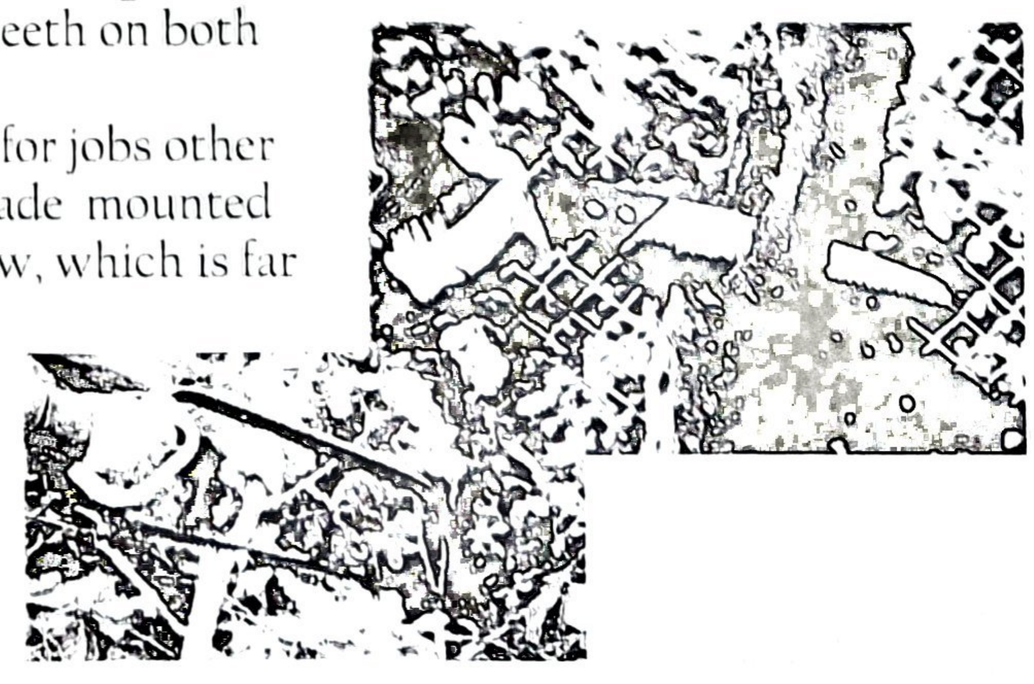
The Case for Cutting

There are many reasons why you may need to remove a sizable limb from one of your trees. The limb may be damaged, diseased, or dead. It may be rubbing against another branch. Or it may just displease you; the tree would look better, you decide, without that particular branch.

Choose The Right Tools

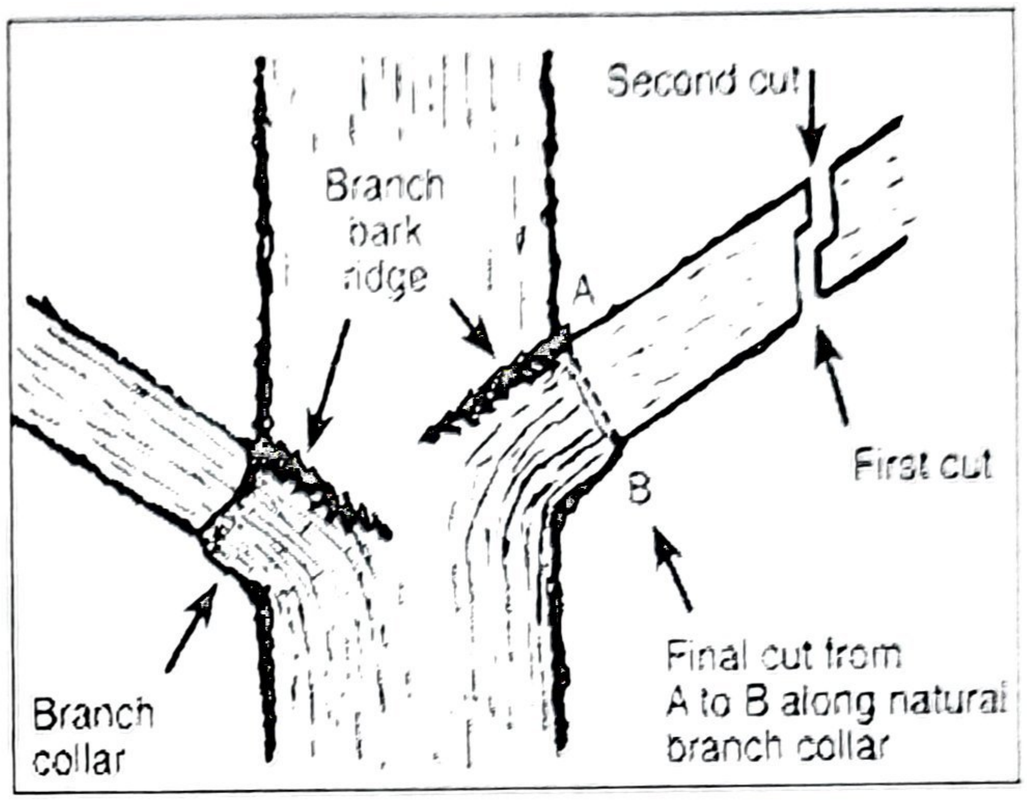
Any limb with a diameter greater than one inch should be sawed. For limbs up to two inches in diameter or even slightly larger, and for limbs growing close another, a narrow, curved pruning saw is the ideal tool and is easy to use, as it cuts by a pulling rather than a pushing action. For cutting larger limbs, a straight pruning saw with teeth on both sides of the blade can be used.

But handier for most amateurs (because it can be used for jobs other than pruning) is a bow saw, which has a detachable blade mounted on a C-shaped frame. In any case, do not use a chain saw, which is far too perilous for someone balancing on a ladder.



Make The First Cut Away from The Trunk

Make your first cut on the underside of the branch one foot out from the trunk, cutting upwards until the branch begins to bind the saw blade.
This upward cut will prevent the limb from tearing away the trunk's bark as the limb begins to fall. The second cut is then made from the upper side of the limb, an inch or so farther out. Cut straight down until the branch breaks off, which it will do as you approach the lower cut.



Make The Final Cut Close

Finish the job by removing the stub that remains. With larger branches you may want to make two cuts again. In any event, make your cut close to the trunk – just beyond the branch collar—and perpendicular to the direction the branch was growing. This ensures as small a wound as possible. If you can hang your hat on the stub that remains it needs further trimming. However, do not cut into the branch collar.
The collar provides a chemical barrier to decay and cutting into that area makes the tree vulnerable to infection.

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Pruning a Spring-Flowering Shrub

Many deciduous shrubs flower in spring, providing a beautiful and often fragrant backdrop for the early-season garden. Shrubs such as mock orange, barberry, deutzia, forsythia, honeysuckle, lilac, weigela, and spring-flowering forms of spiraea are also easy to care for, requiring only basic watering, fertilizing, and pruning. It is important, however, to prune these shrubs soon after the flowers fade, since this is when they begin to develop the new growth that will mature over summer and fall and produce flowers next spring. If you wait to prune until winter, when the plant is dormant, you risk cutting off much of this mature wood and significantly reducing the amount of bloom.

Remove Dead and Crossing Branches

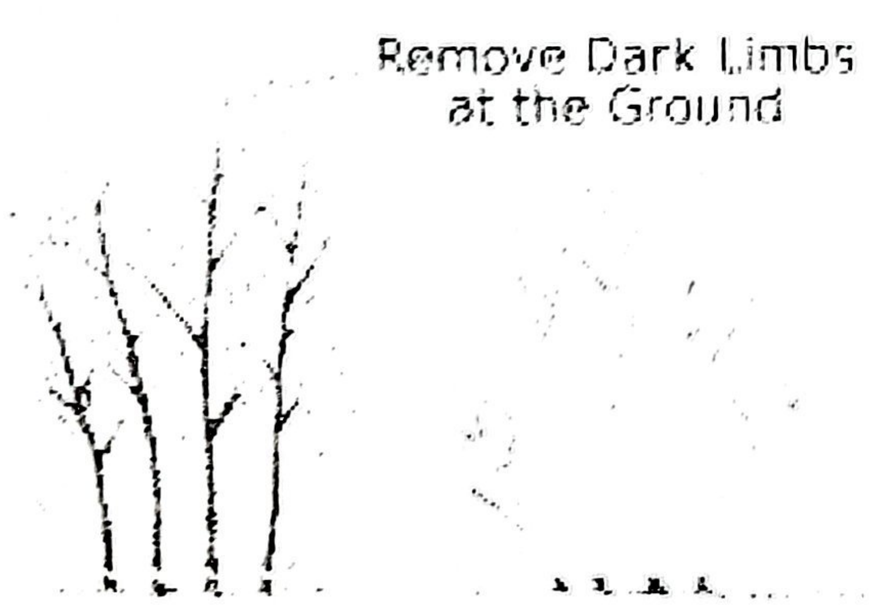
When pruning, aim to retain and enhance the shrub's naturally graceful habit, taking care not to cut it into a boxy or unnatural shape.

Before starting, it's a good idea to clear out fallen leaves and other debris from the plant's crown and the area beneath its branches so you can see the whole plant.

Using pruning shears or, if necessary, heavy-duty loppers, prune out any obviously dead branches, cutting them flush to the ground. Also remove any branches that seem diseased or abnormal, and those that cross each other awkwardly or rub together.

The plants listed above rarely have many disease issues but getting into the habit of cleaning your pruners after removing dead limbs helps prevent the spread of potential disease. A light spray of rubbing alcohol or Lysol can do the trick. Roses, Dogwood shrubs and berries are of the biggest concern.

Renewal Pruning



In time, the branches of old vigorous-growing shrubs tend to become overcrowded, preventing the oldest stems from producing sturdy new side shoots. To give the shrub renewal strength, let light and air into the center of the plant, and provide growing space for new flowering stems, cut about one-fifth to one-third of the oldest canes back to the ground. Repeat the process next year if the shrub seems to need further thinning.

If some overly long stems remain, consider shortening them, but keep in mind that branches cut back partway often give rise to a dense profusion of new shoots, making the shrub appear even more overgrown. Cut these stems back to just above a side branch that is growing in the direction you want, usually away from the center of the plant. This way new growth will be concentrated in one side branch rather than in several new shoots.

Deadhead Flowering Stems

You can begin this phase of the project while the plant is still blooming by cutting a few branches for fragrant bouquets. Then, immediately after the flowers have faded, selectively remove the dead blossoms, cutting each stem back to a pair of young laterals, or side shoots. These shoots will continue to grow over the summer, forming buds for next year's blossoms.

Routine Care

Besides proper pruning, some routine maintenance will keep your spring-flowering shrub healthy and blooming prolifically. If you haven't already fertilized this spring, do so after pruning. Use an all-purpose fertilizer, such as 5-10-10, spreading it lightly in a circle around the outer edges of the branches. Thoroughly water it into the soil. A mulch of aged compost, shredded leaves or small bark will benefit the shrub by conserving moisture and preventing most weed growth. Though an established shrub is able to endure considerable drought, it will flower more reliably if you help it through dry weather with a weekly watering.

Mar 15-Apr 15 prune

Greenhouse
Garden Center & Gift Shop

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Colorful & Classic: The Rose

No other flower has a wider range of size, color, shape and flower form than the rose for attractive and easy adaptation to any garden setting. Roses are among the most versatile of plants. They come in every shape, size and color imaginable with architectural dimensions, both in bloom and plant size, that make it possible to please everyone!

Planting, Fertilization, & Watering

Greenhouse Garden Center's roses were planted bareroot into pots in January, and should be fully rooted out when purchased. Plant with special care though so that the new roots are not damaged and your roses do not suffer transplant shock. Gently remove the rose by tapping the side of the pot to release the soil tension and pull the rose from the pot that is laying on its side.

After digging your planting hole, mix the soil you removed with about ½ as much *Rose Planting Mix* or *Bumper Crop Potting Soil*. Backfill the hole with the soil mixture so that the surface of the soil in the pot will be at the same level as the surrounding soil. Watering the soil gently will eliminate any air pockets. Water with a dilution of *Fertilome Root Stimulator* to help your plant become established more quickly. Because roses are heavy feeders, regular watering and fertilization are essential to the healthy growth of your roses. Fertilize every 4 weeks starting in April, with the last application the first of September.

We recommend *Bumper Crop Rose & Flower Fertilizer*. Protect your plants from insect damage by spraying *Neem Oil* every 2 weeks in June, July, & August. You may need to water your roses daily if the temperatures are over 85° and the wind is blowing—for the first week only. Roses respond well to deep watering every three days or less once they become established.

