



PRUNING DECIDUOUS SHADE TREES

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Trees in the wild are never pruned, yet they often have long healthy lives. In a natural setting, their branches develop a balance and form typical of the species. It is when trees grown in un-natural settings (nurseries) are brought into an urban situation that correct pruning becomes so important. Pruning is both a skill and an art.

The pruning principles discussed in this publication have proven to provide the best possible outcomes including tree longevity and safety. Although trees may live for years following improper pruning their life span and safety may be severely reduced. We encourage proper pruning so that the trees we care for may bring us pleasure for many years.

Many reasons for pruning are born out of planting the wrong tree in a specific location. Choosing “The Right Tree for the Right Place” can greatly reduce future problems with unwanted limbs.

Why prune a tree?

There are only a few valid reasons to prune a tree in the urban landscape:

- Promote tree’s health
- Reduce hazards to people
- Train a young tree
- Increase or decrease flowers/fruit

Identify the purpose for pruning your deciduous shade tree. Resist pruning because the tree is growing rapidly, or because the neighbors are working on their trees. Understand that pruning always causes a wound and always results in some response in the tree:

- Loss of foliage and ability to create food from sunlight
- Potential entry points for decay organisms
- An increase in sprouting
- Reduced or increased vigor
- Susceptibility to insect problems

Decide whether the desired benefit will override the negative effect on the tree.

When to prune a deciduous tree

In general, pruning has a greater benefit if it is performed while the tree is young. Wounds are smaller and recovery is more rapid. This document will discuss pruning young trees and older trees separately.

Deciduous trees are those that lose their leaves and go through a dormant period in response to cold (and sometimes drought). The best time of year to prune is during this **dormancy — when all of the foliage has dropped**. Generally this occurs from mid-December to the latter part of January.

All pruning should be done before buds show evidence of swelling. Why?

- Less likelihood of tearing bark
- Less likelihood of dripping sap
- More time for recovery before bud break
- Easier to see branch structure
- Less likelihood of stimulating unwanted growth

Equipment needed for pruning

Limbs of various sizes will be removed during pruning. Matching the limb size to the hand tool will improve efficiency. Buy the best tool you can afford. In general, you get what you pay for.

For limbs over one inch (2.5 cm) in diameter, use a **pruning saw**. There are several available styles. High quality forged stainless steel is strongest. Those with blades on both sides of the teeth will cut efficiently on both forward and backward strokes. Models with blades that narrow at the end will allow easy access to tight spots.

Pruning loppers are convenient for limbs that are about the size of a finger. Blades that cut like scissors (“bypass” type) will make cleaner cuts. Models are available that have gears for efficient movement, hollow handles for reduced weight, and high quality steel blades.

Hand **pruning shears** are best for branches less than 1/2 inch (1.25 cm). Left handed-versions are available. Those with bypass blades, and handles that fit the hand will cut

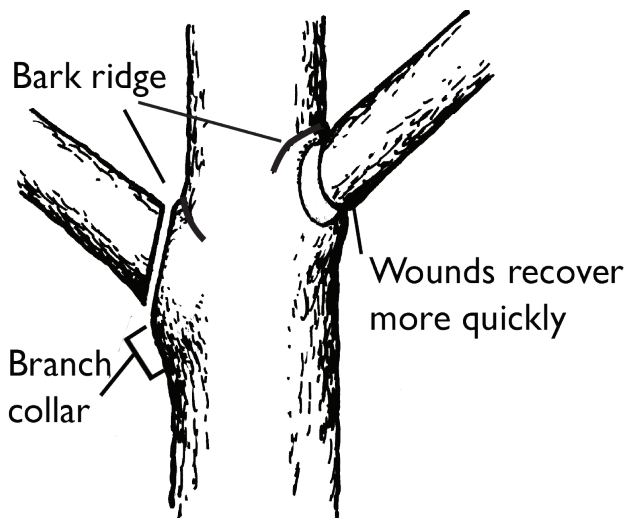


Figure 1. Natural Target Pruning.

efficiently with less effort. Hand pruners are the first choice when pruning because they do the least amount of damage to the tree. Use them when trees are young to direct growth for proper canopy development reducing the need for saws and loppers when trees are older.

