

Guidelines for Planting Landscape Trees

by
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Introduction

Trees planted around homes, public buildings, commercial industries, and along town and city streets fill several needs. They fill a need for shade, a need for screening, a need for softening the harsh and stark lines of buildings, and a need for adding beauty and graciousness and a feeling of welcome to streets that otherwise are purely functional.

For trees to do their intended job satisfactorily - and continue to do it - they must be selected carefully and watched closely until they become established. Once established, they require less attention.

From a homeowner's perspective, most everyone wants ornamental trees around their property to make it more attractive. But many people do not realize that good trees provide other benefits and have many more uses around the home and yard. For example:

1. They increase land values. Landscaping adds to the resale value of the property -- a well planted, properly maintained property may have its original value increased from ten to fifteen percent. Such a property is also easier to sell.
2. Trees provide a great deal of shelter. They give shade from the hot sun, they eliminate much of the cutting force of strong rains and winds, and they retain moisture in the soil.
3. They can be used to screen unsightly objects or to frame and accent pleasing views and garden features.
4. They help secure privacy by providing eye-pleasing barriers, borders, and hedges.
5. Trees can enrich a pleasant feature in the garden by forming a contrasting background for that feature.
6. They can help prevent soil erosion on steep slopes and banks.

Where to Plant - Fitting into the Plan

The space of distance between trees is very important. A landscape changes dramatically, though

slowly sometimes, as they grow. While spacing depends on your objectives, the site, and the growth habits of the trees to be planted, you should anticipate their mature sizes and avoid planting them so close together or so close to buildings, walks, and driveways that removal or pruning will be necessary when they mature.

What to plant, rather than where to plant, is the question most often asked; but what you plant often depends on where you want to do the planting. When you are deciding where the planting should be done, keep a number of things in mind such as:

- Eye-appeal and design. Well placed trees will add to the attractiveness of a house or building and its setting. Most often they will look their best behind the house at the corners. A house of predominantly vertical lines or features can be made to appear lower if trees with rounded forms are planted around it. In the same manner, a low, spreading house will appear taller if trees that have columnar or pyramidal shapes are planted.
- Trees for shade. Shade may be one of the most important factors to consider when landscaping with trees. Leaf size and the density of a tree's canopy determine the amount of shade it will provide. Large shade trees are tall enough to shade the roof of a two-story house. Medium-sized trees are large enough to shade the roof of a one-story dwelling or the walls of a two-story building. Small trees will shade an outside wall of a one-story house.
- Boundaries or borders. Trees for hedges or border plantings often do well and add to the overall appearance of a home site if they are planted along the property lines. In this way they provide an enclosure which offers an individuality to the property and its setting within the neighborhood. Also, such plantings may be designed to screen the whole property or specific parts or structures therein.
- Trees with unique characteristics. Specimen or accent trees may be used in the landscape because they possess some outstanding characteristics such as flowers, fall color, berries, bark

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color, or unusual foliage. Such trees can be used to enhance the overall attractiveness of a property.

- **Scale.** Avoid using large trees in big groups on small properties and small trees in small groups where the land area is large. If the area is large and the house is larger than average, then large trees, either as individual specimens or in groups, are in keeping with the scale. A planting of this type on a small lot and near a small house will monopolize the area and leave little or no space for outdoor living or circulation about the residence.
- **Problem areas.** Planting trees under utility lines, in narrow spaces between the street and sidewalk, and over underground utilities, sewers, or septic drain fields may cause serious problems. If the wrong species are improperly placed in such areas, roots and branches might cause service utilities to malfunction. If such areas must be planted, seek professional assistance in species selection to insure success and avoid future problems.

Sources of Trees

Most of the trees used for landscaping homes, businesses, and public areas are procured from nurseries that specialize in the production of plants well adapted to a given area. In addition to nurseries, there are many garden centers that offer similar selections of landscape trees.

Trees also may be obtained from their native environments; these are referred to as "collected trees", "native species", or "wildlings". If collected trees are chosen for planting, open-grown specimens are harder and easier to dig than those growing in dense woods.

