

Landscape Series

Planting a Tree or Shrub

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Before you plant . . . select the right plant

Developing an entire new landscape, revitalizing an existing landscape or planting a single tree is an investment in your home and the environment. Investing wisely increases the return and reduces disappointment.

The process of landscaping your home begins with proper plant selection and understanding your site. Knowing which plants are best suited to the site is critical to future success. For example, hostas, ferns, bigleaf hydrangea and most azaleas are better suited to shady locations and will struggle in full sun.

A common problem in many new landscapes is poorly drained soils. In this case, we have two choices: either deal with the drainage issue or select plants that tolerate poorly drained soils. Again, proper plant selection is critical. In this situation, knowing that plants such as boxwood, most evergreen hollies and evergreen azaleas will die in poorly drained sites should prompt you to avoid these plants.

A clear understanding of a plant's attributes, good and bad (e.g., plant size, flower fragrance, flowers and fruits, messy fruits, brittle wood) is needed. Many new landscapes are overplanted because homeowners did not consider the ultimate size of the plants selected. This leads to dissatisfaction, extra pruning and the inevitable need to replace or severely prune the plant. Placing a

large shade tree close to the corner of a house or a shrub growing to 12 feet beneath a 4-foot window does not make sense long term. Be sure that the mature plant size will fit the site. Information on plant characteristics can be obtained from books, the Internet or professionals at your local garden center.

Know your planting site

Before purchasing plants or planting them, you need to know several things about the planting site. Issues such as sun exposure, soil pH, drainage and location of utilities need to be considered.

Start with the soil. Significant changes to the soil are easy prior to planting the landscape. Testing your soil before planting is easy and will provide useful information that will improve the long-term success of your landscape. Collecting a soil sample is a fairly easy process (see FSA2121, *Test Your Soil for Plant Food and Lime Needs*, at www.uaex.uada.edu). Soil samples can be submitted at your local county Cooperative Extension office.

One of the most important pieces of information gained from a soil test is the soil pH. The soil test report indicates the current soil pH (acid or alkaline) and makes a recommendation based on the plant type if a change is required. Soil analysis is even more important if other plants in the landscape are having problems.

Check the soil's drainage with a simple percolation test. The rate at which water drains through the soil

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affects plants' survival and growth. Poorly drained soil results in too much water in the root zone and a lack of needed oxygen for healthy roots. To determine percolation rate, dig a hole 1 foot deep, fill with water and see how long it takes to empty. If the water level drops more slowly than 1 inch per hour, drainage is poor. Poorly drained sites can be corrected by proper plant selection, installing a drainage system, elevating plants or planting beds above the affected area.

Before digging, make sure you know the location of buried and above-ground utilities. Before planting any plant, contact Arkansas 811 (call811.com/map-page/arkansas; 1-800-482-8998 or call 811) to locate all underground utilities.

Never place any tree growing taller than 15 feet beneath power lines or within 15 feet of them. Under ideal conditions, keep trees away from utility wires a distance equal to the mature spread of the tree being planted. For example, if the branch spread on a mature tree will be 30 feet, plant the tree 30 feet away from overhead utility lines. Do not plant too close to surrounding objects including houses, barns and other trees. Remember that tree roots spread well beyond the branch area of the tree and roots can interfere with foundations, sidewalks and paved areas.



Time to dig

Prepare the planting hole.

Start the planting process by clearing vegetation and mulch from the site at least 6 inches beyond the proposed hole or bed. For normal planting in well-drained soil, the hole for an individual plant should be *at least* one-and-a-half to two times the width of the root ball and only as deep as the root ball or soil mass. Planting depth is especially critical for trees. The goal

is to have the bottom of the trunk root flare (see photograph) at or above the finished grade of the soil.



Planting depth is critical. The soil level should be at or below the **trunk root flare** (shown by the end of the pointer).

Discoloration on the bark near ground level of bare-root plants indicates the soil level at which they originally grew. **Do not dig the hole deeper than the root ball.** If the top of the root ball is set below the surface of surrounding soil, even by only 3 inches, water can collect in the planting hole, resulting in a lack of oxygen to the roots. If a deeper hole is dug and then filled with loose soil, the plant can eventually settle below the soil surface level. In poorly drained or compacted soil, make the hole three to four times the width of the root ball and not quite as deep as the root ball. When planting on steep slopes, set the plant so the top of the root ball on the uphill side is about even with the soil. The side of the root ball on the downhill side will be well above the surrounding soil.