There is always the possibility of spreading a disease from one plant to another. When pruning several plants, it is wise to disinfest your tools between plants. Dip or coat the blades with a 10% bleach solution or with alcohol. After using pruning tools, thoroughly wash, dry, and coat the blades with a film of light oil to prevent rusting. If kept sharp and clean, good tools will provide years of service.

Proper technique

Rapid sealing off of pruning wounds depends upon where the pruning cut is made. Most trees produce a corky ridge at the juncture or crotch of a branch; this is called the **Branch Bark Ridge**. At the base of a limb is a ring of growth; this is called the **Branch Collar**. The pruning cut should be made just outside a line connecting these two points. This technique is called Natural Target Pruning, and it minimizes problems in recovery. See Figure 1.

If a tree does not produce the characteristic branch collar or ring of bark, make the cut so that the angles between the vertical line of the tree and the bark ridge are the same as the angle where the cut should be made. See Figure 2.

Large heavy limbs over 2" in diameter should be cut in a 3-step process as shown in Figure 3. Sharper tools make **cleaner cuts**.

Do not apply pruning paint; wounds have been found to recover more rapidly in the open air.

Pruning/training young trees

(first 3 years on the site)

Proper pruning when the tree is young will result in a mature tree that is structurally stronger, lives longer, requires less pruning, and is less costly to maintain.

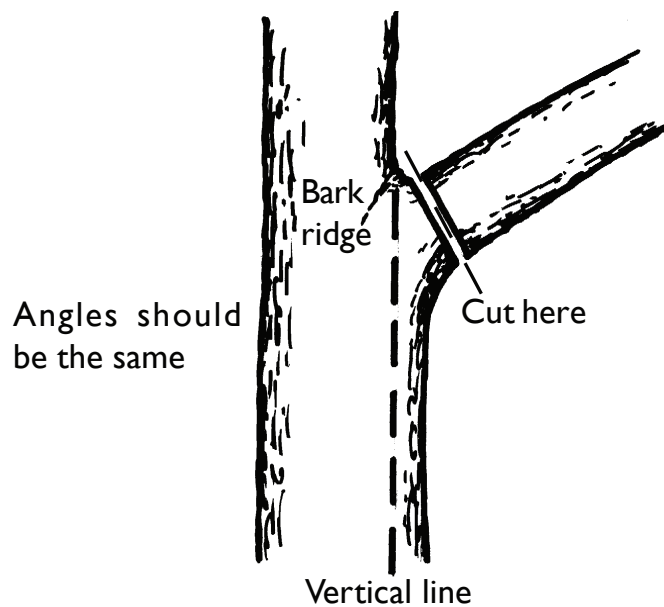


Figure 2. Angle to cut if the Branch Collar is not evident.

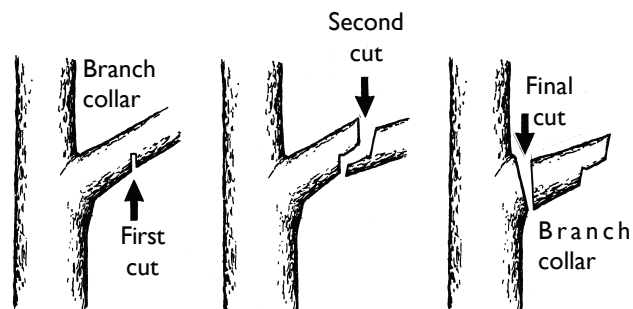


Figure 3. Three cuts are necessary to remove large limbs. This procedure prevents bark from stripping down the trunk.

A. Pruning Your Tree At Planting Time:

There is no need to prune a newly-planted tree unless branches have been damaged or if major defects in form are present in branches greater than 1 inch in diameter. Major defects include: multiple central leaders, branches with included bark, rubbing branches and water sprouts and suckers. It has been found that removing tips and buds of young trees slows root growth. If trees are left unpruned, expanding buds and new leaves help root expansion and tree establishment. Damaged branches can be removed at their point of origin, or they can be cut back to a lateral branch that will provide foliage and help establishment the first season.