Native trees, however, do not have the compact root systems or symmetrical branching habits that nursery-grown trees have. Nurseries also offer a wider selection of trees, especially those slower-growing types whose smaller mature sizes make them desirable for small home grounds. Another advantage of nursery-grown trees is that they often have their roots pruned to stimulate compact root systems that make them easier to transplant. In addition, nursery-grown trees are better because they have been properly trained, watered, and fertilized.

Types of Trees

Trees can be purchased in three different forms: bare-rooted, balled and burlapped (B & B), and container-grown.

Bare-rooted trees (Figure 1) are usually dormant, small, and deciduous. They can be transplanted

successfully without a ball of earth around their roots. They should be planted in the late fall, winter, or early spring while they are still dormant. Bare-rooted stock that has broken dormancy and has new growth of more than two or three inches should not be bought or planted. Evergreen plants, except seedlings or very young plants, should never be bought or transplanted bare-rooted.

Balled and burlapped (B & B) trees (Figure 2) are dug from the nursery row so that their roots remain in balls of soil; roots and soil are then wrapped in protective coverings of burlap. All trees, regardless of their sizes, can be transplanted balled and burlapped. Many of the larger trees, and especially the more difficult to transplant species, should be moved with a ball of soil. Although generally no more than 10% of their roots are harvested from the field, B & B trees can be transplanted successfully throughout the year.

Container-grown trees (Figure 3) have been grown in receptacles that contain their roots. These are becoming more popular because they can be transplanted throughout the year without damaging their roots.

When to Plant

The tree type (bare-rooted, B & B, or container-grown) and the species determine the best time to plant. Bare-rooted trees should be planted while they are dormant -- in the early spring before growth starts or in the fall after their leaves have fallen.

Balled and burlapped trees may be transplanted throughout the year. However, the risk of losing trees moved with a ball of soil is greatest during the summer months, and maximum care should be exercised.

Container-grown plants may be planted any time the ground is not frozen. Summer planting requires watering if the weather is dry.

With the use of mechanical tree diggers, Virginia landscapers are planting trees almost year-round. The only time they are not planting is when the ground is frozen.

Care of Trees Before Planting

After trees are purchased or dug from their native environment, the roots must be protected from drying. This precaution is especially important with bare-rooted trees. Soaking the roots of bare-rooted trees for 30 to 60 minutes before planting will insure rehydration of the roots. The soil on a B & B or container-grown plant should be watered enough to prevent drying.

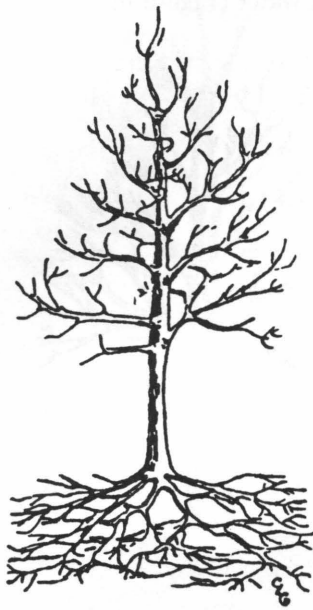


Figure 1

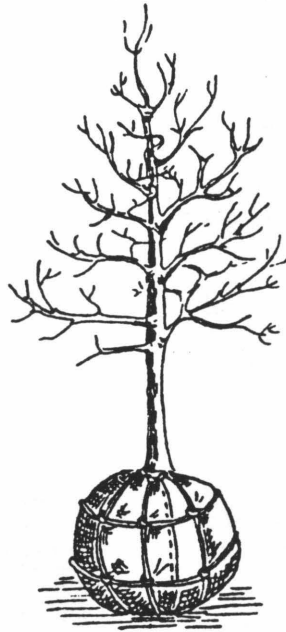


Figure 2

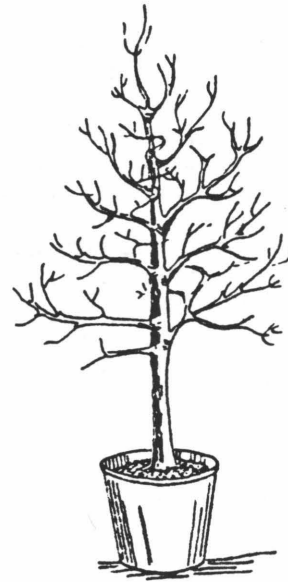


Figure 3

If the plant has leafed-out or is evergreen, protect the branches while it is being transported. If you let the tops of the plants protrude through the end of a station wagon, an automobile window, car trunk, or pick-up truck, the leaves, needles, and branches will lose much valuable moisture.

