Cultural Management for Ornamental Plants

Landscape management generally involves caring for several kinds of plants in a given area – turfgrass, flowers, ground covers, trees and shrubs. A manager must understand the ecology of the entire landscape. A management practice that favors only one kind of plant could easily damage one or more of the others. Therefore, a management plan must take into account the various species in an ornamental setting.

This chapter emphasizes management of woody plants and should be used as a source of information on landscape management. It also discusses the cultural practices needed to maintain an ecological balance within a landscape. Following sound cultural practices will result in high quality plants that are managed in a manner to minimize the need for pesticides, thus fulfilling the rationale behind integrated pest management.

Selection

Woody landscape plants should be selected for a variety of aesthetic, functional and cultural management reasons. Plants may be chosen to form borders and screens, to accent an architectural design, to modify a site's microclimate or for a large multitude of other reasons. When selecting a woody plant, consider other factors to ensure a plant will thrive and remain attractive for a long period of time. Even with all of the important factors listed below, proper plant selection is paramount, as is the selection of a diverse group of plants. Strive for diversity by having no more than 10 percent of plants of any species or cultivar in the landscape. By doing so, should a disease, insect infestation or abiotic stress arise, not all of the trees and shrubs in the planting are likely to succumb to the stress.

Table 1.2.1. Lime requirements of various soil types.

Existing pH of Soil	Pounds of Agricultural Limestone Needed Per 100 Square Feet to Raise:					
	Sandy Loam Soil		Silt Loam Soil		Silty-Clay Loam Soil	
	to pH 6.0	to pH 6.5	to pH 6.0	to pH 6.5	to pH 6.0	to pH 6.5
6.0	0.0	2.0	0.0	4.0	0.0	5.0
5.5	2.0	4.0	4.0	7.0	5.0	10.0
5.0	4.0	6.0	7.0	11.0	10.0	15.0
4.8	4.5	7.0	8.0	12.0	12.0	17.0

Source: The Fertilizer Handbook.

Table 1.2.2.Sulfur requirements of various soil types.

Existing pH of Soil	Amount of Sulfur (95% S) Needed to Lower the Soil pH to pH 6.5: (Weight is in pounds per 100 square feet)		
	Broadcast Application (then mixed in soil to a depth of 6 inches)		
	Sandy Soils	Loamy Soils	Clayey Soils
7.5	1.0-1.5	1.5-2.0	2.0-2.5
8.0	2.5-3.0	3.0-4.0	4.0-5.0
8.5	4.0-5.0	5.0-6.0	6.0-7.5
9.0	5.0-7.5	---	---

Source: The Fertilizer Handbook.

Environment

Some plants are adaptable to a wide range of growing conditions, while others can survive only in specific environments. Before selecting a landscape plant, it is important to first be familiar with the soil texture, pH, drainage, exposure and other important characteristics of the site. A plant that is not suited to an environment is much more likely to encounter serious insect and disease problems than one that is adapted.

The texture of a soil is determined by the size of its particles. Sandy soils are composed of large particles, clayey soils of small particles and silty soils of medium-sized particles. Most soils are a combination of these types. Texture determines how well a soil can retain nutrients, drain and be easily worked.

Another factor that is often overlooked is pH. All soils are measured for their pH, which ranges from 0 to 14. A pH below 7.0 is considered acidic, while those with a pH above 7.0 are alkaline. A pH reading of 7.0 is neutral. Plants such as rhododendron and azaleas usually grow best in acidic soils at a pH of 4.5 to 5.5, whereas most landscape plants are healthy in soils with a pH of 5.8 to 6.8. Plants can also usually thrive in slightly acidic soils. Therefore, the soil pH only needs to be adjusted when extremes are found after a soil test is conducted. Refer to **Table 2-1** and **Table 2-2** on the previous page for suggestions on lowering or raising soil pH. All plants have an ideal pH range in which they best grow and thrive. Although an exact pH requirement does not exist for any species, plants should be grown within an accepted standard range. Consequences that arise as a result of extremes in pH are chlorosis, stunting, overall unthriftiness and, in severe cases, necrosis (plant dieback).