Pests & Diseases

Spider mites are minute reddish insects prevalent in hot, dry weather. Infected plants look yellow, dry, and dusty. Leaves become mottled on top then yellow, curl up, and fall off. Undersides of leaves may be covered in fine webs. Spray **dormant oil** just before leaf budbreak to kill overwintering eggs. Apply a summer horticultural oil or stronger miticide to kill adults.

Signs of **sucking thrips** include brown streaks and spots on petals, distorted blossoms, bud failure, and white, withered leaves. Remove infected plant parts. Apply foliar or systemic insecticide.

Aphids congregate and feed on new shoots, leaves, and flower buds, deforming plant parts. Knock off adults with blasts of water from the hose or spray plants with **insecticidal soap** and summer horticultural oil. Dormant oil in late winter or early spring will kill the overwintering eggs.

Borers tunnel into canes and twigs, causing internal damage. Infected canes turn brown, wilt, and die back. Prune infected canes back to areas of healthy growth and burn the cuttings. Seal cuts with *Tanglefoot Tree Sealer*.

Leaf-cutter bees make regular circular cuts in leaf margins as the collect nesting material. These are beneficial pollinators and should be tolerated.

hole = coin bore

Black spot, a waterborne fungus, infects leaves during warm, humid weather. Small black spots appear on the leaves, which become encircled with yellow rings. Leaves yellow and drop off, defoliating the entire plant. Leave plenty of space between plants and avoid overhead watering. Remove infected leaves and discard them. Spray with fungicide.

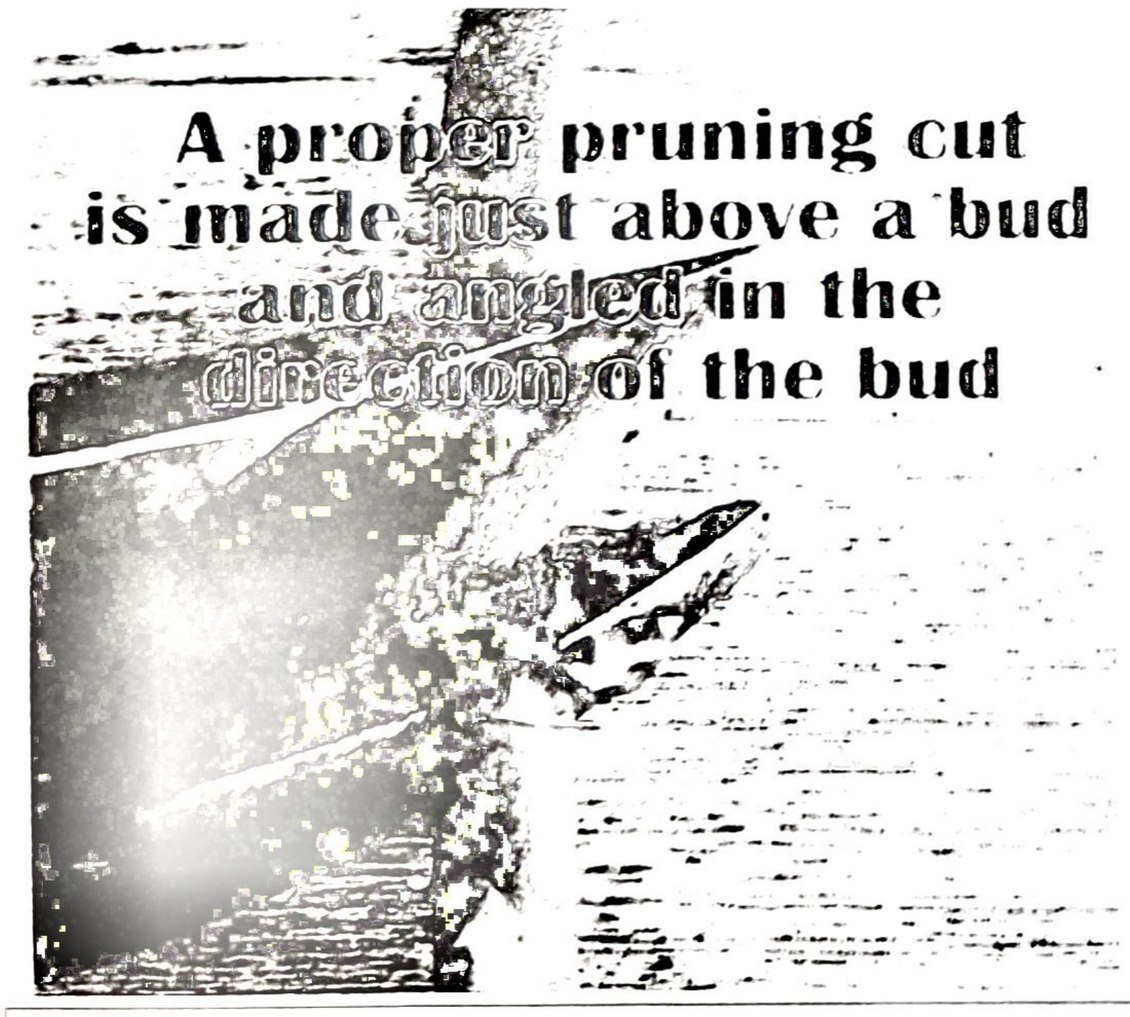
Powdery mildew forms a grayish white powder on leaves and may stunt growth of young canes and interfere with flower development. Give plants good ventilation. Treat with fungicide.

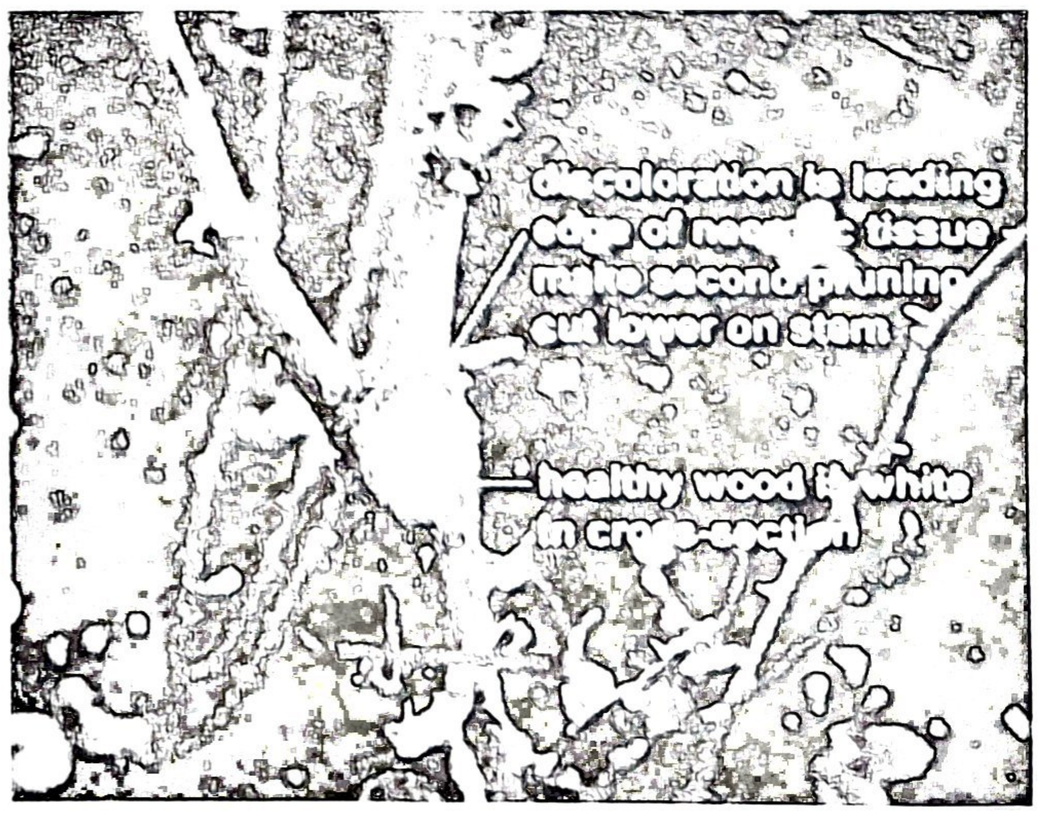
Roses bloom constantly from early spring to late fall, providing a rich tapestry of color in the garden. Starting out on the rose selection pathway, the architectural shape and dimensions are of prime importance. To navigate this panorama of size and space, the following explanations have been compiled to explain the range of classifications available.

Classification of Roses

- **Climbing**: Roses with long arching canes (to 14'), suitable for training on low fences or trellises.
- **English**: A new class of roses in which the repeat blooming habits of modern roses are combined with the form and fragrance of old garden roses.
- **Floribunda**: Medium sized flowers mostly borne in cluster, often more compact in habit, medium length stems.
- **Grandiflora**: Large flowers borne in clusters, usually taller in habit, individual stems within each cluster are suitable for cutting.
- **Groundcover Rose**: Low growing with a strong spreading habit.
- **Hybrid Rugosa**: Exceptionally hardy, vigorous, usually upright compact plants. Most are recurrent bloomers. They produce large, edible orangish-red rose-hips.
- **Hybrid Tea**: Large flowers generally borne one per stem, medium to tall in habit, with long cutting stems.
- **Miniature**: Small flowered roses with proportionately smaller foliage, often very compact in habit. Stems are also shorter but still suitable for cutting.
- **Polyantha**: Polyanthas present their delicate flowers in sprays well above their foliage.
- **Shrub**: Any rose that presents its blooms close to the foliage and is well suited for unattended use in the landscape, usually good disease resistance and hardiness. Most are grown on their own root.

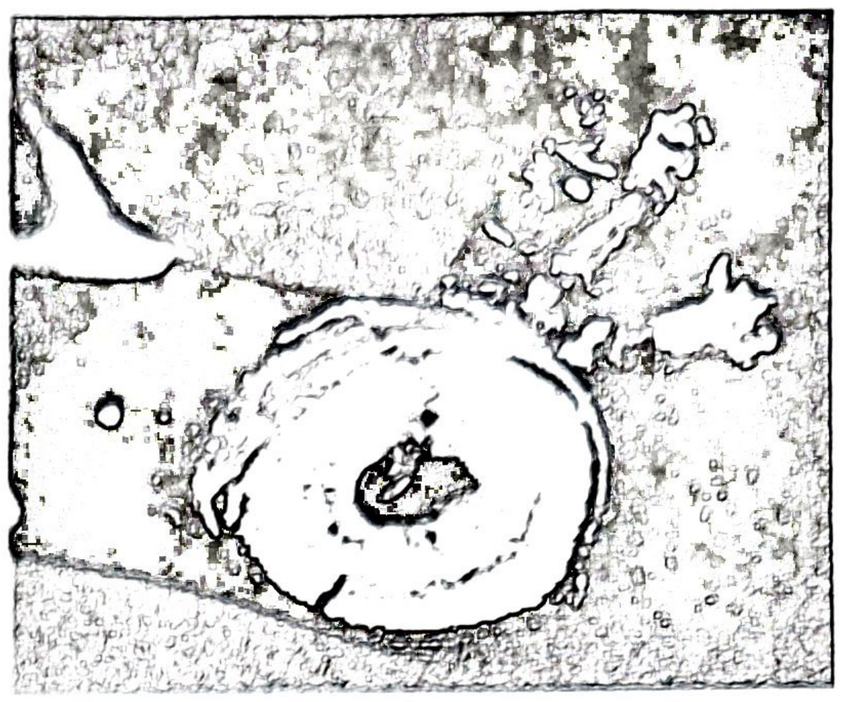
Hybrid Teas, English, and Grandiflora roses need more care and protection than any other rose classification.





Choosing buds that are headed away from the center of the plant will keep your rose open in the middle, improving air circulation among the

The cane on the right is hollow, a sign of cane borers. Old stems may be hollow all the way to the ground, so go ahead and cut them back to the base. As you're pruning off winter damage, cut down to healthy pith (wood).



Pruning

Protect your skin with long sleeves and heavy gloves that reach well past your wrists. Use a sharp pair of bypass pruners—they work like scissors, with the blades slicing past each other. Anvil pruners will crush the rose stems instead of making a clean cut. Disinfect your pruners, loppers, and/or saw as you work to avoid spreading disease—a mixture of 1 part bleach to 4 parts water is a good disinfectant. Use *Doc Farwell's Seal & Heal* to seal the canes to keep rose cane borers out. If the cane is wider than about 1/8in., seal it.

When to Prune

Pruning should be done while plants are dormant. We recommend April 15th. Roses that only bloom once usually bear their flowers on year-old wood. Prune these right after they bloom or you'll be cutting off most of next year's flower buds.