Plant the tree as soon as possible. If you have to wait, protect it from exposure to drying sun and wind in a cool, sheltered, shaded area. If the roots are bare, keep them moist by planting them temporarily in moist sand, sawdust, peat moss, or soil. The soil of B & B or container-grown trees also should be kept moist.

Contrary to past advice, research has shown that there is no need to prune up to one-third of the leaf-bearing branches from the top of a bare-root or B & B tree at planting time. In fact, doing so can be detrimental to the tree because the buds removed by this type of pruning are a source for hormones (auxins) that aid the plant in regenerating new roots after transplanting. See page 7 for the correct reasons to prune at transplanting time.

Rough or careless handling of B & B trees can break the soil ball and result in the death of the tree. Never pick up a B & B tree by the trunk as this might break the soil ball. Instead, gently carry the tree by the root ball to the planting site, or contract with the nurseryman to deliver the tree and place it in the prepared planting site.

Cultural Considerations

Soil drainage: Ornamental trees grow best when planted in well drained soils. If you have to plant in

areas where water tends to accumulate, try to select species that can tolerate wet soils or provide some artificial means of draining away the excess water.

The selection of trees that grow satisfactorily in wet soils is limited; therefore, you will probably find it necessary to improve the drainage conditions. A simple method to determine if there is good internal soil drainage is to dig the hole, fill it with water, and see if the water drains away within 24 hours. Poor soil drainage can be improved by regrading and filling water-collecting areas, installing underground drain tiles to carry away excess water, or a combination of both.

Drain tiles are most easily installed by digging a straight ditch 12 to 18 inches wide and 2 to 3 feet deep. The bottom of the ditch should be either level or sloping gradually toward a draining area such as a storm-sewer, open ditch, or roadway. Lay the draining tiles end-to-end in the ditch. Either four-inch clay drainage tiles or perforated plastic drainage pipe may be used. Cover the drainage tile with two to three inches of gravel before filling the ditch with soil. When possible, connect raingutter downspouts to the drainage tiles. This will help keep the line clean and carry away excess water.

Soil preparation: It is not always possible to follow the advice of transplanting a tree in soil at least as good as the soil from which it came. Much of the battle is won, however, if the soil is well-drained, aerated, and retains adequate moisture. Do not plant when the soil is too wet. If soil can be worked up into a rubbery and pliable ball in the palm of your hand, it is too wet; if the soil ball crumbles when pressure is applied, it is right for planting.

If very rocky or heavy clay soil exists at the planting site, it may be desirable to replace that soil with a higher quality soil, in particular if a whole planting bed can be altered in that fashion. Otherwise, regardless of soil type, research has shown that the old practice of amending the backfill soil with organic matter such as peat moss, compost, pine bark, or rotted manure does not benefit the trees unless the entire planting bed is amended.

When individual planting holes have their soil amended, a "bathtub" effect can be created in which water will drain through the amended soil and stand in the bottom of the planting hole, often leading to "wet feet" or eventual root rot. In addition, the lateral movement of water through the soil is often interrupted due to the difference in amended vs unamended soil textures. This can cause the amended soil in the planting hole to dry out more quickly under reduced water conditions.

In addition, tree roots often will not grow out into the native soil if they are planted in a hole with amended soil. This can lead to restricted top growth, root girdling, or the eventual death of the tree.

All holes should be dug and soil preparation completed before bringing trees in to plant, so that the time the trees must be out of the ground is minimized. Procedures for planting bare-rooted and balled-and-burlapped trees differ slightly.

Planting bare-root trees: Holes for bare-root trees, as for B & B and container-grown trees, should be at least one half to one time larger in diameter than the spread of the tree's roots, and need only be as deep as the root system, no deeper. This is to insure that a large volume of well-aerated soil will be used to backfill over and around the roots. Digging a wide, shallow hole into which plenty of well-aerated existing soil is used as backfill is now considered the most important step in insuring tree transplant success.