All woody plants do best if planted in the kind of soil to which they are naturally suited. While some woody plants thrive in moist, undrained bottomlands, most cannot tolerate such water-soaked environments. Whenever possible, you should select a plant that grows naturally in the soil type in your area. Not only is a particular soil type important, but also plants that are indigenous to an area sometimes are much more reliable than certain exotic species. Examples would be redbud, river birch and other trees native to Arkansas. Depending on which part of the state a grower resides in, such natives could be ideally suited for a wide range of landscape types. This is one of many areas in which a nurseryperson or garden center owner can help with selection of the proper species or cultivars, regardless of whether or not the plants are native to Arkansas.

Exposure is also an important consideration. Marginally hardy plants do best on northern and northeast exposures because those sites experience the smallest fluctuations in temperature and are less exposed to the sun. To protect against desiccation by wind, plant or build windbreaks. It is not always possible to protect against the sun.

Hardiness

All landscape plants are assigned hardiness ratings that indicate the coldest zones in which they can thrive. Arkansas includes USDA hardiness zones 6a through 8a. In these zones, the lowest average temperatures range from -10°F to 10°F, respectively **(Figure 1.2.1)**. By selecting plants that are sufficiently hardy for an area, an important source of stress is eliminated that often makes a plant more susceptible to insects and diseases. Check with a knowledgeable nurseryperson to determine if hardiness-improved cultivars are available for the species of interest or if a hardier but closely related species exists. Also see UACES fact sheet FSA2097, *Arkansas and U.S. Plant Hardiness Zone Maps*.

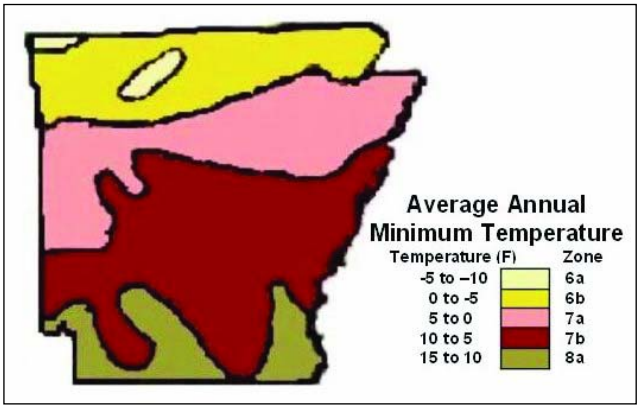

Figure 1.2.1. Arkansas plant hardiness zone map (USDA).

Each specific site has its own microclimate. For example, when a backyard is fenced, the microclimate is changed (the environment is made warmer). A zone 6 can be changed to a

zone 7, and vice versa. A plant may be perfectly suited to the degree of heat in a geographical zone, but if a microclimate is rendered warmer by planting the tree beside a white brick wall, for example, the tree will still scorch. The survivability of any plant varies with the microclimate in which it is situated. The ability to change microclimates enables Arkansas growers to have trees and shrubs in their yards which otherwise would only grow in warmer climates.

Insect and Disease Resistance – Proper plant selection is important in pest management. For example, many different crabapple cultivars are commercially available in Arkansas, and all of them vary in their reactions to four common crabapple diseases – apple scab, fire blight, cedar apple rust and powdery mildew. White-barked birches are susceptible to the bronze birch borer, but the river birch (*Betula nigra*) is rarely attacked by this pest. These and other pests can be avoided by selecting resistant cultivars or species recommended by a reputable nursery or garden center worker.

Planting

Spring and fall are the best times to plant trees and shrubs; however, trees can be planted successfully any time if they are handled properly. They become more difficult to transplant after they break dormancy, primarily because during this period the new leaves and stem growth are susceptible to high transpiration (water loss). Desiccation is the most common reason newly planted trees fail to survive the first season after planting. Therefore, any cultural procedure that reduces water loss from transpiration or that increases water uptake will improve the chances of survival. Such cultural procedures include thorough mulching 3 to 4 inches at least out to the tree's perimeter (dripline) and winter irrigation when temperatures remain above freezing for prolonged periods.