B. Young Tree Health And Structure:

A word of caution: different tree species grow at different rates. Your tree may not seem to be adding any height or spread for the first year or so. Check the irrigation design and frequency, keep the soil mulched, and avoid compacting the root zone. Resist the urge to prune a young tree simply to "force" new growth. Such growth is weakly attached, rarely

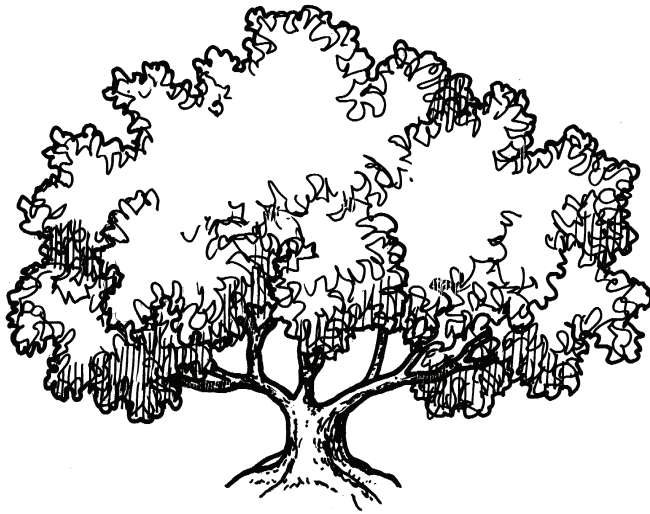


Figure 4. Wide-spreading tree.

looks good, and will require additional maintenance later in the tree's life. Conversely, overwatering and overfeeding a young tree may result in fast growth that appears to need pruning each year. Cutting back on irrigation after the first summer, particularly if the species is adapted to your climate, can slow growth and maintain a more balanced tree that requires less maintenance.

Know the **species' natural form**. Many deciduous trees, including most desert trees, have a rounded spreading shape with no single central leader. See Figure 4. The lateral branches grow as fast or faster than the main trunk. Do not try to force a rounded species into a tall narrow shape (or a tall species into a rounded shape!)

Rounded spreading deciduous tree species may naturally form **multiple trunks**. These can be very attractive and provide much needed shade. To develop a multi-trunk tree in a species that naturally has low branching, allow the secondary trunks to arise close to the ground with wide branch angles. If several trunks all arise from the soil, choose 3 or 4 of the largest, removing the smaller ones.

Early in the tree's life, decide between closely spaced **scaffold branches** (large branches that form the main structure). Try to visualize how the tree will look as it thickens in years to come. Know the natural form of the species. Remember — branches do not slowly rise with time! As a tree grows, branches retain their position on the trunk, though they increase in diameter and become more crowded. Spacing scaffold branches radially and vertically allows growth to be channeled where it will be more effective. See Figure 5. No more than 1/4 of the canopy should be removed at any one time. Depending on the tree's growth rate and branching structure, this training may take several years.

During the tree's first 3–4 dormant seasons, keep an eye on the water sprouts (vigorous upright shoots from a branch), suckers (vigorous upright shoots from below the soil level),