How to Prune

1. Step back and look at your rose before you start pruning. As you choose which canes to cut, remember that you want to open up the center of the shrub for good air circulation.
2. Remove crossing and rubbing canes—those areas will create wounds that could let in disease.
3. Cut back blackened, winter-damaged tips, trying to keep all the healthy canes about the same length.
4. Prune dead canes back as close to the base as possible. For winter protection, roses should be mulched deep enough to cover the graft. We recommend pulling back the mulch in Spring.

Shorten the plant by not more than two-thirds of new growth. Don't prune climbers—thin them. Deadhead (removal of spent flowers) throughout the season to encourage rebloom. You'll want to make deadheading cuts right above five-leaflet leaves that face outward.

Most shrub and Rugosa roses grow on their own roots, but hybrid teas and many other roses are grafted onto a rootstock. When you see a cane emerging from the rootstock, below the graft, that cane needs to be removed. Often, the foliage is a different color or size on these suckers. Cut them back as close to the root as possible.

Winterizing Your Roses

Take care not to stimulate your roses unduly as autumn approaches lest they put out new growth that will be damaged by cold weather in the fall and winter.

Stop fertilizing by September and stop deadheading spent blossoms at about the same time.

Mulch (compost, bark, leaves) your roses making sure you cover the graft point. Mulch minimizes the possible damage that can come from abrupt temperature swings in midwinter.

Spray with a copper fungicide to prevent fungal diseases.

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Pruning and Training Wisteria

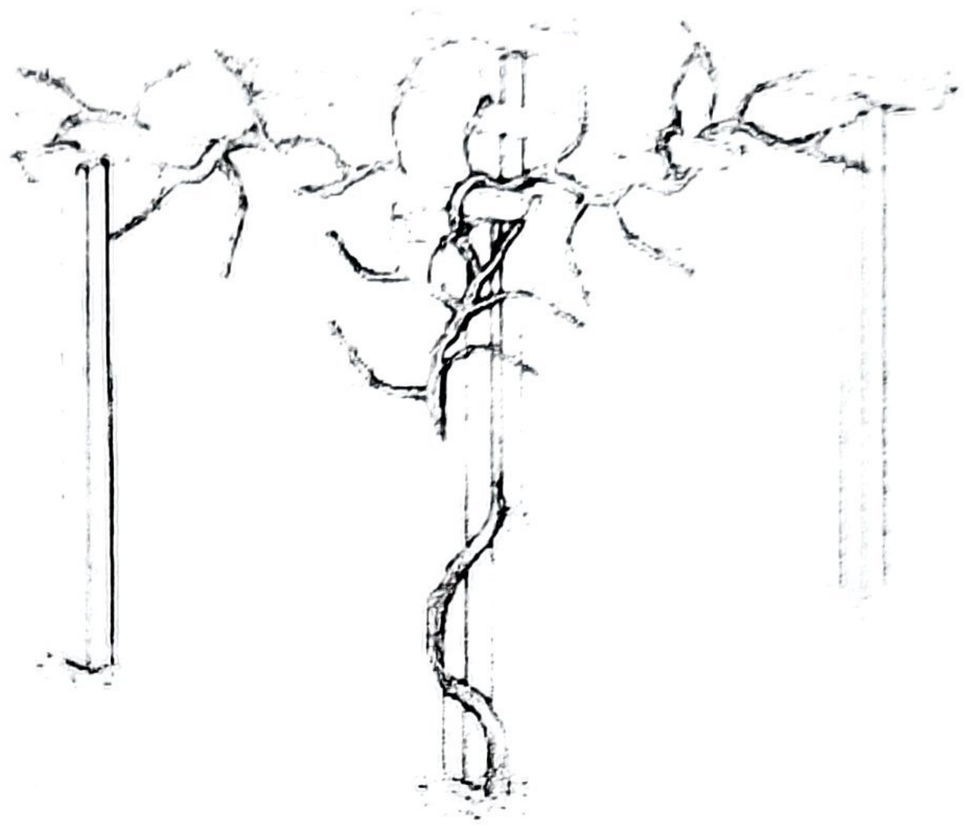
Wisteria can live a long, healthy life with no pruning at all, happily twining, climbing, and sprawling over everything in its path. But for the gardener who has limited space and wants to enjoy more visible and abundant wisteria flowers, a pruning routine becomes a necessary chore. For optimal results, plan for at least a biannual (once in summer, once in winter) pruning regimen. Knowing how the vine grows will also aid in your success.

Summer: Cut the long shoots after flowers fade

Since wisteria flowers develop on the previous year's growth, pruning wisterias biannually not only keeps these vigorous vines to a manageable size but also creates a system of short branches close to the structure, where you can more easily enjoy the blooms. To accomplish this, simply prune the long shoots of the current year's growth back to 6 inches long in early summer after the vines have flowered. Also, at this time, completely remove any shoots not needed for the main framework of the plant and prune away root suckers, especially on grafted varieties. This type of pruning may be done once a summer or more frequently, depending on how much time you have and how neat you want your vine to look. Keep in mind that many gardeners find wisteria seedpods decorative, so you many want to leave some spent flowers behind.

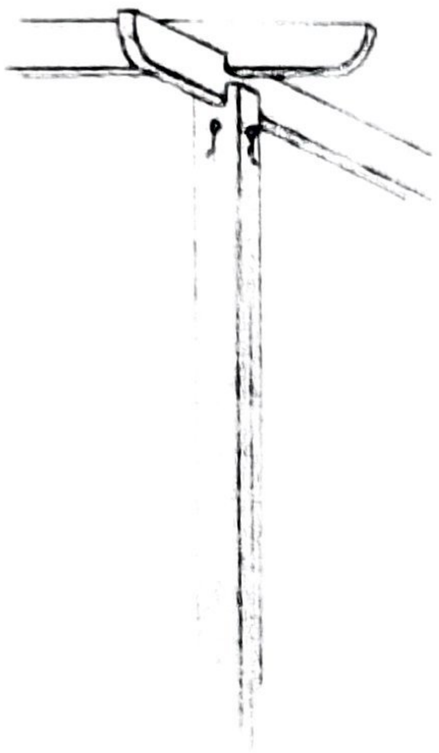
Spring Blooming = Lilacs prune = right after blooming cut to closest stem every yr

Winter: Prune long shoots down to three or five buds

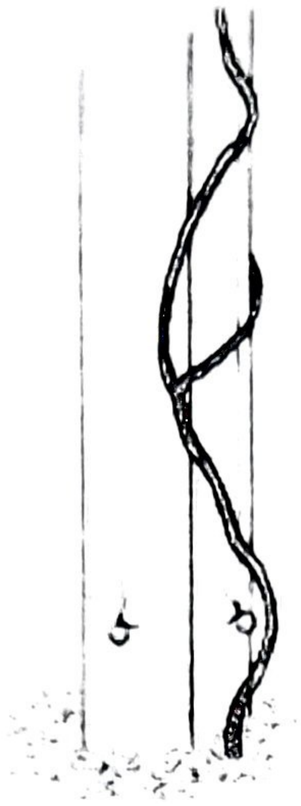


In late winter, prune the long shoots that have grown since the summer pruning down to three to five buds. Also remove any of last season's unwanted long shoots, which will be more apparent now because the leafless framework will be exposed.

Training a new wisteria on a pergola



Start with a sturdy structure



Train to climb vines

Encourage branching

The vigor of the plant makes it adaptable to many forms. Wisteria may be shaped into a shrub or standard, trained against a building or lattice, or grown on a pergola or arbor. *Wisteria floribunda* is a desirable selection to grow on pergolas and arbors because its long flowers hang dramatically through the top. Only one plant is usually needed to cover an entire structure since it is, like other species of wisteria, such a vigorous grower. Planting two vines at opposite ends, however, gives a structure visual balance and affords a gardener the opportunity to feature two different cultivars on the same structure.

Start with a sturdy structure

Training wisteria to grow on a pergola or arbor is a practice that requires careful planning. In order to successfully use these structures, they must be made of a stout, weather-resistant material like cedar and set securely in the ground with concrete footings. Wisteria is infamous for pulling down its supports, so don't be afraid to overbuild a pergola or arbor. I recommend that the posts be made of 4×4 lumber and the crosspieces of 2×4 lumber at least.

Train vines to climb

To begin training a new plant onto a pergola or arbor, allow two or three young shoots to twine loosely around each other and the post as they grow. This will help to provide added interest to the plant's structure, since the woody stems become contorted and picturesque with maturity. The young shoots need to be secured to the post as they climb. To do this, attach a 14-gauge galvanized (or similar) wire using eye hooks, spaced about 18 inches apart, along two opposite sides of the post (or on all four sides for extra support). As the shoots grow, tie them as needed to the wire using gardening twine. Allow some slack as they grow to create a more attractive habit and to prevent the plant from putting heavy tension on the structure as the plant matures.

Encourage branching

Once the shoots have reached the top of the arbor, head them back (prune off the tips) to encourage side shoots, which will spread across the top of the supports and produce flowers. As the plant grows and becomes more stable across the top of the structure, the training ties on the post will become unnecessary. It's a good idea to remove them to prevent the plant from being girdled as it grows.

Why your wisteria may not bloom

Wisterias are notorious for failing to bloom. Before trying drastic measures, make sure these basic cultural requirements are met.

Seed-grown plants

The most common reason for lack of flowers is the selection of a seed-grown plant over a grafted plant. Grafted plants typically bloom within three years, while seed-grown vines may take upwards of seven years before flowering— if ever.

Light requirements

Wisterias need at least six hours of sunlight per day.

Exposure

Late frosts and high winds may damage flower buds, especially those of Wisteria sinensis. Conversely, wisterias bloom best after years with hot summer temperatures.

Fertilizer

Avoid high-nitrogen fertilizer. Like other legumes, wisteria fixes nitrogen in the soil. Too much nitrogen can cause excessive foliage growth and poor flowering.

Wisteria varieties

Wisteria floribunda – Japanese wisteria – Blooms before leaves develop in spring, fragrant 12-18 inch flower clusters, develops velvety, hairy seed pods and twines clockwise around supports. Tends to have a longer bloom time.

Wister sinensis – Chinese wisteria – Blooms before leaves appear in spring, fragrant 12 inch flower clusters, develops velvety, hairy seed pods and twines counterclockwise around supports.

Wisteria frutescens – American wisteria – blooms later in the spring or summer months with shorter flower clusters, develops smooth and hairless seed pods, vigorous but non-invasive.

Wisteria macrostachya –Kentucky wisteria – blooms later in the spring or summer months with shorter flower clusters, develops smooth and hairless seed pods, vigorous but non-invasive.

Both American and Kentucky wisteria are guaranteed to bloom almost every year.

Some material taken from *Fine Gardening* magazine

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All About Grapes

Planting & Fertilization

Grapes prefer a soil that is rich in organic material and well-drained. Encourage growth by adding any of the **Bumper Crop** family. Soil should be kept evenly moist the first year after planting, but they will stand short, dry periods in following years. A spring application of fertilizer is recommended, such as **Master Nursery Fruit & Vine Food** or **Bumper Crop Citrus & Fruit**. Late feeding during the ripening period can force excessive growth and spoil the fruit. Grapes may produce an occasional fruit bunch the first year, and a good crop the second year if full sun is supplied. A southern exposure is to your advantage.

Pruning

Prune grapes at any time from mid-February through April

Grapevine Terminology

First, here are the key terms used in grape training and pruning, namely the different parts of the grapevine:

- **Trunk**: The permanent, upright stem of the grapevine.
- **Shoots**: The new soft, green and succulent growth on one-year old wood, with leaves, tendrils, and flowers clusters that develop into grapes.
- **Canes**: Mature, woody, brown parts of the grapevine. Canes are either mature shoots after they have produced fruit and the leaves have dropped in the fall, or canes that are able to bear fruit; those are called fruiting canes.
- **Cordons**: Used in grape training and pruning when referring to the "arms" of a grapevine that extend from the trunk. They are often positioned horizontally along a trellis wire.
- **Spurs**: One-year-old short and stubby canes that have been pruned so that only two to four buds remain. Spurs will grow into shoots, and later, after bearing fruit, into canes.
- **Renewal Spurs**: Spurs that are cut back to only one node—the location on a cane where the buds emerge. The purpose of having renewal spurs on a grapevine is to grow shoots for next year's fruiting canes.
- **Suckers**: Shoots that grow at the lower part of the trunk.