Planting Hole

Dig the planting hole at least twice as wide as the root ball to be planted. This allows for easier root expansion and penetration, which ultimately leads to more rapid establishment. Not only is the width important, but also planting depth is critical. Always plant at the original grade or slightly higher than the level at which the shrub or tree was growing when it

Figure 1.2.2. Planting too deep.

was purchased. Never plant below grade because this will lead to oxygen deficiencies and waterlogging to the roots **(Figure 1.2.2)**. The exceptions to planting at grade are when the soil is a heavy clay or when overall drainage is poor. In these cases, the plant should be positioned slightly above grade (2 to 3 inches). This can be accomplished most easily by purposely digging the hole shallower than the plant's root ball. Be certain to taper soil down to the soil line; otherwise, the top few inches of the exposed root ball will act as a wick, causing the root system to dry out excessively **(Figure 1.2.3)**. Plants such as pines and other high moisture sensitive plants will benefit from this simple technique when conditions warrant it.

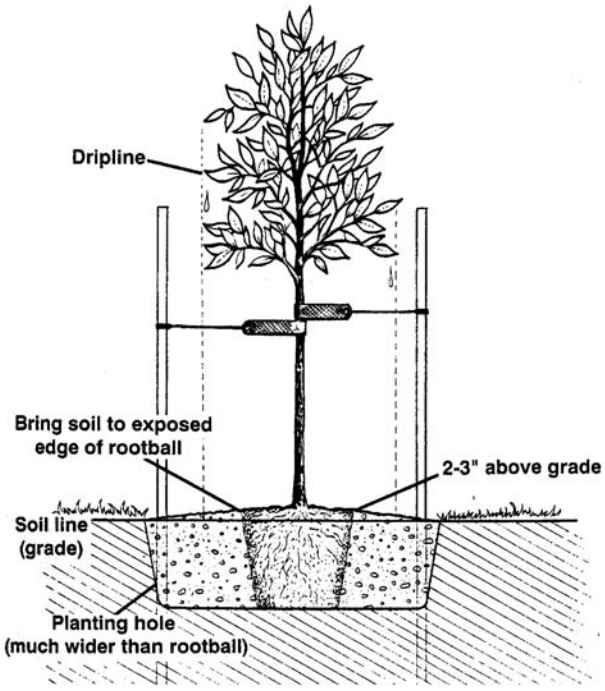

Figure 1.2.3. Guide for planting a tree in heavy clay soils.

Two other techniques used for improving survival are the split ball technique and scoring the root system. The split ball technique, also known as the butterfly technique, forces the root system to be positioned shallowly in the soil profile **(Figure 1.2.4)**. Therefore, roots are positioned in a more favorable area for growth due to better drainage and oxygen relations. Scoring the root ball is a less radical procedure, but it also stimulates new root growth **(Figure 1.2.5)**. This simple technique is particularly valuable when containerized stock is purchased. Often times, circling roots are a problem in overgrown containerized stock. This is partially corrected by scoring. If the circling roots are not corrected, they may eventually girdle the trunk as late as several years after transplant.