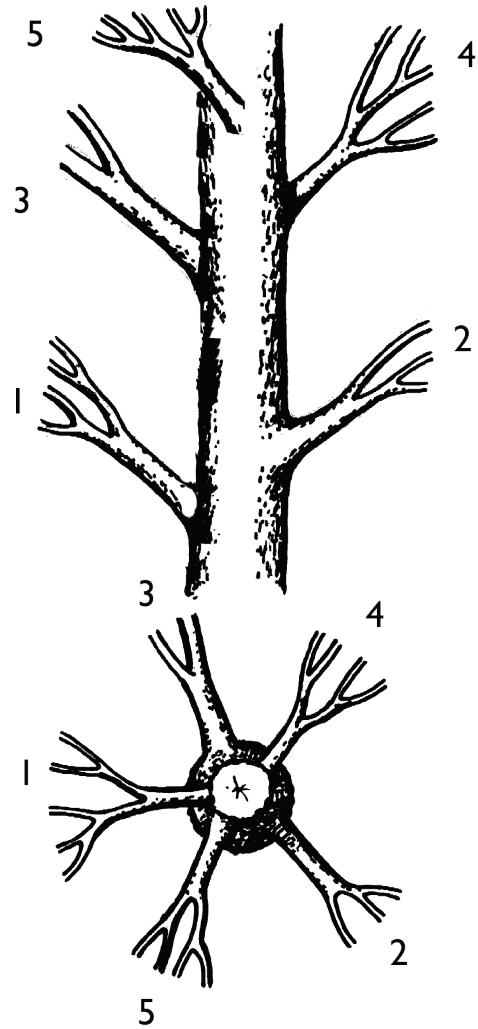
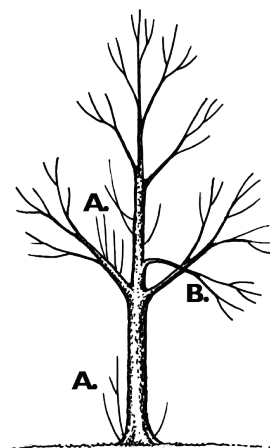


Figure 5. Scaffold branches require proper vertical and radial spacing on the trunk.



A. Water sprouts and suckers

These sprouts can occur at the base or inside the crown. They are rapidly growing, weakly attached, and upright. Usually they use more energy than they return to the tree.

B. Rubbing branches

Branches that rub result in wounds, decay and notches. Remove one of the offending branches.

Figure 6. Water sprouts, suckers, and rubbing branches..

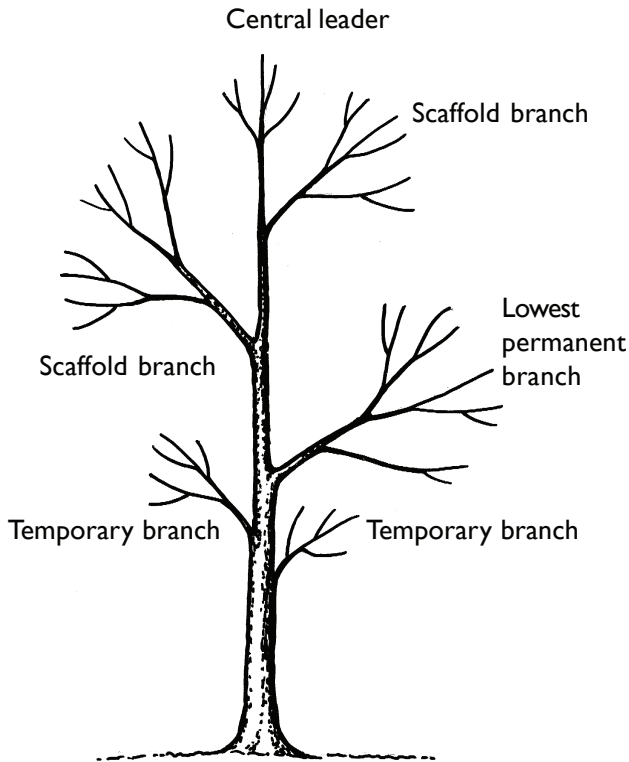


Figure 7. Temporary branches.

and rubbing branches. See Figure 6. These should be pruned at their points of origin. Again, cut cleanly just outside the branch collar.

Should **small branches covering the lower trunk** be removed? Not completely. Cutting off lower trunk branches does not “force” growth of the top, and may result in more sprouting from the cut area. It has been found that small branches along the lower trunk provide hormones and food for trunk expansion and stability. Leaving them intact, or only trimming back slightly will help the trunk develop taper and strength during early years. See Figure 7.

Note of caution: The longer temporary branches are left on, the larger the wound when cut.

Most tree species form secondary branches at regular intervals along the trunk and scaffold branches. Removing branch ends or tips usually causes a proliferation of buds to break open down the stem, resulting in a “bushier” form that will need more attention in future years. If one branch is longer than the others, prune it back to a side branch that’s headed in the right direction. Do not shear the tips of tree branches.