Before planting, remove all broken, damaged, or diseased roots with clean, sharp pruning shears. Place the plant in the hole at the same depth at which it had been growing. This can be easily identified by the dark line on the stem (trunk) near the roots. Spread the roots to their approximate original position and fill the area around the roots with well-aerated existing soil. Tamp or pack the soil carefully around the trunk and roots to eliminate air pockets. Do not bruise or scrape the roots or trunk base. When three-quarters of the hole is filled with soil, water heavily to eliminate all air pockets and to provide for better root-soil contact. Air pockets will cause drying of the roots. Fill the hole, building a ring (berm) of soil two to three inches high around

the outside edge of the filled hole to hold moisture and again fill with water (Figure 4).

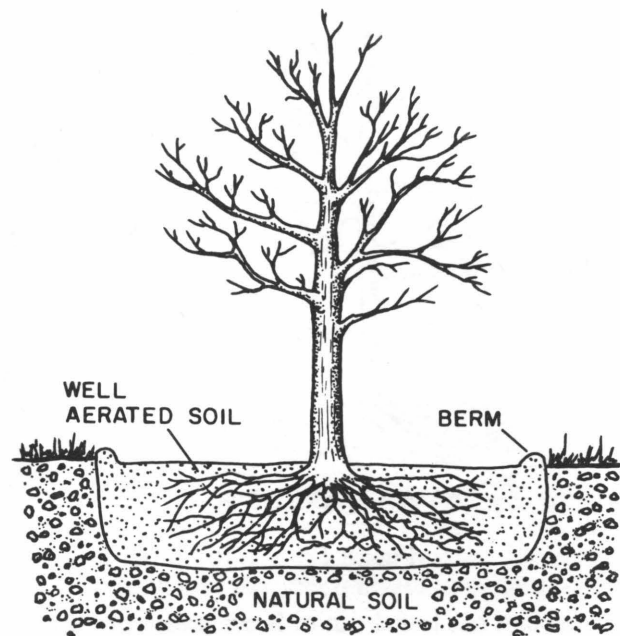


Figure 4

Planting B & B and container-grown trees: B & B trees and those grown in containers have a distinct advantage over bare-rooted trees -- their root systems are relatively undisturbed, although the B & B tree may have only as much as 10% of its root system present, whereas 100% of the container-grown tree's roots will be present. If this advantage is to be retained, use care to avoid breaking or damaging the root ball.

As with bare-root trees, dig a hole that is at least one half to one time larger in diameter than the root ball of the tree. Again, the hole need only be as deep as the root ball, and in heavy soils it is often recommended that the hole actually be less deep than the root ball to aid in drainage. If the top of the root ball is left above ground level in heavy soils, the exposed portion should be covered with mulch.

If cotton burlap was used to wrap the root ball, the burlap does not need to be removed but should be untied or loosened and lowered around the ball so that it does not stick above the soil line, acting as a wick that removes moisture from the root ball (Figure 5). If a plastic-like burlap, or any other non-cotton or synthetic material (such as nylon carpet backing) was used, this material should be either completely removed or pushed to the bottom of the planting hole so that the sides of the ball are completely exposed.