Training Your New Grape Vine (as you see in the vineyards)

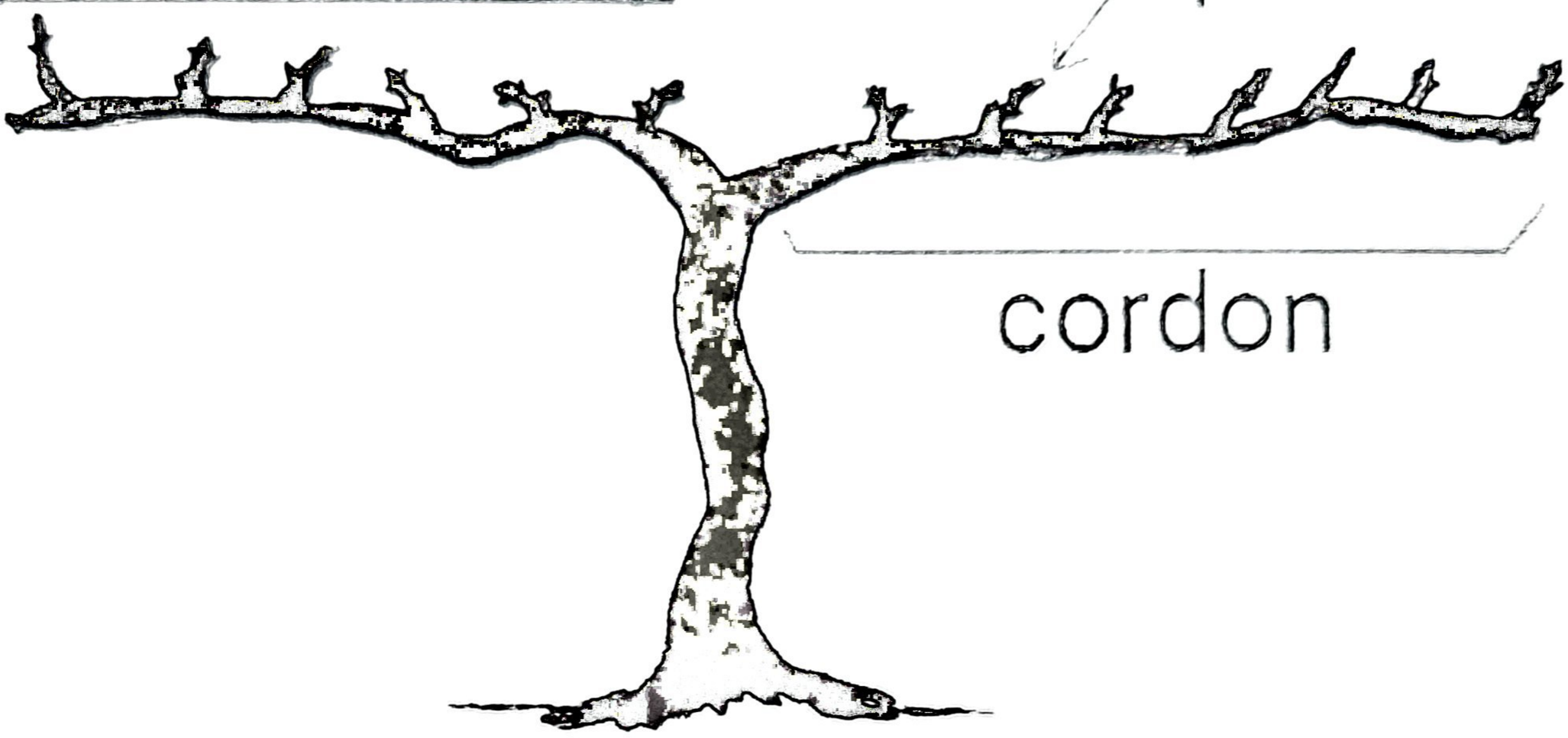
First Growing Season–If your grape is newly planted, you want to just let it grow the first year. This will allow for large and healthy root development. The first winter after growing free over the summer select the straightest and sturdiest shoot and train it to a post or bamboo to allow it to grow up to the guide wire. Tie it with twine or plastic tape to keep it supported and encourage straight growth. This may seem counter-intuitive but remove all the lower shoots on the trunk and on the shoot, you are keeping, shorten it to about 3-4 buds.

Second Growing Season–Choose the strongest upright shoot for continued elongation of the trunk. If growing two tiers, start training your bottom layer by selecting a shoot on each side of the trunk at about 30" above the ground. Tie to your support wire with twine or plastic tape. Remove shoots that are growing out along the trunk below these side shoots (will become your cordon). Once the center shoot (trunk) reaches the top support wire, pinch it back to encourage growth of side shoots.

Second Winter–Remove shoots growing along the trunk and arms (or new cordons).

Third Summer- Prune shoots sprouting along the trunk and allow the side shoots to grow. The following winter you will decide whether to cane prune or spur prune.

Spur Pruning



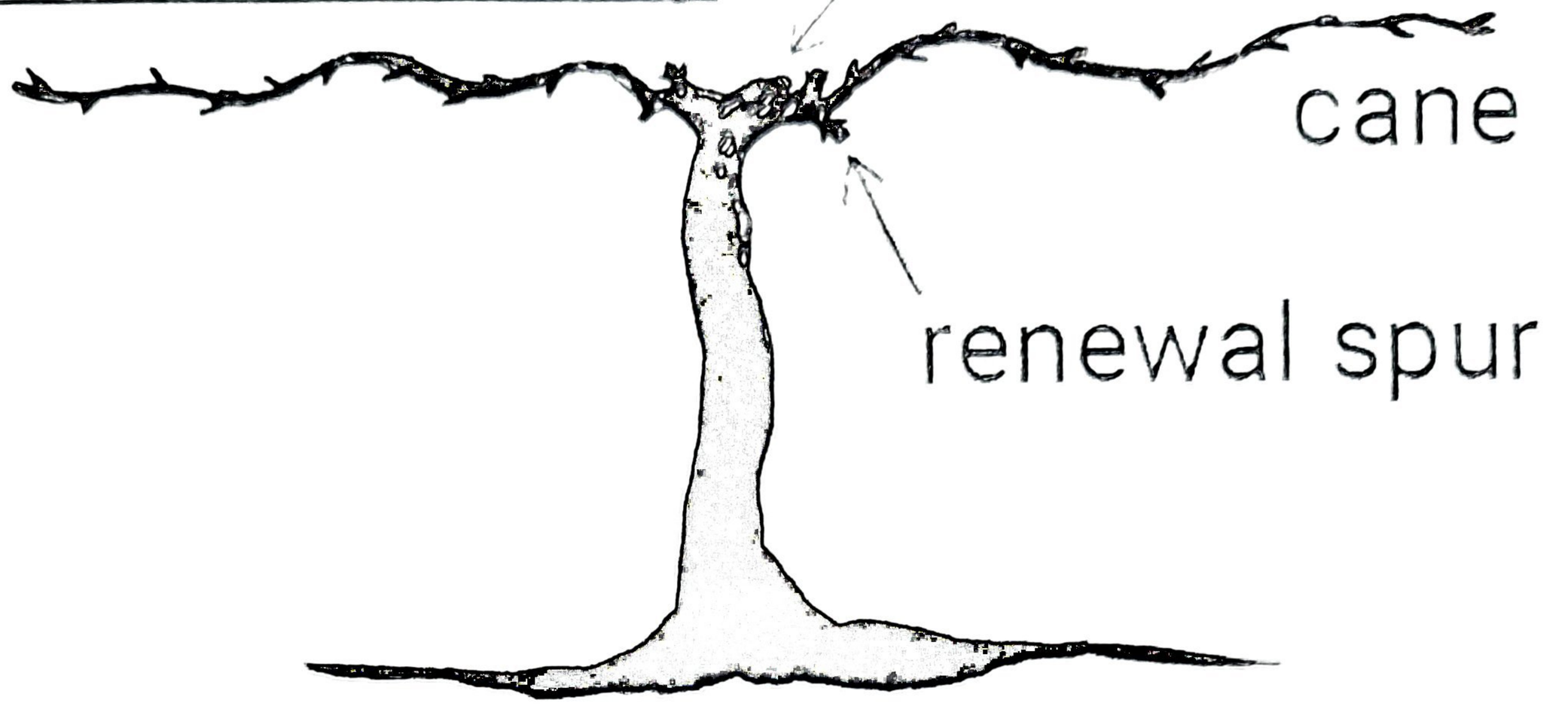
Selecting Your Spurs–on a new vine it will be very important to select spurs that will become the permanent arms of your cordon. The spurs should be about 6" apart with a total of about 6-7 for each half cordon (each side). Keep spurs that are growing upright and are the closest to the cordon or main shoot. Shorten the shoots to 2 buds per spur.

In late winter or early spring select and tag your fruiting and renewal spurs for the season.

Selecting Fruiting Canes and Renewal Spurs

- From the previous year's growth decide which one-year old (bark is smooth) canes you want to save for your fruiting canes.
- Select two canes on each side of the main trunk and the canes should be ones that were exposed to sun and are coming off close to the trunk. These canes should be strong, a diameter of 1/4-1/2", and not have long internodes (space between nodes should be around 3-4 inches). I
- Save two canes on each side to be used as renewal spurs. These should be growing near the base of the fruiting canes. Renewal spurs will be the fruiting canes for next year.
- Tag with a ribbon the canes you have selected for fruiting and renewal.
- Remove all other canes that were not selected.
- Trim your saved fruiting cane to 10-15 buds and tie them to the guide wire or trellis.
- Trim your saved renewal spurs to about two buds.

Cane Pruning



How to Prune if You Don't Know What Variety of Grape

So you have moved to a property that has some neglected mystery grapes. How do you decide how to prune them? It is best the first dormant season to cane prune the grapes as described above. Then when your plants start to put out blooms, look at where flowers are coming off the cane. If the blooms are coming off very close to the main trunk, then that indicates it would be better to spur prune the following year. If they set blooms all along the cane, then continue to cane prune your vine.

Pruning on a fence or informal style, allow your vine to grow with abandon. During Late February to April count the average number of buds on last year's shoots of canes and cut off seven buds for every three you leave. An average of thirty buds on the cane means remove twenty-one of them and leave nine. Tie or weave the remaining canes into the fence.

Due to the uncertainty of wholesale grower stock, trucking, and weather, all varieties will not be available at all times. Although we do have the ability to special order some stock, we make no guarantee of its arrival and cheerfully encourage alternate selections.

Available Varieties

Black Monukka: Medium. Tender skin, with excellent, crisp, sweet flavor. Black, seedless table grape. Good fresh or for raisins. Cane or spur pruning. Ripens: August/September.

Canadice Seedless: Medium. Red, seedless table and raisin grape. Very productive. Long tapered clusters are well filled. Sweet, fruity, excellent flavor. Cane pruning. Ripens: mid-August.

Catawba: Large, deep coppery-red. Juicy, sweet, rich. Medium size clusters. Cane pruning. Ripens: September/October

Concord, Eastern: Medium, round. Blue-black, thick, tough skin. Excellent, strong flavor seeded fruit. Good for juice, jelly, and table use. Cane or spur pruning. Ripens: August/September.

Concord, Seedless: Slightly smaller clusters and berries than Concord. Same color and flavor, slightly sweeter. Regarded as a pie grape. Cane pruning. Ripens: August/September

Delaware: Small to medium. Skin is light red, thin. Flesh is juicy, tender, aromatic, sprightly, refreshing and sweet. One of the highest quality grapes both for table use and white wine. Keeps well. Clusters are small to medium. Cane pruning. Ripens: August.

Einset: Seedless. Medium oval, bright red berries. Tender to firm flesh with fruity, mildly strawberry flavor. Adherent skin, resistant to cracking. Ripens: early.

Fredonia: Large, blue-black, thick, tough skin, similar to Concord but larger. Vigorous vine. Excellent for arbors. Spur pruning. Ripens: late August.

Glenora: Small to medium, seedless. Skin blue-black, thin. Flesh is firm, but tender, juicy and sweet. Quality is very good for table use. Loose clusters. Cane pruning. Ripens: August.

Golden Muscat: Large, Golden-green, sweet, seeded, table and wine grape. Highly productive. Cane pruning. Ripens: August.

Himrod: Medium. Seedless, pale green to yellow fruit. Good for table use. Holds well on vine. Cane pruning. Ripens: August to September.

Interlaken Seedless: Medium. Greenish-white to amber-yellow. Crisp, sweet, firm, tight skinned, seedless fruit, excellent flavor. A Thompson Seedless hybrid. Cane pruning. Ripens: July/August.

Marquette: Wine grape. Typically matures with high sugar content and moderate acidity. Can produce complex wines w/attractive ruby color and pronounced tannins, often with notes of cherry, berry, black pepper, and spice.

Niagara: Large. Light green to white. Sweet, tangy flavor seeded table and wine fruit. Very productive. A "White Concord". Excellent for arbors. Cane pruning. Ripens: August/September.

Perlette: Large. White, thin skin. Flesh firm, crisp, juicy, seedless. Table use and raisins. Cane pruning. Ripens: July.

Reliance: Excellent quality, productive, seedless red. Very hardy. Ripens: mid-season.