Planting a balled and burlapped (B&B) plant

B&B plants are field-grown trees and shrubs that are dug, the soil ball wrapped in burlap and then laced up with string or rope. Many large trees also have a heavy-gauge wire basket outside the burlap wrapping to help stabilize the soil around the tree roots.

In a majority of cases, the burlap fabric is biodegradable. In those very rare cases, if the burlap is made from plastic, it must be removed as far down the root ball as possible so the root ball is in direct contact with the backfill soil. Roots will not grow through the synthetic burlap material.

In Arkansas, biodegradable or natural burlap can be left along the sides of the root ball since it will naturally break down. Burlap and any rope or tie material, whether natural or synthetic, that is located at the top of the root ball should be removed. Materials that are in direct contact with the trunk are of special concern as they may eventually girdle the trunk. Synthetic materials may be difficult to distinguish from natural materials. Synthetic rope is usually orange and synthetic burlap is typically a slick green or tan. A simple test involves burning a small portion of rope or burlap with a match. Synthetic materials will melt but not really burn.

Most large trees are sold with a wire basket outside the burlap wrap. The wire basket is designed to help in the shipping and handling of these heavy root balls. Wire baskets degrade slowly in soil. There is a great deal of discussion whether to remove all or some portion of the wire basket from the root ball. The wire basket does present a potential risk to the operator of a stump grinder if the stump is ground before the wire fully degrades. While most research shows that the wire basket has little effect on trees, most horticulturists recommend removing at least the top 12 to 18 inches (two or three levels) of wire from the root ball. This allows the major roots and trunk to grow without possibility of becoming girdled by the wire. A bolt cutter or heavy wire cutter makes the job quick and easy. Since most roots grow in the upper 12 inches of soil, few if any roots would be potentially girdled by the lower portion of the basket.

It is important to understand that the purpose of the burlap, rope and basket (if present) is to

keep the field soil in close contact with the roots.

Extensive handling of the root ball or unnecessary removal of these materials may damage the plant's root system. It is best to remove any of these materials, if you choose to remove them, once the root ball has been placed in the planting hole. This may require that the top of the planting hole be widened to provide access to remove burlap and wire basket materials.

If the tree you purchased has **black** trunk wrap, remove that at planting.

Planting a container-grown plant

A majority of ornamental plants are now sold in containers. The shift to container-produced plants offered several advantages, including increased availability and improved handling of plants, and made certain plants available that did not respond well to B&B production. Rather than growing in field soils, container-grown plants use organic materials such as compost, peat moss and bark.

It would seem obvious, but the container must be removed before planting. While obvious, it is not uncommon to find dead plants in the landscape planted with the plastic container intact. Removing plants from containers can be accomplished several ways. Plants grown in thin-walled pots (blow molded; fiber pots) can be removed by cutting or slicing the container walls. On thicker-walled containers it is better to slide the pot off the root ball. This may be difficult for pot-bound (or root-bound) plants. In that case, laying the pot on its side and then pushing down on the pot in several quadrants may help separate the root mass from the container wall.

Once the pot has been removed, determine if there are extensive roots circling the outside of the root ball (see photos below). Plants with extensive or excessive (some root growth is normal and a good



Extensive root circling.



Root circling in container-grown trees can result in problems many years later.

thing) root development at the outer edge are referred to as root-bound or pot-bound. While this is typically not a serious problem for annuals and herbaceous perennials, it is a serious problem with most shrubs and trees. These circling roots continue to increase in diameter and can eventually strangle the trunk of a tree.

If the plant has extensive circling of roots, these roots should be cut with a knife or sharp spade. Make three or four slices an inch or two deep starting from the top of the root ball to the bottom. For very large containers (e.g., 15-gallon and larger), pay particular attention to circling roots in the upper one-half or one-third of the root ball. Recent studies show that slicing the root ball does appear to enhance the distribution of regenerated roots in the backfill soil profile. Instead of growing almost exclusively from the bottom of the root ball, slicing encourages root regeneration along the sliced sectors.

Planting a bare-root plant

In Arkansas, there are very few woody plants sold bare root. Bare-root plants are grown in a field, harvested in the fall by removing all of the field soil, graded, stored in large refrigerated rooms and then shipped in very early spring. The most common bare-root plants sold in Arkansas are roses and fruit trees. Other bare-root plants include fruit plants (e.g., strawberries), herbaceous perennials and some groundcovers. The bare roots are packed with a shipping material such as cellulose strands or peat moss and then sealed in a plastic tube or bag.