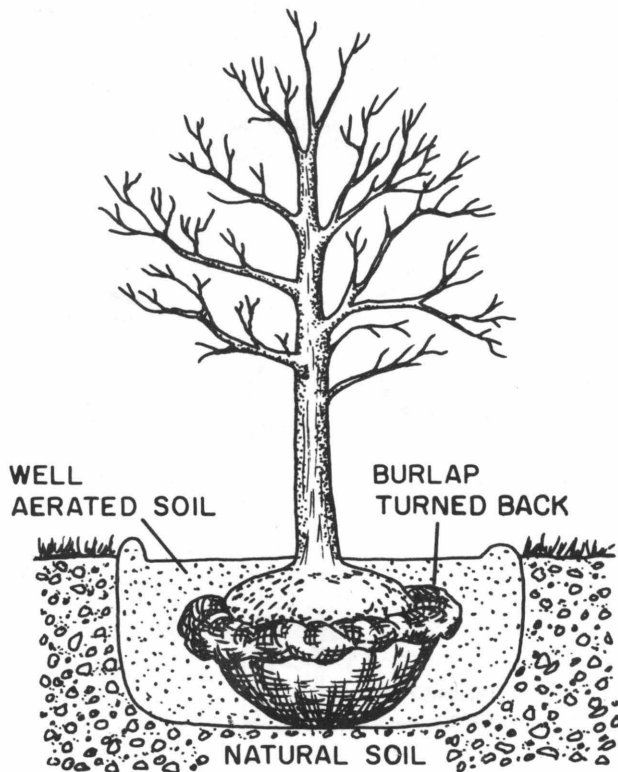


Figure 5

When planting container-grown trees, remove them from their containers carefully so the balls of soil are not broken. The best way to remove a container is to cut it from top to bottom in four places 90-degrees apart; gently pull the four cut sides away from the root ball (like peeling a banana); then gently tap the container until it falls away from the root ball.

For planting a tree that has a ball of soil around its roots (either B & B or container-grown), follow the same procedure of partially backfilling the hole and watering the soil to settle it before completely backfilling, as was described for planting bare-root trees.

Staking - supporting trees: Research has shown that not all trees need to be staked when they are planted. Whenever possible trees *should not* be staked. Their stems will flex in the wind, encouraging the development of stronger and larger trunks.

Trees *should* be staked when they are planted in windy, exposed locations where they might physically be blown over, or when the tree has a large top or canopy that might cause the plant to be top heavy and susceptible to being blown over. Depending on the tree size, a variety of staking or guying techniques may be employed.

For small trees up to and including those from two to three inches in trunk diameter, two or three stakes

should be used. The stakes should be long enough to extend from just above the lowest branches of the tree into the soil far enough to be firmly stable. The stakes are usually positioned, in firm soil just beyond the edge of the hole, so that the trunk is located between them (Figure 6). The trunk is connected to the stakes with pieces of coarse cord, soft rope, or wire that is padded with old garden hose (this keeps the wire from cutting into the tree).

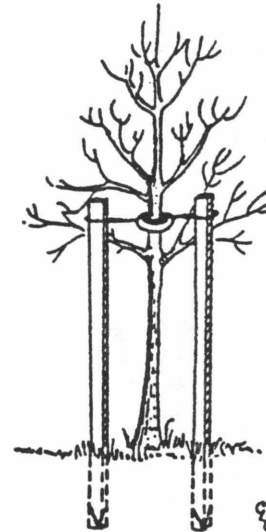


Figure 6

If the stakes will be located within the planting hole, they should be driven into the ground before backfilling so that they can be positioned where they will not break any roots or the root ball.

Trees larger than three inches in diameter should be stabilized with a system of three guy wires or cables (Figure 7a). About half-way up the trunk, one end of each cable should be padded and slipped around the crotch of a limb and the trunk. The lower ends of the cables should be secured to stakes, or "deadmen", buried in the soil. The installed guys should form 45-degree angles with the ground. Turn-buckles can be used to adjust the tension of the guys (Figure 7b).

Stakes should be removed after one growing season or year. If after one year a tree's roots have not re-established so that they can adequately support the tree, there is something wrong with the tree and/or the planting/cultural practices, which should be adjusted.

Leaving the stakes longer than one year can retard the development of the tree's trunk. It can also lead to problems as the trunk increases in diameter and begins to be girdled by the materials used to connect the stakes to the tree.