Suffolk: Medium. Large, loose clusters. Round, firm, meaty and seedless. Excellent quality. Color varies from bright red to grayish pink. Ripens: September.

Worden: Slipskin large berries. Larger and blacker than Concord. Excellent for eating fresh, jelly and juice. Hardier and more vigorous than Concord. Ripens: September.

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Fruit Tree Espalier

For those of you who are new to landscaping, 'espalier' refers to the training of a plant or tree to grow flat against a wall or other vertical surface.

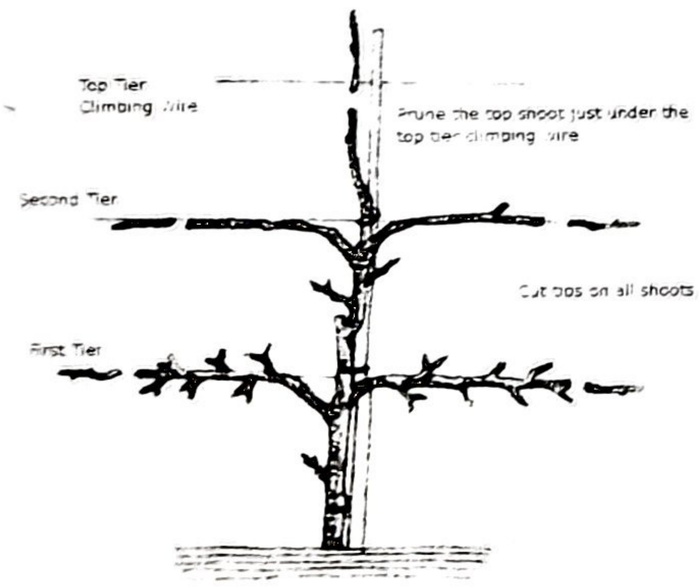
Espalier has considerable merit in today's landscape design. The practice was originally used in the old world to conserve space in small orchards and gardens. Today, espaliers are mostly used for introducing a decorative accent in the landscape, and many, many types of shrubs, trees, vines and other plants can be useful as espalier.

An espalier becomes a living sculpture in the garden. You can use espaliered plants and trees to cover unsightly or boring windowless walls. Espalier can bring an otherwise boring wall to life, as a 'living wall.'

Espalier plants are often used by landscape designers in home or building foundation plantings between widely spaced windows to add height in the foundation planting. They can also be used in tight, confined areas where spreading shrubs or trees cannot be effectively maintained to stay within the confines.

Apples and pears are traditionally used, as their branches are flexible and they fruit repeaedly on the same spurs. A small number of apple and pear cultivars are tip-bearing, but spur-bearing varieties are best for espaliering.

Quinces, almonds and crabapples can also be trained. Stone fruit (peaches, plums, nectarines and cherries) are best trained into a **fan shape** as their more brittle wood is difficult to train horizontally.



GETTING STARTED

You can espalier trees against a wall or fence, or create a free -standing living screen or fence between you and your neighbors.

- Make a support frame by fixing horizontal wires to a fence or posts using eyebolts.
- Use a 2.5mm galvanized high tensile wire and create two or three tiers spaced 12" to 20" apart.
- Dig a planting hole 12" from the fence.

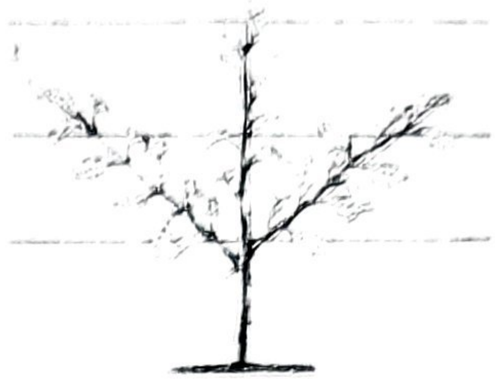
YEAR 1, WINTER

To espalier an apple or pear tree, plant it, then prune the tree to the hight where you want your first tier (just above the first wire) and where there are several strong bds just below the cut.

YEAR 1, SUMMER

Come spring, the buds will shoot.

- In summer, train one shoot vertically, one to the left and one to the right. This is easiest done by securing three wooden stakes temporarily to your support frame, one placed vertically behind the central stem, the other two at 45° angles to the left and right of the middle stake.
- Don't bend the young branches completely horizontal at this stage as they're still tender and may snap. Tie the three shooots to your stakes regularly as they continue to grow over summer using a flexible tie or pantyhose.
- Any shoots below these three should be trimmed back to about three leaves.
- Remove all forming fruit in the first year to divert the plant's energies into growth.



YEAR 2, WINTER

- Untie the 45° angled side shoots, remove the stakes and gently lower the shoots to a horizontal position. Tie shoots in place, cutting them back by a third.
- Cut back the central vertical shoot to just above the next wire on the support frame.
- Choose a bud at this height that has two more buds beneath on opposite sides so you can repeat the process.
- Remove any excess shoots above and below the first tier of branches. Cut flush with the main stem.

YEAR 2, SUMMER

- Again, tie three wooden stakes to your support frame, one vertically and two at 45° angles.Train the next tier of shoots along these stakes.
- Remove any other shoots, cutting back to about three leaves.
- Keep training the horozontal branches of your first tier along the bottom wires. If any side shoots form on these, trim these back to three leaves.

FOLLOWING YEARS

- Repeat the process until you've achieved the desired number of tiers.
- To stop further growth, cut the central stem to just above the last tier of horizontal branches.

Likewise, when your horizontal branches reach the desired length, stop further growth by sutting back the tip.
Each summer, trim back any side shoots that grow from you main stems to three leaves.

The most important thing to remember is to trim your espaliers twice a year, once in winter and again after they've finished fruiting in summer.

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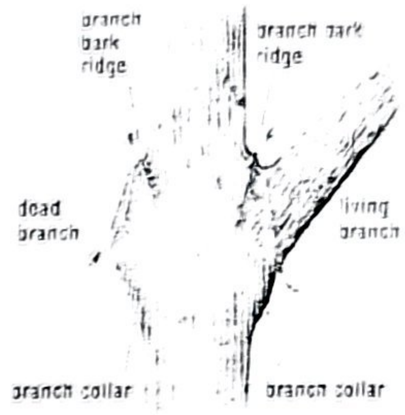
Pruning Terms

by Dick Post 2003

- **Branch Axil**:
  The angle formed where a branch attaches to another branch on a woody plant.

- **Branch Bark Ridge**:
  The ridge of bark that forms on a branch crotch extending partially around the stem resulting from the stem and branch tissues growing against one another. It is often a darker color than the surrounding bark. The top arrow points to the branch bark ridge.



- **Branch Collar**:
  A bulge at the base of a branch where it attaches to the trunk. It is formed by the annual growth of overlapping layers of branch and stem tissues.

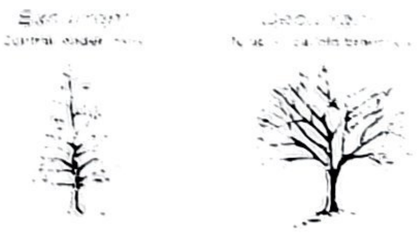
- **Crown Raising**:
  The removal of lower branches to provide clearance for pedestrians, vehicles, building, lines of sight, and vistas.

- **Crown Reduction Pruning**:
  The pruning method used to reduce the height of a tree. It is important to cut limbs back to side branches that are at least one-third larger in diameter than the diameter of the limb being removed.

- **Crown Thinning**:
  The method of pruning that increases light penetration and air movement through the crown of a tree by selective removal of branches. No more than one-quarter of the canopy should be removed.

- **Callus**:
  The bark-like growth that covers up pruning cuts. It consists of lignified, differentiated tissues produced as a response to the shock of wounding. Areas where this has occurred is often referred to as healed-over.

- **Decurrent Trees**:
  Trees that don't have a central trunk because of weak apical dominance. These trees have many lateral branches that compete with the central stem, resulting in a globe shaped crown. Maples, oaks, and elms are examples of decurrent trees.



- **Epicormic Sprout**:
  A shoot that arises from dormant buds. These ae also known as water sprouts when they occur on stems and branches, as suckers when they sprout from the base of trees. Radical pruning (topping) or severe defoliation often results in the formation of epicormic shoots on older wood.

- **Excurrent Trees**:
  Trees with strong apical dominance. These trees have a strong central stem and pyramidal
  shape, and the lateral branches rarely compete for dominance.

- **Flush Cuts**:
  Pruning cuts that are made between the branch bark ridge and/or the branch collar, and the trunk, causing unnecessary injury to stem tissue that is slow to heal.

- **Included Bark**:
  The bark enclosed between the branches that is formed when branches form a narrow crotch. This bark forms a wedge between the branches causing a weak attachment and will cause on of the stems to split the tree when it peels down.

- **Pollarding**:
  Originally used as a means of collecting firewood without having to cut down the tree, this old practice removes all of the previous year's growth on the trained branches annually, resulting in a flush of slender shoots and branches each spring.
  Pollarding is still used in some formal gardens but we advise against this practice since it makes many weak attachment points with the multitude of stems.

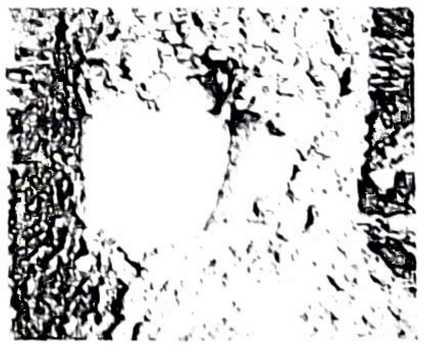
- **Stub Cuts**:
  Pruning cuts made too far outside the branch bark ridge or branch collar. When a stub cut is made, the remaining portion of the branch will die and become an entrance for insects and disease. Stub cuts are also called 'hat racks'.

- **Tipping**:
  The cutting of branches at right angles leaving long stubs in the top of the tree that is a poor maintenance practice used to control the size of tree crowns.

- **Topping**:
  A harmful maintenance practice often used to control the size of trees involving the indiscriminate cutting of branches and stems at right angles that leaves a few long stubs attached to the trunk. Synonyms include rounding-over, heading-back, dehorning, capping and hat-racking. Topping is often improperly referred to as pollarding.

- **Topiary**:
  A plant that is pruned and trained into a desired geometric or animal shape.

- **Woundwood**:
  Another term for the callus tissue formed when a tree is wounded by natural causes or pruning.



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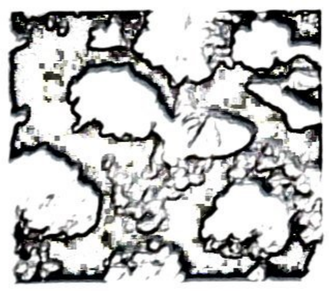
Hydrangeas: when to prune



Hydrangeas that bloom on old wood:
(least common in Nevada)

Bigleaf hydrangeas (Hydrangea macrophylla, Hydrangea serrata)
Oakleaf hydrangea (Hydrangea quercifolia)

Prune after the flowers start to fade in late summer

To determine if your hydrangea blooms on old wood, think about when it flowers. Shrubs with this characteristic generally begin blooming in early summer and peter out by midsummer, though sporadic blooms may appear afterward. These shrubs form next year's flower buds in late summer or early fall as the days get shorter and temperatures cool off. To reduce the risk of removing these buds, prune just as the flowers begin to fade. Often, the earlier you get it done after bloom, the quicker the shrub can recover, producing more and larger blooms next season.

To tidy up, remove old blooms

Gardeners who want to maintain a tidy appearance can snip off spent blooms just below the flower head and remove any wayward or straggly canes at the soil line.

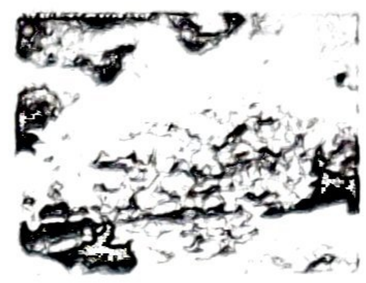
Don't prune these hydrangeas in the ground in late fall. Doing so removes buds of next year's flower buds.

To improve vigor, remove the oldest canes.