Likewise, “topping” or severely heading back large branches causes large wounds and severe stress to the tree. This practice results in a proliferation of sprouts that all originate from the same area, are weakly attached, and will need extensive care in future years. Topping is extremely detrimental to any tree species.

Some trees that are planted in pedestrian areas may more easily survive in the sites if their lower scaffold branches are at

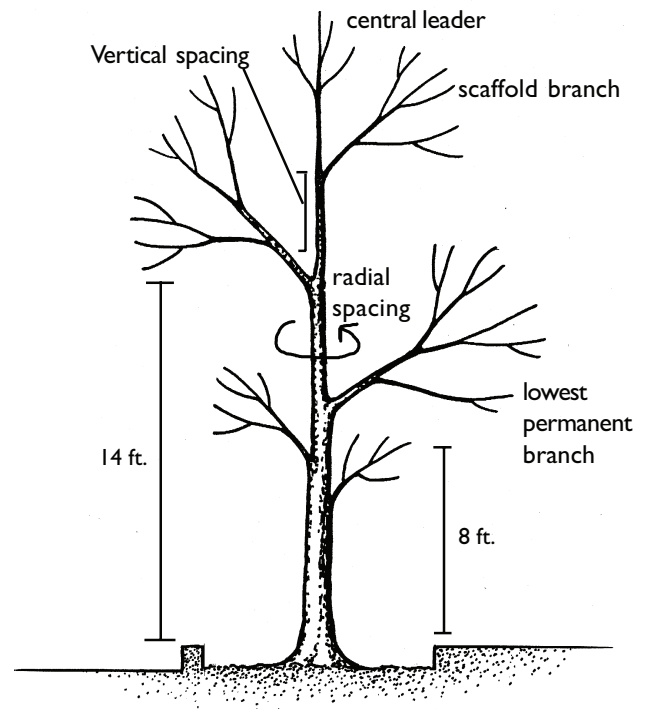


Figure 8. Pedestrian space below crown.

least 8 ft above the ground. See Figure 8. This is called raising the crown, and is best done gradually; i.e., prune one scaffold branch each year over several dormant seasons, rather than removing them all at once. The lowest permanent branches should have wide angles and be less than half the width of the trunk at the point of attachment. Clean cuts just outside the branch collar will allow more rapid recovery. See Figure 1.

Pruning older trees (longer than 3 years on the site)

A. Form and Health of the Tree:

Trees growing in native habitat develop natural forms even though they were never pruned. There may be some defects: large limbs may be rubbing against each other, limbs may be crossing over to the opposite side or there may be sprouts arising on the main trunk or near ground level. Even with defects present, these trees have stabilized branch structures and they normally withstand strong winds. Their graceful forms are more attractive than severely pruned trees in home yards.

If your older tree has never been pruned, this doesn’t mean it needs to be. Walk around the tree and carefully observe limb placement. Look for obvious defects on larger size limbs: narrow angles that have included bark (a buildup of bark within the angle), branches originating too close together, or rubbing or crossing branches.

Branch angles are important. Narrow angles are more prone to splitting because included bark cells do not join together. Angles that are closer than 60° will cause problems later on.

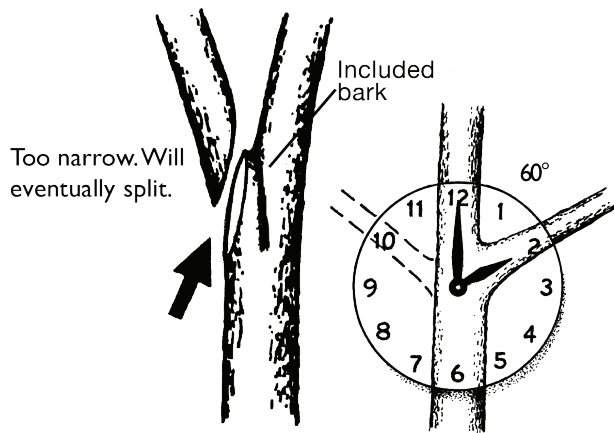


Figure 9. Narrow branch angles. Narrow branch angles are often accompanied with included bark.