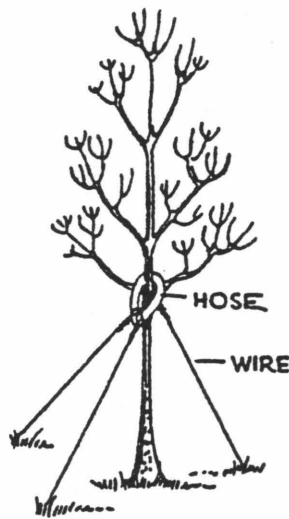


Figure 7a

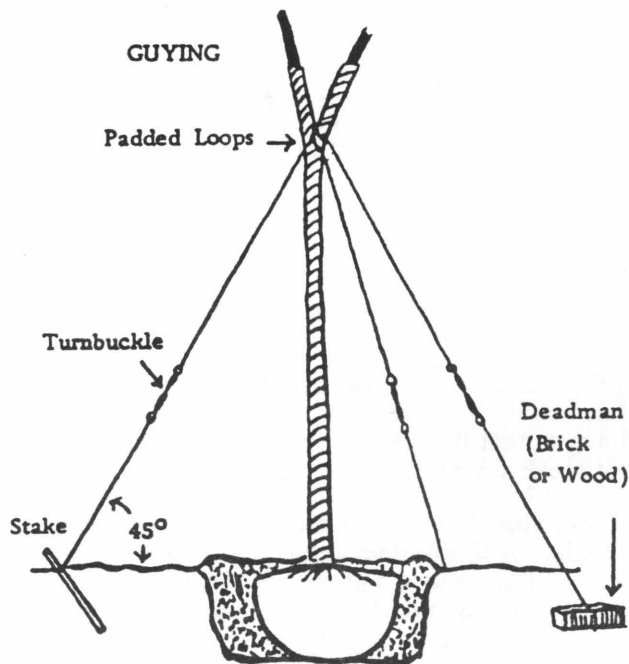


Figure 7b

Wrapping: The trunks of many trees will benefit from being wrapped for the first year with burlap or special kraft tree paper. This will protect the bark from direct sun rays (which may cause sun scald on thin-barked trees), prevent excessive loss of water, and reduce borer infestation. For availability and appearance, crepe tree-wrapping paper is probably best.

On most trees it is only necessary to wrap the trunk. Wrap from the ground line upward to the point of branching. Wrapping from the branch point down will often cause water to accumulate behind the wrapping material, often resulting in rotting of the bark.

The wrap should look like a spiral, each turn overlapping one-half the width of the wrapping material so that the trunk is covered with a double thickness of material. Constant tension on the wrapping material will keep it from slipping, as will lashing a rope covering over the wrapping material (Figure 8).

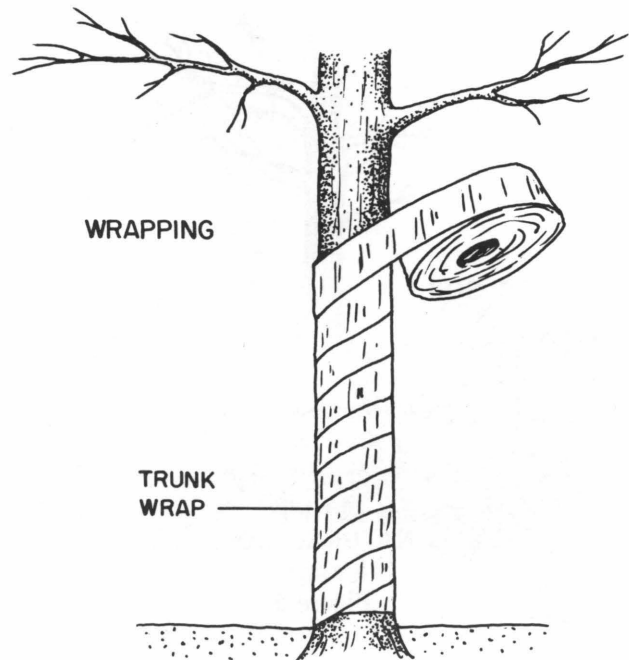


Figure 8

Tree wrap should be removed after one growing season or year to discourage bark rotting and to keep the wrapping material from restricting trunk growth.

Watering: Tree survival will depend, to a great extent, upon watering during the dry periods of the first growing season (including the fall months). Watering deep once a week during dry periods is adequate if the tree is properly mulched. If the tree is watered too frequently, root injury and eventual death could occur.

Container-grown trees (and, to a lesser degree, B & B trees) require special attention with regard to watering. The root balls of these trees tend to dry out much faster than the surrounding soil. Consequently, it is important to know the area the root ball encompasses and to be sure to water the root ball itself thoroughly. It is crucial to check the root ball to determine when rewatering is needed because the moisture content of the surrounding soil can be misleading.

Mulching: The addition of a two-inch to three-inch layer of mulch around the tree has a number of benefits: it greatly aids in preventing soil water loss, it aids in holding soil heat during cold periods, it reduces soil temperature during hot weather, it provides a buffer zone around trees in sod to keep lawn

mowers and weed eaters away from the trunks, and it reduces weed problems. Pine straw, a mulch grade of pine bark, and wood chips are excellent for mulching trees. Other materials such as slightly decomposed leaves, grain straw, or even non-white coarse gravel (so that light isn't reradiated back onto the trunk), can also be used successfully.