When a hydrangea gets old and woody, it can produce smaller blooms. Regular removal of a few of the oldest canes at the soil line can keep the shrub vigorous, producing large and abundant flowers. The same method can keep a shrub from getting too tall by targeting the tallest canes for removal

never cut a stem more than ½ way - otherwise

(more common in Nevada)

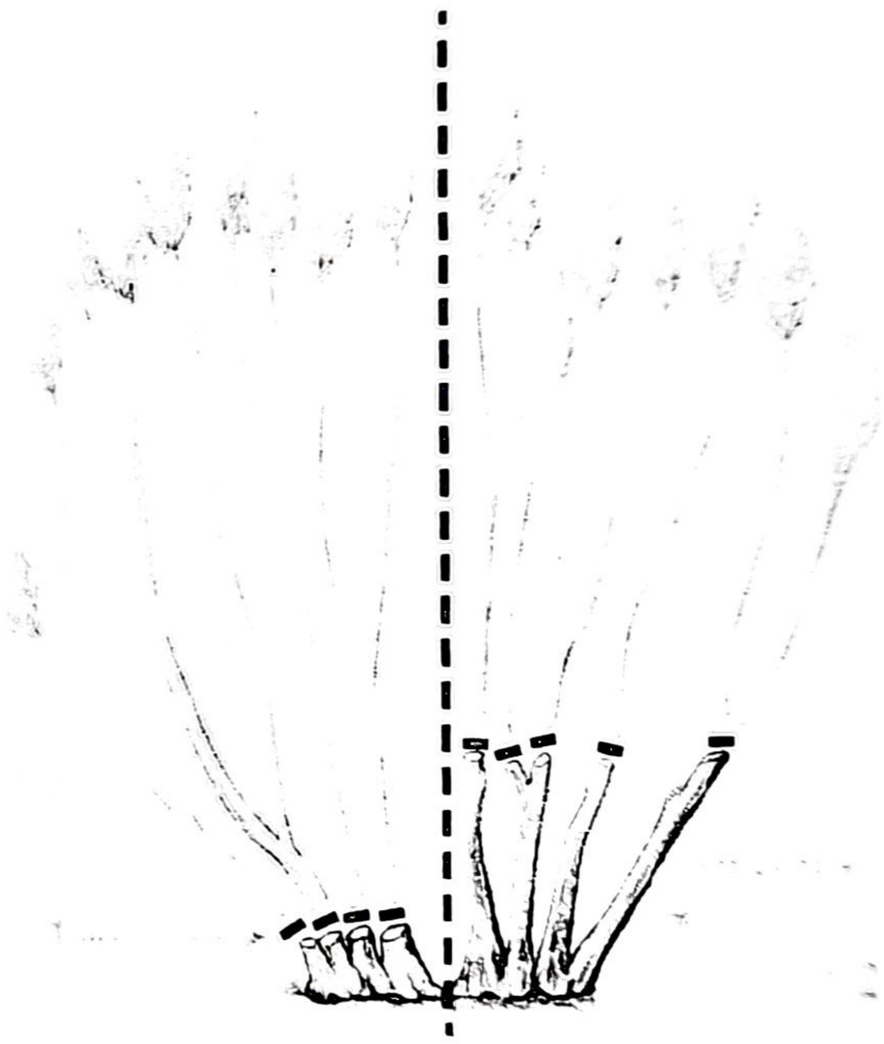


Panicle hydrangeas (Hydrangea paniculata)
Smooth hydrangeas (Hydrangea arborescens)

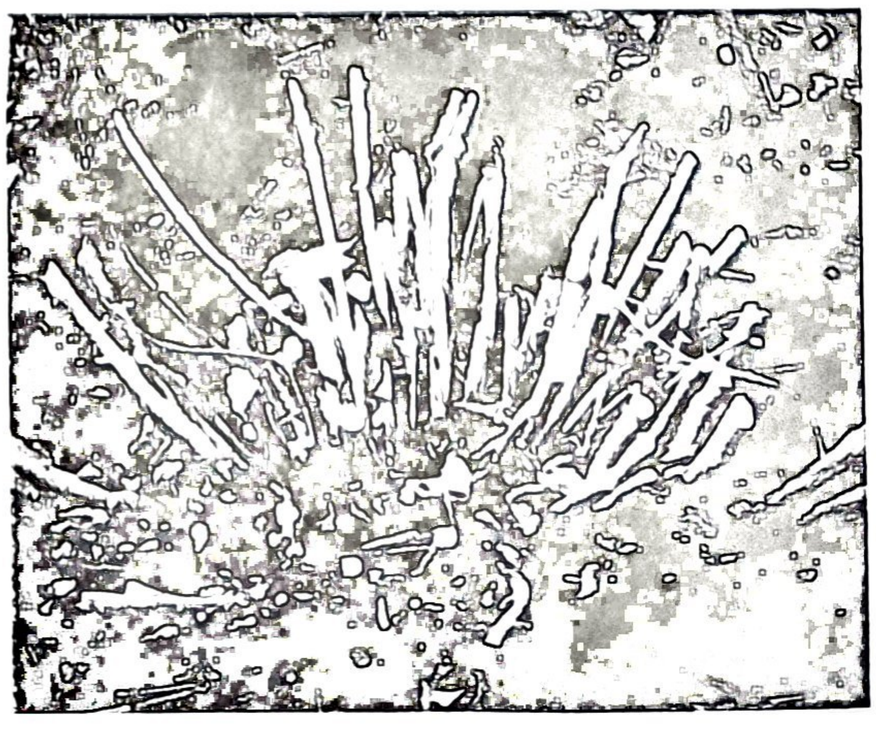
Cut back these shrubs in late winter before new growth begins

Because they need to grow and set buds the same year that they bloom, shrubs that flower on new wood generally start blossoming later than old-growth bloomers, beginning in midsummer and continuing until the first frost. These shrubs are forgiving if pruning is not done at a certain time as long as you avoid pruning when the flower buds are opening.

In late winter or early spring, these shrubs can be cut back to within a couple of inches from the ground. Smooth hydrangeas will produce much larger blooms if pruning hard like this each year, but many gardeners opt for smaller blooms on sturdier stems.
This method keeps the shrub in smaller size for the year, usually ranging in size from two to 5 feet tall.



Some hydrangeas' branches often fall over under the weight of their blooms, especially after overhead irrigation or after a good rain. One way to alleviate this flopping is to cut the stems to a height of 18 to 24 inches to provide a sturdy framework to support new growth.
This method is to be done especially on hydrangeas grown as a tree form (patio or on standard).



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All About

Pruning Evergreens

Evergreen plants can be divided into two broad categories: (1) Narrowleaf (needled) evergreens such as pines, junipers, spruce, yews, and (2) broadleaf evergreens like rhododendrons, hollies, and boxwood.

Form

The pyramidal form many of us want from our conifers results from their strong apical dominance. This means a single leader branch dominates and suppresses the growth of other shoots. Occasionally, two or more terminal leaders may become dominant, or the main leader grows quickly, making the tree look like it has a rocket shooting out the top. These conditions can make your lovely tree resemble a nondescript shrub. Extra leaders can also develop into branches that have poor attachment angles and are often the first to break in storms.

Certain plants may be grown for special purposes and may require special pruning. This would apply when formal effects are desired, such as clipped hedges, topiary, or espaliers.

Size control

In some ways, this is the weakest reason for pruning. If we plant the right tree in the right place, tree size should not be an issue. Almost all gardeners, however, have found themselves in the position where a tree grows faster than anticipated into other plants or buildings, and the need to keep that conifer in check arises. General pruning is best done in late winter or early spring just before growth begins. Needled evergreens are pruned May/ June before the new growth has matured. This helps cover any holes that were made while doing the pruning.

Health

Removing dead, diseased, or damaged branches should be done anytime a problem pops up and can be safely corrected. Removing branches that cross and could potentially rub against each other is important because these injuries can be an entry point for disease. Limbs that appear weak because of poor attachment angles (called a narrow crotch) should also be pruned away. As the tree grows, excess bark accumulates in the crotch. This results in weakness because, over time, more bark pushes on the limb forcing them further apart and less wood holds the branch to the trunk.

Rehabilitation

With few exceptions, conifers will not resprout if cut all the way back to the base, unlike many deciduous trees and shrubs. It is possible, nevertheless, to rehabilitate old, unsightly conifers with some drastic and creative pruning that can result in a new, pleasing look.

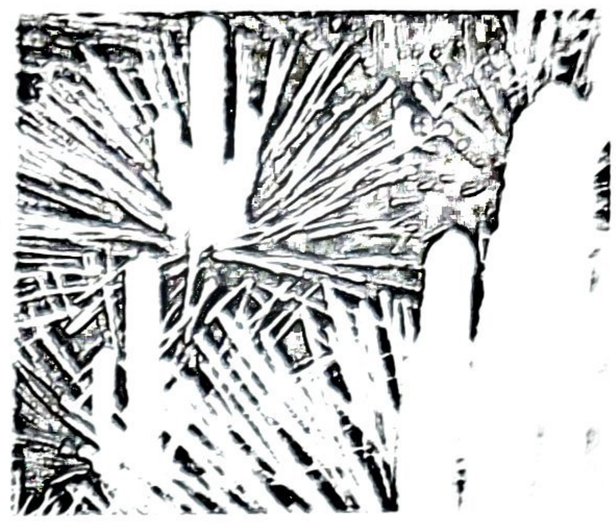
It is important to have the necessary tools in proper working order for pruning your plants. These tools should include hand pruners, loppers, hedge shears, and a curved pruning saw.

Determine branching habit

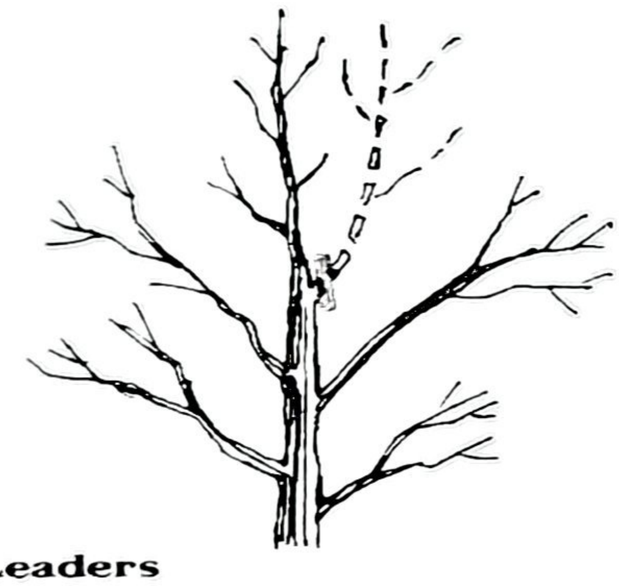
Conifers with whorled branches, such as pine, spruce, and fir, have layers of branches around the trunk. Species with random branching, such as arborvitae, juniper, yew, and false cypress, have limbs that occur all along the trunk.

needs winter water

Pinch candles Conifers have new shoots called "candles". To promote dense branching and shorter limbs, pinch candles before their needles lengthen and harden. On species with whorled branches, take care not to cut into older wood below the candle because these conifers have few or no dormant buds that can become new limbs. Removing just the tip of the new growth allows for quicker growth on that year's cycle, while removing half of the candle or more will result in a smaller denser plant.



Redirect growth Conifers with random branching habits can sprout new limbs from older, foliage-bearing wood. Prune into this wood, if necessary, to make the conifer more compactly branched or to change the direction of the branch. To redirect growth, prune back to a side branch that is growing in a more desirable direction. If pruning is needed it is best done in early spring. For a natural look, cut each branch tip back to a side branch to hide the cut. Avoid shearing after midsummer. Severely pruning an overgrown shrub will result in bare wood.



Double Leaders

Maintain straight trunk If two central shoots or leaders exist at the top of a pyramid-shaped conifer, remove one of them to maintain a straight, unforked trunk. If the central leader has died, create a new one by bending an uppermost limb into an upright position and securing it in place with stretchy fabric and a wooden splint. Remove ties when it can stand on its own.

Boxwood: Prune boxwood when actively growing. Pruning in winter can be slow to heal. If extensive pruning is needed, do it over a three-year period. They can be sheared into hedges or topiaries and lightly pruned as needed during the summer. Do not prune past late summer.

Rhododendrons & Azaleas: Prune just as blossoms fade, as buds for next year's flowers will set well before winter.

Hollies: During the dormant season (winter) is one acceptable answer, especially for holly bushes valued for their berries since many of us tend to trim off some of the branches for use in indoor displays during the holidays. But this can reduce flowering —and consequently, berry production—for the next cycle. So a compromise may be for some varieties of holly: prune in December every other year.

Yews, Junipers & Arborvitae: If the proper cultivars are selected, they should not need much pruning. However, they tolerate heavy pruning or shearing. A second light pruning in summer may be needed after a second flush of new growth

Prune Hemlock before new growth appears, ideally late summer or late winter.

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Grafting

What is Grafting?

The seed from a Haralson apple will produce an apple tree, but it will not produce a Haralson apple tree. Likewise. the seed from a Honeygold apple will not produce a Honeygold apple tree. In other words. fruit trees cannot be reproduced "true " to the original cultivar from seed. They can only be reproduced by grafting. Grafting describes any of a number of techniques in which a section of a stem with leaf buds is inserted into the stock of a tree. Grafting is useful, however, for more than reproduction of an original cultivar. It is also used to repair injured fruit trees or for topworking an established tree to one or more different cultivars.