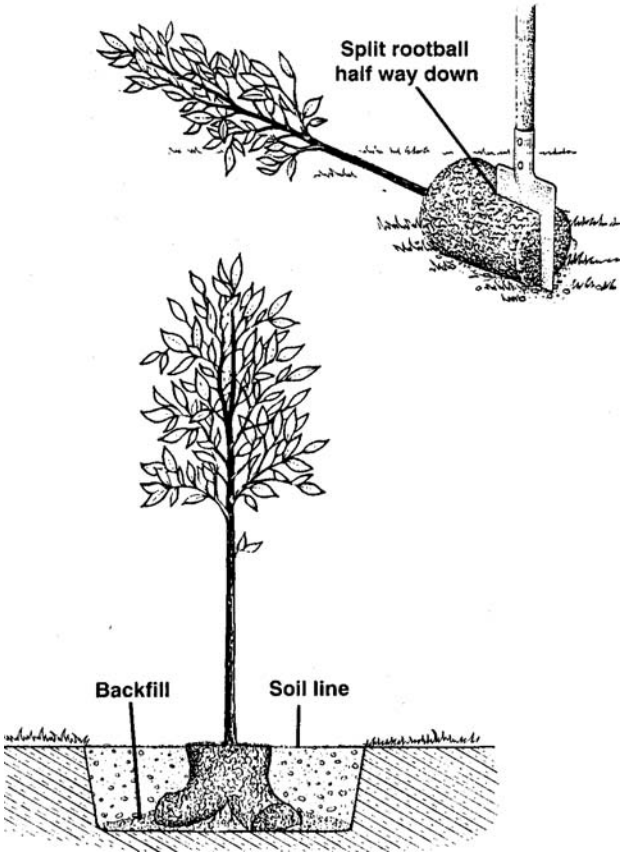

Figure 1.2.4. The split ball or butterfly technique.

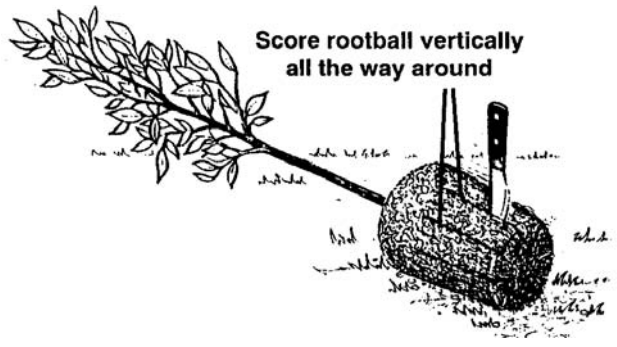

Figure 1.2.5. Scoring the rootball.

Backfilling

Soil can be backfilled around a new tree in either of two ways. Soil may be added dry or as a "slurry" by simultaneously adding soil and water, thus forming a thick "soup" in the planting hole. Both methods have advantages. The dry soil method is fast and clean. Even though the slurry method is messier, it is better at removing air pockets around and under the root ball. Do not stomp in air pockets because this could result in serious root damage and compaction. Use the end of the shovel handle to lightly tamp the soil and always backfill with native soil present at the planting site.

Watering

Before watering a plant, form a basin around its base so that water will soak in rather than run off. Make sure new plantings never dry out. Keep the soil moist but not waterlogged at any time during the first season. It is imperative that water does not stand in the basin for more than 20 minutes after watering. If it does, drainage is poor and should have been corrected beforehand or the planting area avoided altogether. Simply putting gravel or crushed stone in the bottom of the hole will not solve the problem. In fact, an artificially raised water table may result (perched water table), which will essentially "drown" the roots. Constant moisture invariably leads to root rots and other diseases.

Mulching

It is always a good idea to mulch newly planted trees or shrubs. Shredded hardwood bark, well-rotted manure, coarse peat moss, compost and grass clippings are good mulch materials that conserve moisture, retard weed growth and help maintain a more even soil temperature. Never apply mulches such as grass clippings or other plant materials if they have been recently exposed to herbicides, because the herbicides may damage or kill the plant. A 2- to 3-inch mulch layer is usually sufficient for one season. However, for fall transplants, mulch can be increased to 4 to 5 inches. The deeper mulch will delay deep frost penetration, thus allowing

more time for root growth and establishment. Be sure the crowns of the plants are not buried with mulch material. Keep a weed-free mulched area well out from the tree's trunk. Mulch reduces competition for water and nutrients. Also, landscape caretakers are less likely to girdle tender trunks with string trimmers or bruise them with lawn mowers.

Synthetic mulches are suitable, but plastic can cause several problems, especially when applied around plants such as yew, azalea, rhododendrons, hollies and pines. Plastic prevents air and moisture exchange in the soil and thus stresses the plants. Also, plants grown with plastic mulch may develop very shallow root systems that suffer during temperature extremes common to Arkansas. Newly developed fabric barriers have shown promise in the landscape. Although more expensive than clear or black plastic, they allow gaseous and water exchange to occur more freely. This improvement in the rhizosphere (root growing area) can make the difference between success and failure with plants that are sensitive to lowered oxygen and moisture extremes.