(See Figure 9.) Remove the smaller or least desirable branch by cutting outside the Branch Collar.

Large scaffold branches should be evenly spaced throughout the tree. If two branches originate from points less than about 12" (30 cm) from each other, they will only put stress on the trunk as they increase in girth. Decide if two or more branches are originating from the same point on the trunk. Choose the one with the narrowest crotch angle, or the most internal one and remove it. If there are several troublesome branches, take the one that will leave the smallest void if removed.

If two limbs are paralleling each other too closely, the least desirable one should be cut at its point of origin. Try to visualize the appearance of the tree if one or the other is removed. Which one is best placed? Which one will leave the smallest void if removed? Which one will leave the smallest wound? If the branch is larger than about an inch, use the 3-step method as shown in Figure 3.

The same procedure should be used if two large limbs are rubbing against each other. Study the placement of each and then remove the least desirable one.

After removing these undesirable limbs, **STOP and re-evaluate**. If you are tempted to severely prune, remember this: trees with natural forms are beautiful and healthy. By removing only those limbs that threaten sound structure, you will have a tree that surpasses those in nature. Severe pruning destroys the natural form and causes trees to develop shapes that are completely different than nature intended. More importantly, from a health standpoint, removing more than 1/4 the total amount of the live wood at any one time causes significant stress and reduced photosynthetic ability as the tree recovers.

Remove only limbs that cause problems and allow the tree to develop a natural growth habit. Few pruning cuts will be made; sunlight will filter through the foliage, reducing leaf drop, the bark will not burn from sudden exposure to sun, and wind will pass through the tree without threatening breakage.

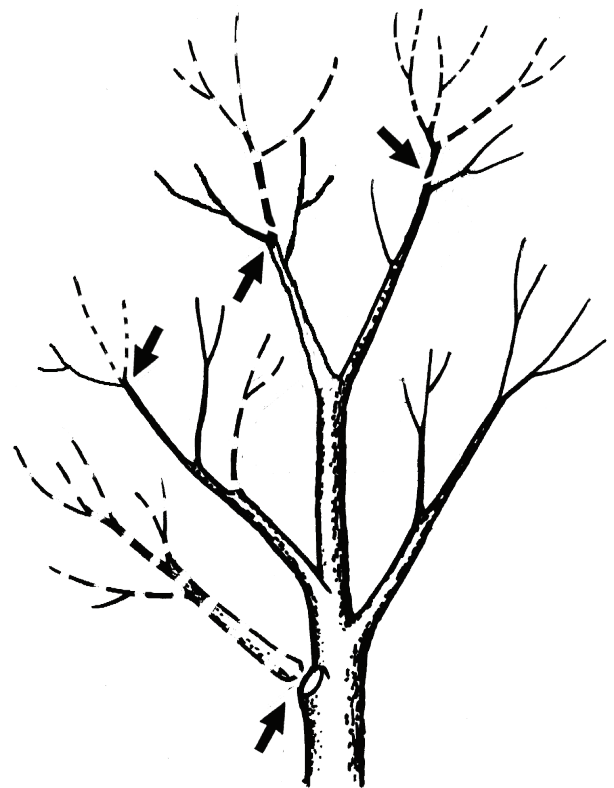


Figure 10. Cutting back to a lateral branch.

B. Reduction of Height and Width:

Reduction of height or width may be necessary, but it is also possible that the tree has been planted in the wrong site. If the natural form of the species includes a wide spreading canopy, it was the wrong choice for a narrow walkway or close to a building. The landscape might be improved by removing the tree and replacing it with one that has a more narrow upright form. Likewise, if the species typically makes a tall narrow canopy, it is the wrong tree for under power lines or roof overhangs.