By topworking you can do the following:

- An undesirable cultivar can be changed by grafting a preferred cultivar to the branches.
- Cultivars that lack hardiness or have poor-crotches (narrow angled) can be made more durable by grafting them on hardy, strong-crotched cultivars such as Hibernal, Virginia, or Columbia Crab.
- Pollinator cultivars can be grown much sooner by topworking than by planting young trees.
- New cultivars for trial can be brought into bearing in 2 or 3 years if topworked on stock of bearing age.
- Interesting novelties can be developed by grafting several cultivars on one tree.

A Glossary of Grafting Terms

Topworking – The operation of cutting back the branches and top of an established tree and budding or grafting part of another tree on it.

Understock or stock – the part on which the scion is inserted, the part below the graft.

Rootstock – That part of a tree which becomes the root system of a grafted or budded tree.

Scion – A piece of last year's growth with three or four buds; the part inserted on the understock.

Cambium – the growing part of the tree; located between the wood and bark. At the season when bark separates freely, cambium will be both on the wood surface and on the inner bark.

Dormant – The condition of live trees at rest – as in winter.

Budding – A type of grafting that consists of inserting a single bud into a stock. It is generally done in late July and August, the latter part of the growing season.

Budstick – A shoot of the current season's growth used for budding. Leaves are removed, leaving ½ inch of leaf stem for a handle.

Cultivar – Denotes a cultivated type of plant. (Now used in place of the term variety.")

What Trees Can Be Grafted?

Young, vigorous fruit trees up to 5 years old are best for topworking. Older apple and pear trees of almost any age can be topworked but the operation is more severe and those over 10 years old must be worked at a higher point. Hibernal, Columbia, or Virginia Crab, because of their 3 vigor and their strong, well-placed branches, are very good understocks. Young trees should have 1 to 2 feet of branch between the trunk and the graft. Otherwise the good crotch formation of the understock will be lost by the trunk expanding past the union.

Trees up to 5 years old can be grafted at one time. On older trees about half - the upper and center part only - should be worked at one time. The remainder should be worked a year later.

How To Collect and Store Scions

Scions are selected from the previous season's growth, while they are dormant, but before growth begins in the spring. If the scions are left on the tree until spring, however, there is some danger that the buds will start to grow or be injured during winter. Scions cut in November grow best in Minnesota.

The scions should be tied securely, carefully labeled and placed in moist (not wet) sawdust or moss or wrapped in plastic material. They should be kept in a cool, moist place where they will remain fresh and dormant until spring.

When To Graft

It is best to graft in the spring, from the time the buds of understock trees are beginning to open, until blossom time. The usual time is April or early May.

Tools and Materials Needed

1. Budding knife
2. Grafting knife
3. A fine-tooth saw for cleft grafting
4. Pruning shears
5. Dormant scions (cultivar labeled)
6. Tying material such as grafting tape, adhesive tape, electrician's tape or rubber strips
7. Asphalt water emulsion compound for covering grafts
8. A light hammer for bridge grafting
9. A cleft-grafting chisel and mallet, or a heavy knife or hatchet can be used for a small job

Protective Coatings

All grafts should be covered with a protective coating immediately after completing the graft.

Electrician's tape is an excellent material that will bind and protect graft unions. Choose a brand that is elastic and amply adhesive. A good tape for purpose will stick well to itself. Do not stretch this tape too tightly or it may crack or weather. Better brands will last throughout the first summer, after which the tape is no longer needed.

Asphalt water emulsion is now widely used as a protective coating on graft unions. It is of pasty consistency and can be applied with a brush. It is preferable, however, to smear it on thicker with a small paddle.

Methods of Grafting

The Whip Graft

The whip graft is used mostly on young apple and pear trees when the branches are relatively small (not more than ½ inch in diameter) and the understock is about the same diameter as the scion of the new cultivar.

Cut off a branch of the understock, leaving a stub at least a foot long. Make straight, slanting cut about 1 ½ inches long on both the scion and the stock (see A and C in Figure 1). Make the cut straight and even-one stroke with a sharp knife will do it. For the tongue, make a straight draw cut (not split), beginning near the top and cutting about the full length of the level (B and D).

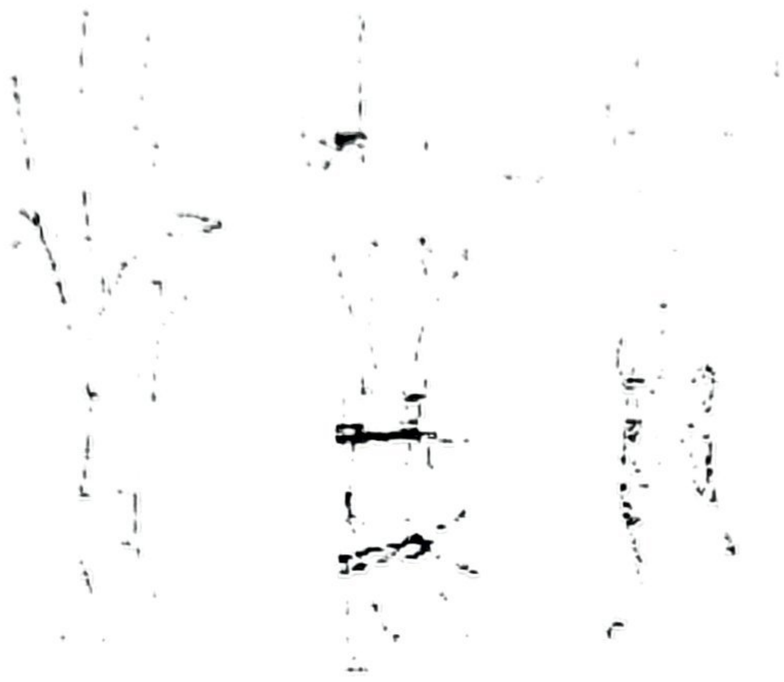


Figure 1. (above) The whip graft is usually used for grafting root stocks and scions but can also be used for grafting small branches.

Union – Match the two parts together (E). Unless the scion and stock are the same size, be sure the scion is in contact with inner bark on one side. If the toe of either the stock or scion extend beyond the heel of the other, cut it off evenly.

Tying and covering – Bind tightly with tape, then carefully cover the union and binding material with grafting compound.

This type of graft is difficult for the beginner but is used extensively by experienced operators. It lends itself to the tape method of binding. Tape serves to seal the wound and bind the parts together.

While other types of grafts depend on the bark slipping well, the whip graft does not. In fact, it is best if you make this graft before the narrow tongue of wood.

Aftercare – Remove wrapping as soon as the scion has started to grow to prevent girdling of the tree.

The Cleft Graft

The cleft graft is used for topworking older established apple and pear trees, either on the trunk of a small tree or on the side branches of a larger tree. It is best adapted to branches 1 to 2 inches in diameter. The grafts are made within 2 to 3 feet of the trunk or main branches and preferably not more than 4 to 6 feet from ground, or new top of the tree will be too high.

Cuts – Select a place free from knots and cut off the stock with a saw. Cut the cleft (avoid splitting if possible) with a grafting chisel, large knife or hatchet. After a few trials you will learn the proper depth of cleft. In horizontal branches, the cleft should be sidewise, that is, not perpendicular, to reduce breakage from birds and storms.

With a sloping cut about ¼ inch above the upper bud, cut the scions to include three buds, and to a blunt wedge about 1 ½ inches in length with one side slightly thicker than the other (see A and B in Figure 2). If the scion wedge is cut to a sharp point there is danger of the bark peeling. Also a sharp scion wedge will not fit the cleft as well (C).

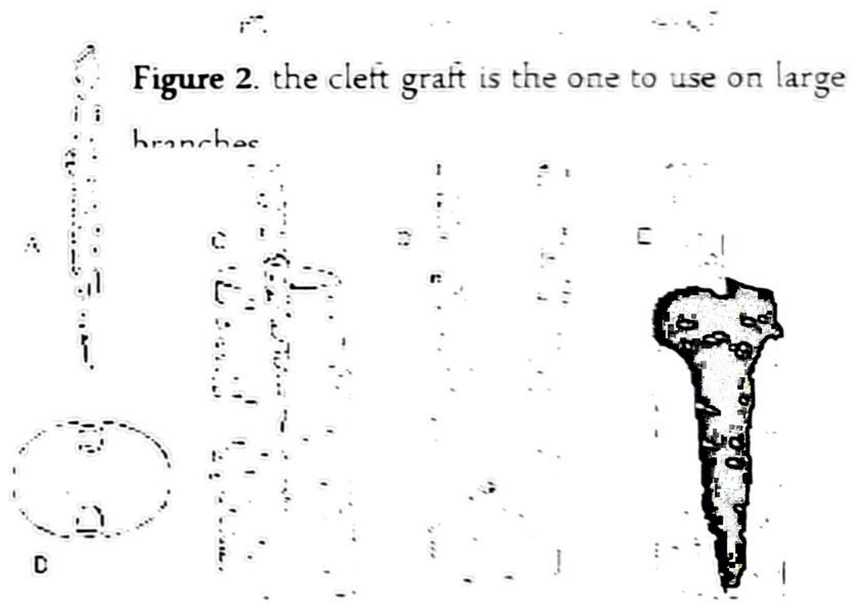


Figure 2. the cleft graft is the one to use on large branches

Union – Open the cleft slightly with a grafting tool or screwdriver. Insert a scion on each side, with the inner bark of stock and scion in contact. Have the thick side of the scion outward (B).

Keep in mind that the bark of the larger stock is thicker than the scion bark, so the scion should not be flush with stock. A very slight tilt will ensure contact, at least where the cambium layers cross (D).

Tying and covering – There is no need to tie, unless the stock is small and does not bind well. Cover the unions with grafting compound and be sure the cleft is covered its full length (E).

Aftercare – Scions that are growing vigorously will need attention to prevent breakage by birds, ice and storms. Either tie the scion to a supporting brace (see B in Figure 3), or pinch back the tips before growth becomes excessive. For additional support, circle all the shoots from one stub with twine (A).

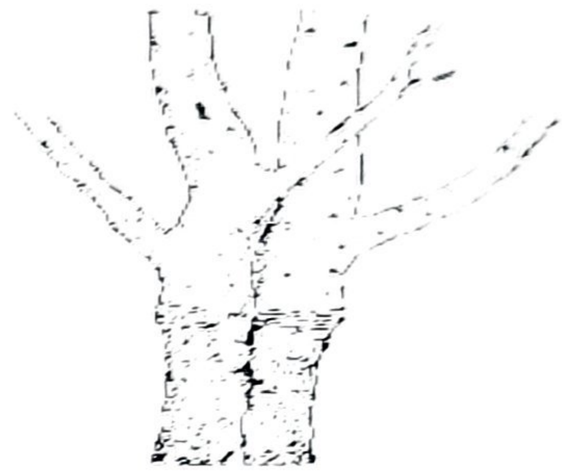
Figure 3. In this example of a cleft graft, three stages in the growth of a branch from a scion are shown. During the first season, let all scions and shoot growth from below the graft grow undisturbed. However, do not permit this understock growth to shade out the scions. The second spring, select the most suitable scion as the permanent branch and consider the others as spares. Leave the spare scions to assist in healing over the stub but cut them back to a few buds on each (see B). The third spring, severely cut back the spare scions again. In the fourth season, or when crowding is noted, cut off all of the spare scions as seems necessary (C).

Don't let two leaders compete.→

Figure 4. Trouble ahead in the next storm.

The Modified Cleft Graft

Instead of trying to master the whip graft or side graft, use a simple kind of cleft graft on small understock. Stock (see B) about the same size as the scion (A) may be split and a wedge shaped scion inserted.



Should the stock be larger than the scion, be careful to set the scion to one side instead of on center (C). In this way the cambium of stock and scion will make contact.

Wrap this graft union (D) carefully with a good grade of rubber tape. As the graft grows the tape stretches and eventually deteriorates.

Very large trees are generally poor subjects for cleft grafting, so when grafting their large branches, a slightly different method is ordinarily used.

Carefully saw off the branch undercutting it first to avoid tearing the bark. You may need to recut the stub to get it smooth. Saw the branch to receive the scions, instead of splitting it.

Make two saw cuts about 4 inches deep at right angles to each other across the end of the stub, making a + shape. Then fit the scions into the four places made by these cuts.

The Side Graft

Although the side graft is adapted to a wide range of branch sizes (1/4 to ¾ inch diameter), its use is generally restricted to branches that are too large for the whip graft yet not large enough for the cleft graft. As the name suggests, the scion is inserted into the side of the stock, which is generally larger in diameter than the scion.