Pruning

It is usually not necessary to prune aboveground parts at planting time. It was once thought pruning helped equalize the top growth with the amount of remaining roots, thus reducing the amount of water that was lost through transpiration. However, recent research shows this pruning is unnecessary. Injured or diseased branches, however, should be removed.

Pruning too early or excessive pruning also leads to sunscald and overall depressed growth. Since the lower limbs have leaves that directly contribute to photosynthate production, their removal should be avoided. The more limbs that are removed, the lower the production of photosynthate for the young plant. This in turn leads to depressed growth rates. Also, the lower limbs help shade the young, susceptible trunk from summer or winter sunscald. Pruning is discussed in greater detail later in the chapter.

Wrapping

Newly planted trees should have their trunks wrapped, while shrubs often do not need wraps. Wrapping protects trunks from sunscald and rodent attack. Paper, burlap, hardware cloth and plastic tree wrap may be used for this purpose. The polyurethane wraps are permanent and quite resistant to rodent damage.

Before wrapping, inspect the tree trunk for mechanical damage and the presence of insects. If the tree is being planted during the time(s) when borers may be laying their eggs, consider spraying the trunk with a suitable insecticide to prevent borer infestation. Begin wrapping from the base of the trunk and work up to the first main branch. Overlap the wrapping material to create a shingling effect. Then, anchor it by tying it in several places with two-ply jute twine or water- proof tape. Do not use plastic twine because plastic will not degrade naturally and may eventually girdle the trunk. Avoid wrapping trees during the summer months. The warmer, moist environment encourages insects and diseases to develop. However, some thin barked trees may need summer protection. This is why a young tree should not be limbed up (pruned) too soon. Lower limbs help shade the sunscald-susceptible trunk. Check with a nursery or garden center person for advice on which trees need summer wraps. Ginkgos and Japanese pagoda trees, for example, may benefit from summer wraps while the trees are young (during the first two or three growing seasons).

Not only will tree wraps prevent rodent damage in the winter, they also help keep the bark at an evenly cool temperature to reduce exposure during periods of winter warm-up. Sometimes, the bark's cells start to grow, only to be damaged by the eventual plummeting temperatures. This phenomenon has been called "Southwest injury."

Staking

Most studies have shared common conclusions that trees must sway in the wind somewhat to grow normally. Therefore, overstaking or making the tree too rigid should be avoided. When the tree can sway, it develops a stronger root and shoot system and quicker caliper (trunk diameter) development. Trees will benefit from stakes being removed as soon as possible, perhaps after the first growing season. This is a judgment call, of course, and is contingent upon such factors as the size of tree, establishment rate and average wind velocity in the area. After the first year, gently tug at the tree. If the root ball easily moves

away from the surrounding soil, the root system is not established. Leave the tree staked and repeat this procedure the next growing season. In most cases, if root systems do not establish after the second growing season, something is preventing the tree from adapting to the site.

Regardless of the number of stakes and their duration, always check them regularly. Girdling, essentially strangulation of the trunk, can occur rapidly in fast-growing trees **(Figure 1.2.6)**. The traditional hose and wire is particularly likely to damage young, tender trunks. Be prepared to periodically check the trees throughout the growing season. The strap and grommet method is an alternative staking system that allows for lessened and slower girdling and thus is more "forgiving" **(Figure 1.2.3)**.

Figure 1.2.6. Stake left on too long.

Watering

There are no exact rules for watering plants. Water newly planted trees and shrubs well at the time of planting, and adjust all later waterings to the plants' needs. Since different plants have different moisture requirements, soil and plant conditions should be used as primary guides. Many woody ornamentals in Arkansas reach maximum growth when they receive an equivalent of at least 1 inch of water from rainfall or irrigation each week during the growing season. Newly planted trees and shrubs will probably have to be watered two or three times a week in extremely hot, dry, windy weather because their root system cannot take up the needed amount of water to replenish the water transpired by the growing leaves. Wilted leaves are normally a reliable sign that the tree needs moisture. If the soil seems to be moist and the tree is still wilting, it may be necessary to intermittently moisten the canopy. However, chronic wilting can also be a sign of an oxygen deficiency due to overwatering or disease.