As a one time effort, however, a limb or the central leader can be removed to **reduce the height** or redirect growth from interfering with a building. See Figure 10. Be aware that, depending on the species, the tree may respond to the cut by putting forth more growth than what was originally there. This is particularly true in attempts to reduce the height. A professional tree care expert should be consulted for help with reduction in height. See Arizona Cooperative Extension Publication # AZ1003: *How to Hire a Tree Expert*.

Before removing lateral branches to **reduce a tree's width**, remember your goal is to prevent regrowth from the wound. Always attempt to cut back to a side branch, or to the point of origin. See Figure 10. Either of these choices will discourage development of numerous new limbs that are weakly attached. Cut back to a branch that is at least 1/3 the diameter of the part that's removed. Heavy branches should be cut in 3 steps as shown in Figure 3.

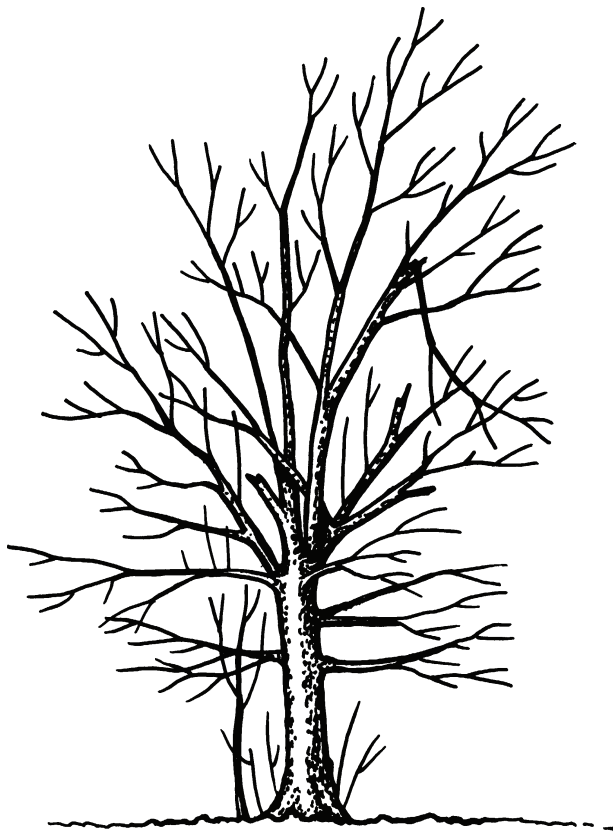


Figure 11. Tree that has been neglected.

Trees often suffer limb breakage during severe wind storms. Removal of heavy, large limbs should be left to professionals. Cut limbs do not always fall in the intended places and serious damage to home or body is always a hazard. Smaller broken limbs resting on the ground can be removed with little danger. Can a fractured limb be lifted and wrapped and heal itself? NO. Trees do not heal the way bones do.

C. Pruning to Increase Flowering or Fruiting:

Older trees of low vigor can be induced to produce more flowers. When problem branches are thinned out, the branches remaining have more available light and nutrients. Typically, flowers on wood produced after the pruning will be larger or more numerous. Species that flower early in the spring on last season's wood should be pruned after the bloom season. Species that flower later in the season, on wood formed the current year, should be pruned during the dormant season.

Pruning or ruining?

There is an old saying among professional arborists in connection with tree pruning, "If in doubt, don't prune."

Nature has a unique way of allowing trees to develop natural forms that balance shoot growth with root zone health. When this natural form is destroyed, trees will react accordingly — by producing rank, weakly-attached growth, elongation of existing shoots, reduced vigor, increased susceptibility to insect or disease problems, or consumption of stored carbohydrates.

There is always a reaction. If even one limb is removed from a tree, there should be a reason for doing so. Anyone who prunes for the sake of pruning "because everyone else is" will undoubtedly cause problems that will be difficult to correct in later years.

On the other hand, careful selective pruning for any of the valid reasons listed will produce a healthy, beautiful tree that will enhance your landscape and improve the quality of life in your neighborhood for years to come.

Note: Although the same basic principles discussed herein apply to fruit trees, pruning management for fruit trees can vary considerably from shade trees. Consult with your local county Extension office for information on pruning fruit trees.



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