Cuts – Select a smooth place on the understock branch at least a foot from the trunk. Make a slanting cut at a narrow angle almost to the pith (core of the branch) (see B in Figure 5). Cut the scion to a short, sharp wedge (about 1 inch) with one side thicker than the other (see A).

Figure 5. In the side graft, the cut goes across the grain to reduce splitting.

Union – Bend the branch slightly to pen the cut. Press the scion in so the cambium layers of the stock and scion meet at one side (C).

Tying and covering – Tying is unnecessary if the stock binds well, but you may have to tie small materials if the scion is not held firmly. Cut surfaces should then be covered with grafting compound (E).

Aftercare – In about two weeks, cut off the stock above the union (D) using sharp shears in order to avoid disturbing the scion. Then cover the cut surface with grafting compound (D).

If the graft has been tied, cut the binding shortly after growth starts; this will prevent girdling. In the first season, you may allow some shoot growth from below the graft, but do not permit this growth to shade the scion growth. After the first season, all growth should be cut off, except that of the graft.

Inspect grafts during growing season to guard against faulty covering or binding. If shoots are attacked by fire blight, cut them 6 inches below the visible symptoms.

Budding

Budding is a form of grafting in which a single bud is used as a scion rather than a section of stem. It is the most commonly used method for fruit tree production in the nursery, but can also be used for topworking plum, cherry, apricots, and peaches as well as young apple and pear trees. (Cherry, plum, apricot, and peach are not easily cleft grafted or whip grafted.)

Budding is done in the summer, usually from July 15 to August 15, when the bark of the stock slips easily and where there are well-grown buds. The first step is to cut bud sticks of the desired cultivar from strong shoots of the present season's growth. These buds should be mature, as indicated by a slightly brownish color.

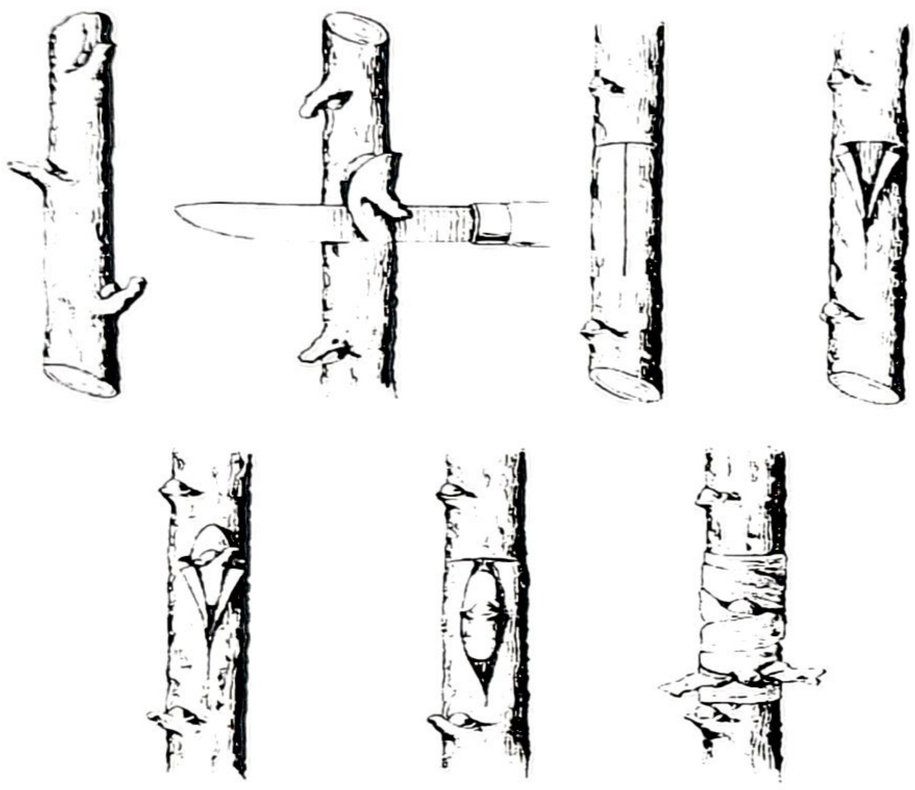


Figure 6. In budding, a single bud does the work of a scion

Clip off the leaves as soon as the bud sticks are cut, leaving about ½ inch of the leafstalk for a handle. Discard the soft tips of the bud sticks. Wrap the bud sticks in moist burlap, moss or paper to prevent drying out.

Branches from the size of a lead pencil up to ½ inch diameter may be worked by this method. The bark of larger branches is too thick for satisfactory budding.

Cut – On the branches of the stock, about 15 inches or more from the trunk, make a T cut just across the bark. Then, with a knife blade or bark separator, lift the corners and carefully loosen the bark.

BUD WITH WOOD ATTACHED

Cut a bud from bud stick which includes a thin piece of attached wood. Start the bud under the flaps of bark and lead it down by the handle (see figure 6).

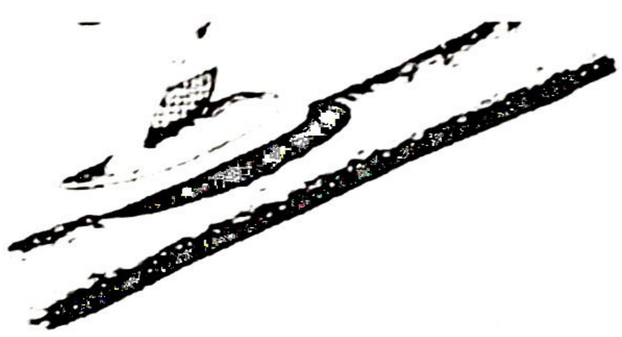
Tying – Use rubber strips, electrician's tape, or adhesive tape to tie the bud. Wrap and tie tightly but be sure you do not cover the bud (see figure 6).

Aftercare – Cut the tie before it binds too tightly – that is, in two or three weeks. Cut on the side away from the bud. Rubber strips need not be cut. The bud should remain dormant until the following spring. Cut off the stock above the bud as soon as the bud starts growing.

Do not permit any shoot growth.

After the second year, remove all extra growth from the stock, that is, keep only the bud grafted shoots. When two or more buds grow, all can be used, but one is usually enough to produce a new branch.

BUD WITH WOOD REMOVED



As illustrated, cut from well under the bud. Remove the knife and rock the blade just through the bark. Grasp the bark between your thumb and finger and pinch the bark with attached bud free from the wood. If the bud stick is fresh and in good condition, you will be successful after a few tries.

Buds which have the sliver of wood removed have a complete cambium surface exposed to meet the cambium of the stock and sometimes result in better growth, but they are not rigid enough to handle easily.

Buds with wood attached are easier to handle and usually give good results. (See above, for "**Tying**" and "**Aftercare**" of the bud.)

The Bridge Graft

When the bark of a tree is removed (girdled) completely around the trunk, that part of the tree above the damaged area will die. Even though completely girdled, some trees may leaf out and remain alive for one season, but both the top and root will die the second year unless shoots have been produced below the girdled areas.

Girdling can be caused by rodents, which damage many fruit trees each year. Occasionally a tree may only appear to be girdled if the gnawing has not gone through the bark to the wood. Sometimes the girdled area extends less than halfway around the trunk, and such injuries are protected from drying out, new bark will grow from the cambium. As soon as you discover an injury, cover it with an asphalt grafting compound.

Rabbit damage is usually some distance above the ground or snow line. These animals cut off twigs and pull off bark in shreds. Mice work near the ground out of sight under grass or snow. They usually begin at one spot and enlarge it. Pocket gophers gnaw off roots below the ground. Trees hurt in this way often tip over and cannot be repaired.

The following supplies are necessary to repair girdled trees:

1. A sharp knife, such as a good jackknife.
2. Small nails for tacking scions to the tree
3. A light hammer
4. A nail set
5. A saw for trimming old thick bark
6. A shovel or trowel if damage is below the ground
7. A heavy scrub brush for cleaning excavated bark
8. Dormant or fresh cut scions for bridges
9. Asphalt grafting compound or asphalt wound dressing

Scion – Scions for apple trees may be taken from any hardy cultivar of apple or crabapple. Pear scions must be used for pears, plum for plums, and so on. Old trees rarely produce good scion wood unless they were pruned well the previous year. If 1-year-old wood is not available, 2-year wood may be used. If you can anticipate the need, you should cut the scions before any growth begins. Keep them in moist and cool storage. You may cut the scions fresh as needed, if you bridge promptly before shoot growth begins.

Small Tree – Apple and pear trees under 2 inches in diameter are too small to bridge. The swaying of such small trunks by strong winds will dislodge the scions. If the tree is under 1 inch, it is best to saw it off just below the girdle, then cover the cut with asphalt wound dressing or grafting compound. Shoots of the same cultivar probably will grow out from above the place where the tree originally had been grafted. Trees between 1 and 2 inches can best be treated by cutting or sawing them off below the injury in the spring and placing scions in the stubs by cleft grafting. Cherry and plum trees usually are not bridge grafted successfully. If they are only 2 or 3 years old, cut off below the injury and a new shoot will grow out from above the place where the tree originally had been grafted.

How to Bridge Graft – Bridge grafting is done in the spring after growth has started when the bark of the tree to be repaired will lift readily (slip) from the wood – usually between April 15 and May 15.

The first step is to trim the bark of the girdled trees both above and below the girdle. Cut back damaged or frayed bark an inch or so to sound bark. The edges should be clean and smooth. Scrape down old rough bark to live bark.

Two methods of setting scions are used: (1) the **L-cut**, best for trees with thin bark, and (2) inlay, for trees with thick bark.

To make the L-cut, start at the edge of live bark and cut a slit about 2 inches long in the bark below the girdle (left side in Figure 8). Lift the edges with a dull smooth tool. Such a tool can readily be shaped from hardwood or a piece of plastic. The rat tail of a comb is good for this purpose. *Do not use the scion to lift the bark.*

Prepare a second slit at the upper side of the girdle directly above the first.
Shape the scion on the lower end and measure against the girdle to determine the length of the scion. Shape the upper end of the scion to a definite taper with a longer flat surface next to the tree. Slip the ends under bark, nail them in position and nail down the flaps of bark. In nailing either scion or bark, use care to avoid crushing the bark. A nail set will help to avoid injury to the bark.

The **inlay** method (right side of Figure 8) is the best bridge grafting technique. In fact, it is a necessity for a short span. Select a curved scion to make in inlay bridge. Measure the distance to be spanned and make the scion long enough to extend 1 ½ to 2 inches beyond the girdle at each end. Cut a straight, smooth face on each end.
Place a nail in each end. Tack this lightly to the tree bark to mark the place. Mark around each end on the bark to get the exact size of the scion. Remove the scion, cut to the wood on the marks, and lift out the piece of bark. Then fit the scion in the channels in the bark and nail carefully. One nail is usually enough.
In either grafting method, place a scion every 1 ½ to 2 inches around the tree.

Figure 8. Two methods of bridge grafting (**L-cut on the left and inlay on the right**) are shown. The scion on the left is inserted under the bark at each end: the scion on the right is laid in a groove at each end.

There is a third method to insert scions in bridge grating, as shown in Figure 9. Little or no trimming is done to the bark that borders the damaged area. This is a little less tidy and it requires somewhat longer scions but is quicker and equally effective.
Covering and care – When all the scions are in place, the graft unions should be covered with grafting compound. Note that the entire girdled surface should be covered and more than one coat may be necessary.
In bridge grafting, after the scions begin to grow, it is important that shoots or leafy growth be cut or rubbed off the scions.

Figure 9. A quick way to bridge girdled trees.
Scions are cut and inserted essentially the same as in Figure 8.

How to Protect the Graft

Immediately after completion of the graft the scions should be protected from drying out. Usa grafting compound on the graft unions and other cut surfaces.

Some Reasons Why a Graft Fails

1. The scion and stock were incompatible; apple will not unite with plum, for example.
2. The grafting was done in the wrong season.

3. The understock was not healthy.
4. The scions were not vigorous.
5. The scions were dry or injured by cold temperatures.
6. The scions were not dormant.
7. The cambium of scion and stock were not meeting properly.
8. The scions were upside down.
9. The graft was improperly covered with grafting compound.
10. The scions were displaced by wind, birds or storms.
11. The graft was shaded too much after growth began.
12. New growth was damaged by aphids or other insects.
13. New growth was killed by fire blight.
14. The union girdled because the bindings or label were not released in time.

What if Grafts Fail?

One hundred percent success in grafting is rare. The failure of one or two scions is not serious, since usually more scions are inserted than are necessary for the completed tree. On branches where the scions fail let the shoots grow. These can be budded the same summer or grafted later. Some shoot growth is needed for regrafting, but don't let them become so dense that they crowd the scions.