Follow these general rules when watering established plants:

- Do not water until plants show signs of light wilting.
- Apply water slowly to allow it to soak into the soil.
- Wet the soil thoroughly to a depth of 8 to 12 inches. Thorough wetting encourages a uniform root system, which is better able to withstand stress.
- If possible, water the soil only, rather than the entire plant. If the entire plant is to be watered, water early in the day so that the foliage will dry before late afternoon. This practice helps prevent certain foliar diseases.
- Do not overwater, since overwatering can leach nutrients from the soil or deplete oxygen availability to the roots. Some plants, such as yews, are sensitive to too much water. Do not plant high-moisture sensitive plants next to gutter downspouts or other areas where excessively wet soils develop.
- Give special attention to plants set close to a wall where an overhanging roof blocks rainfall.
- Check the soil for moisture near the root zone, not just at the surface, before deciding whether or not to irrigate. Quick summer showers may not supply enough moisture to wet the entire root ball area.
- Lastly, mulch plants whenever possible to reduce supplemental irrigation. Even if a plant is touted as being drought resistant, it still needs to be mulched and irrigated at least the first growing season after it is transplanted.

Winter Irrigation

Experienced landscapers know that plants benefit from winter irrigation when temperatures are above freezing, which could be a significant period during average Arkansas winters. This is particularly true for all broad-leaved evergreens and many deciduous species. When plants are properly mulched, however, the need for winter irrigation is greatly reduced.

Fertilizing

Fertilization is a necessary part of woody plant care. Vigorously growing plants are more attractive and recover more easily from insect and disease infestations than plants with insufficient amounts of nutrients. Poorly nourished plants have reduced or abnormal growth; small, discolored leaves that may drop prematurely; fruits that abort or fail to form; and reduced vegetative and root growth. However, plants have limits on how much of any nutrient they can tolerate. Thus, excessive fertilizer amounts can be toxic.

Elements that are essential for plant growth and reproduction include hydrogen, carbon, oxygen, nitrogen, phosphorus, potassium, calcium, sulfur, magnesium, copper, manganese, iron, boron, chlorine, zinc, nickel and molybdenum. Hydrogen and oxygen are supplied by water, and carbon and oxygen by the air. All of the other elements needed for growth are absorbed from the soil by the plant's roots. Nitrogen, phosphorus, potassium, calcium, sulfur and magnesium are needed by the plant in relatively large amounts and are called macronutrients, or major elements. Copper, manganese, nickel, boron, chlorine, zinc and molybdenum are needed in relatively small amounts and thus are called micronutrients, trace elements, or minor elements.

Nutrients are derived from organic, synthetic organic or inorganic sources. Organic sources come from plant or animal material, such as manure, bone meal, dried blood, cottonseed meal, composted plant material or inorganic material that has not been "processed." Synthetic organic fertilizers are manmade fertilizers with a carbon skeleton. Complex synthetic organic fertilizers have been developed to give controlled release of nutrients. Inorganic fertilizers are minerals that are usually mined or manufactured by man.

Since nutrients are absorbed by plants as inorganic ions, organic fertilizers must be decomposed before the ions are available for plant uptake. The principal advantage of organic fertilizers is that they improve the tilth and water-holding capacities of the soil. Inorganic fertilizers are generally more apt to burn or injure plant roots and should be used with additional care. However, they are usually needed in smaller amounts and are much easier to handle. Nutrient application is like any other input into a landscape – care must be used to maximize inputs without creating potential damage to the environment or applicator.

Timing

Trees and shrubs should be fertilized in the spring, early summer or late fall. Spring applications will provide nutrients for the initial flush of growth, when nutrients are most often needed. Plants can absorb nutrients as long as soil temperatures are above 40°F. Nutrients from fall applications are absorbed by plants and stored until they are needed for growth. Root growth will occur even though the top of the plant appears dormant. Avoid fertilizing in late summer because extra nourishment at that time can result in a flush of fall succulent growth that may not have sufficient time to harden off before the first frost. Fertilize after leaf drop or after the first hard freeze.