Mulch should not be too thick because overmulching can encourage overly shallow root establishment and can lead to excessive moisture retention and root rot. In addition, mulch should not be piled up tightly against the trunk; pile the mulch so that air can circulate to keep disease problems at a minimum and so that rodents won't nest in the mulch and feed on the bark during the winter.

Removing labels: Remove any wire, string, or plastic strips used to attach labels to trees. These label devices can eventually girdle the branches or trunks.

Pruning: Inspect your shade trees regularly to determine when they need pruning. Pruning will improve their appearance, guard their health, and make them stronger. And, by pruning as soon as the need becomes apparent, you can easily correct defects that would require major surgery if allowed to persist (Figure 9). Here is a list of things to look for when determining pruning needs:

- Dead, dying, or unsightly parts of trees.
- Sprouts growing at or near the base of the tree trunk.
- Crossed branches. If branches cross and rub together, disease and decay fungi can enter the tree through the abrasions.
- V-crotches. If it is possible to do so without ruining the appearance of the tree, remove one of the members forming a V-crotch. V-crotches split easily; their removal helps prevent storm damage to the tree.
- Multiple leaders. If several leaders develop on a tree that normally has only a single stem and you wish the tree to develop its typical shape, cut out all but one leader.
- "Nuisance" growth. Cut out branches that are likely to interfere with electric or telephone wires. Remove branches that shade street lights or block the view into streets and constitute a traffic hazard. Prune branches that shut off breezes, and remove lower limbs that shade the lawn excessively.

Do not leave major stubs when you prune. Cut just outside the branch bark collar or just above a bud. Stubs usually die and can serve as entry points for

fungal infection of the tree. Research has shown that no wound dressing or paint is needed to cover or seal the cut areas because none thus far contribute to the wound closure or compartmentalization process. In fact, many of the materials that have been used in the past have been shown to accelerate decay problems.

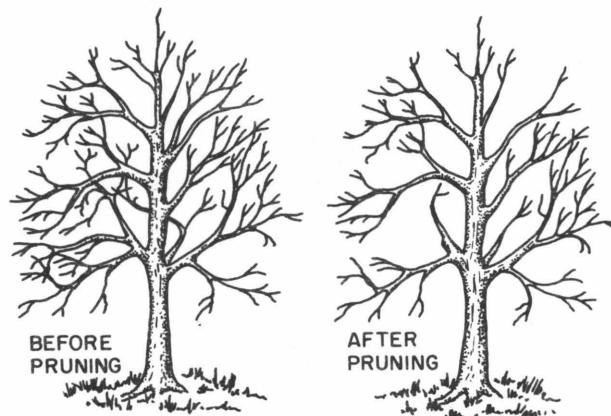


Figure 9

Fertilizing: Trees are not likely to need fertilizer for the first year after planting if plenty of good soil was used for backfilling the holes in which they were planted. If you think a tree needs fertilizer (its leaves are paler than normal or its growth is slower than normal), have the soil tested and follow the resulting recommendations, generally fertilizing from late fall through early spring.

Usually, dry fertilizers are not incorporated directly into the fill used during tree planting, because of the risk of root injury, unless they are slow-release (in pellet, tablet, or spike forms) formulations of fertilizers. A 20-20-20 (or similar analysis) fertilizer should be diluted at the rate of one tablespoon per gallon of water to serve as a starter solution. The entire root zone of the tree can be safely drenched with this solution. Apply the solution when the soil is moist. A well fertilized lawn provides adequate fertilizer for the trees it surrounds or borders.

Protecting from insects, diseases, and mechanical injury: Most insects and diseases can be controlled by spraying with appropriate and recommended pesticides. Your local Virginia Cooperative Extension Service agent, local nurseryman, or garden center personnel can identify the pest problem and tell you what spray to use and when to use it. When trees are small, you can spray them yourself. As they grow larger, however, spraying becomes a job for professional arborists who have the equipment and knowledge required to do a thorough job.

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