Fertilizer Rates

Determine the need for fertilizer by observing deficiency symptoms on plants and by taking soil tests. Deficiency symptoms only indicate that fertilizer is needed; soil tests determine how much fertilizer to apply. Soil tests are the primary measures used. When taking a sample for a soil test, remove a core of soil about 1 inch in diameter and 12 to 18 inches deep. Always take a composite sample of at least 10 to 20 cores to obtain a true "picture" of the area's fertility. In other words, take 10 to 20 small samples throughout the growing site and blend them into one composite sample to be tested. Such a sample will yield more accurate information.

Fertilizer application rates are determined by the area to be fertilized **(Table 1.2.3)**. Six pounds of actual nitrogen per 1,000 square feet per year is recommended to encourage optimum tree growth. Woody plants should receive 3.6 pounds of phosphorus (P_2O5) per 1,000 square feet and 6 pounds of potash (K_2O) per 1,000 square feet every three years.

Remember that a sick or weakened plant will only respond to fertilizer when a true nutrient deficiency exists. Often times, the stress is some other culprit. In such a case, no amount of fertilizer will improve the health of the afflicted

plant. Only an actively growing plant or one suffering from a nutrient deficiency can benefit from fertilizers. Fertilizers used in excess of label rates may exacerbate any problems existing prior to the fertilizer application.

Always be wary of high-priced fertilizers with exaggerated claims for luxurious growth or improved flowering. This also holds true for vitamin and hormone formulations. Check with a reputable nursery or garden center person for further advice on products available and amounts needed.

Table 1.2.3. Fertilizer application rates.

Type of Fertilizer	Approx. Amount of Fertilizer (lbs./1,000 sq. ft.)
Ammonium nitrate (33-0-0)	18
Ammonium sulfate (21-0-0)	30
Urea (45-0-0)	12
10-10-10	60
12-12-12	48

Note: Many other types and formulations of fertilizers are acceptable.

Pruning

Pruning is one of the principal techniques by which a specimen plant is produced. In nature, when a twig or branch has served its purpose, it dies and eventually falls to the ground. In urban settings, however, deliberate pruning is needed for aesthetic and functional purposes. Pruning is also important in the prevention and treatment of certain diseases.

The plant and its environment must be considered together. Often a plant is selected without thinking about how large it will grow. In a foundation planting, a shrub may be planted that in a few years will grow up and screen a window. It would be hopeless to try to prune the shrub for best effect and also keep it at the desired height. It would be much better to replace it with one that would grow no higher than the height desired. Foresight in plant selection will often save much labor and will provide a plant that looks better and more natural for a longer period of time. Ask a nursery or garden center worker if a dwarf cultivar is available for a prized species. Also, check for cultivars that grow more upright than the species. This growth habit could also reduce the need for pruning in close growing quarters. The upright cultivars will often have the name 'Fastigiata' or 'Columnaris,' for example.

Pruning must be done to produce a good appearance and to ensure the health of the plant. This is why pruning is considered both an art and a science. It is important to know how plants grow and develop, what effect pruning will have on a plant's health, how much growth one should remove and at what points one should prune.

The obvious effects of pruning are the changes that occur in a plant's size and shape. But, physiological changes also occur that are not immediately visible. For example, pruning during the dormant season (fall or winter) reduces the number of growing points on the tree. Therefore, the food (carbohydrates) that is stored in the roots and main stems during the winter is concentrated in fewer branches in the spring. The result is more vigorous vegetative growth. By contrast, pruning during the summer growing season has a tendency to check or retard growth. If the most active growing points are removed, the plant stops growing until new buds are activated.

All pruning has the general effect of making the plant fuller. Topping or heading back is a method by which the terminal buds are removed. These buds usually inhibit the growth of the lateral buds below them – a phenomenon known as apical dominance. If the terminal buds are removed, the lateral buds will show more growth, thus creating a fuller and denser plant.

Pruning can also be used to control the direction of growth. If you want a plant to grow toward a certain point, cut back to a bud which points in the desired direction. This kind of pruning is used in heavy traffic areas in landscapes where a definite shape is desired.

Proper pruning cuts are essential in preventing or minimizing insect and disease invasion. Flush cuts are no longer recommended. Instead, limbs should be pruned outside of the branch collar **(Figure 1.2.7)**. By pruning beyond the branch collar, the tree is able to defend itself from decay by imposing physical and chemical barriers.

Prune older trees to maintain their appearance and vigor. Always remove dead,

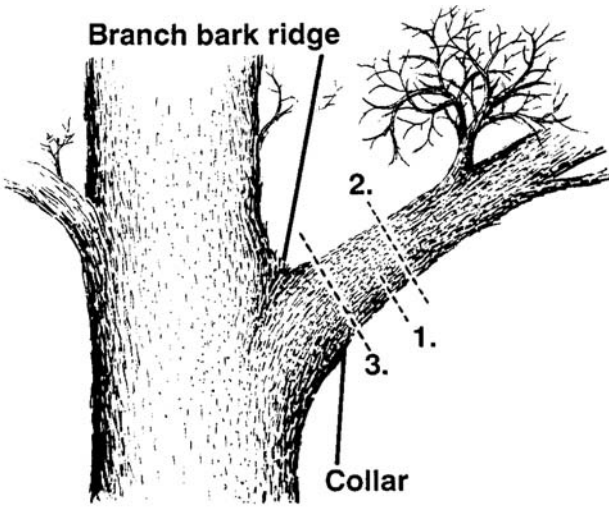

Figure 1.2.7. The three-cut method for removing heavy limbs.

dying and broken branches as soon as possible, both to improve the appearance of the plant and to reduce the danger of falling branches. Branches that grow back into the center of the canopy should also be removed, so they will not rub against healthy branches as they develop, and remove all crossing or rubbing branches. Rubbing branches can develop bark wounds that can serve as entry sites for insects and disease-causing organisms.

Pruning Flowering Shrubs

It is important to understand when flower buds are formed on ornamental shrubs. Some flower buds are formed on old wood during the summer, then overwinter and bloom the next spring. However, others form buds on new wood or form buds after new growth begins in the spring that bloom that same year. Pruning a plant at the "wrong" time of the year could cause the plant not to flower properly. Consult a nursery or garden center worker for the optimum time to prune any given tree or shrub.

Pruning Paints

Whether or not to use pruning paints is a chronically debated issue. Recent research has suggested that paints may actually delay the healing process. Even if they do not delay it, they probably do not aid in wound closure. Therefore, most researchers have labeled pruning paints as cosmetic. However, some researchers have concluded the paints may offer defense against woodborer invasion and other pests. If pruning paints are desired, they probably should only be applied as a thin coat or only when requested by the client.

Winter Protection

Many of the important winter protection practices have already been mentioned. The first step in avoiding winter damage is to select plants that are winter-hardy in the area. In addition, avoid late-summer fertilization and pruning, both of which may force soft, succulent growth that will not have time to harden off before winter. Remember to apply tree wraps to all young trees during the fall and winter months.

Another large part of winter protection is proper watering. It is essential for plants to enter the winter months with a good supply of moisture. This is especially true for evergreens, such as hollies, boxwoods, rhododendrons, junipers and yews. Water plants well before the soil freezes and then mulch.

Mulching plants is an excellent practice in winter. Mulch helps keep the soil moisture and temperature levels even, thus preventing rapid and damaging changes. Avoid burying the crowns of the plants too deeply. This practice can lead to crown rot in some plants and may also create a harboring place for insects and rodents. The main purpose of mulch is to protect the root systems, not the crowns. Roses and other budded or grafted plants, however, are often exceptions to this rule.

During the winter, extra time is often afforded the landscape attendant to review maintenance records for the year. During this time, cultural management decisions made can be reviewed and evaluated and modified if necessary for the next growing season.

Remember: Despite everything that is mentioned in the literature, proper plant selection is critical, and thus the most important factor that can be controlled in achieving success with ornamentals.