Bare-root plants are less expensive, but much more perishable, than container or B&B plants. Bare-root material should be planted as soon as possible after purchase. Make sure the roots do not dry out or freeze. After removing the packing bag, remove any packing material carefully from the roots. Inspect the roots for any diseased, broken or dead roots and remove any of these roots with pruning shears prior to planting. Shorten exceptionally long roots. Immerse the roots in a bucket of water for at least one hour.



Packaged bare-root plants.

Make a cone-shaped mound in the center of the planting hole. Position the plant so that it's at the correct depth. Discoloration on the bark near ground level of bare-root plants indicates the soil level at which they originally grew. For most grafted plants such as fruit trees, the graft union will likely be one to three inches above the ground level. Spread the roots as evenly as possible in the hole. Bare-root trees are more likely to require staking following planting than container or B&B plants.

Amendments at planting and backfilling

The value of amending backfill soil when planting trees and shrubs has been debated for decades. In all but exceptional circumstances where the soil is very poor, extensive research has shown **no need to incorporate any amendments**, fertilizers, living organisms, water-holding gels, humic acids or organic products into the backfill soil. Simply use the loosened soil that came out of the planting hole. Loosen and break up large clods of soil and remove large rocks before backfilling.

The exception to not adding backfill amendments is where existing soil is so poor (e.g., mine spoil, small cutout in a concrete sidewalk, parking lot island) that all soil in the area needs to be replaced with good quality soil. Incorporation of organic matter when planting in very sandy or gravelly soils will also increase the water-holding capacity. If results from a soil test indicate the pH needs to be adjusted, incorporating acidifying (e.g., sulfur) or liming (e.g., limestone) materials in the backfill amendment at planting is most efficient. If the soil does require a significant change in pH, follow-up tests in subsequent years are encouraged to monitor any changes.

Fertilizing

Adding slow-release fertilizer of any type at planting has never been associated with improved or reduced survival. There are only a few documented cases of increased growth when fertilizer was applied at or soon after planting. A response to fertilizer at planting is most likely to occur in sites with poor soils. Avoid using soluble fertilizers or manures when planting bare-root plants as the salts can damage the roots. When fertilizer is applied, spread the amount as indicated by the manufacturer on top of the root ball after planting or on top of the mulch. Plants may require fertilizer after the establishment year depending on results from a soil test or based on the planting situation. Typically trees and shrubs that are planted in fertilized turf areas do not require additional fertilizer.

Irrigation

Adequate irrigation after planting is the most critical factor in determining success after planting. Water every plant immediately after planting. Unlike established plants, research clearly shows that recently transplanted plants establish faster with light, frequent irrigation. The actual amount of water will need to be adjusted based on the weekly precipitation. In Arkansas, during the summer months, newly transplanted plants may require supplemental irrigation several times per week. The actual amount of water will depend on the type of soil and size of plant. As an example, a 2-inch tree may require 4 gallons of water distributed evenly over the root ball every irrigation.

Plants can be killed just as easily by overwatering as underwatering (drought). When in doubt, feel the soil in the planting area to see if it is moist.

Mulching

Somehow, the concept of mulching has gotten out of hand. Over the past 30 years there has been a shift from no mulch to “volcano” mulching. Mulching offers many advantages including reducing weeds, protecting the trunk from string trimmer damage, conserving soil moisture and adding organic matter to the soil. Research has shown a dramatic increase in tree growth when a small area above the root ball is maintained free of vegetation.

The depth of an organic mulch should not exceed 3 inches after settling. Never pile mulch against the trunk. Mulch resting on the trunk and applying too thick a layer may result in increased stem and root diseases, may harbor rodents that feed on the trunk and may reduce the oxygen required by roots.



Avoid volcano mulching.

A wide variety of products is available for use as landscape mulch. Mulch can be broadly categorized as either organic or inorganic. Common inorganic mulch materials include crushed stone, recycled tire chips and gravel. Organic materials include pine needles, softwood or hardwood tree bark, colored wood chips, composted yard waste and cottonseed hulls. A rare problem with bulk hardwood mulch is something called “sour mulch.” Hardwood bark that has been held in a large pile is most susceptible to this problem. Anaerobic conditions in the large pile cause a buildup of gases that can burn foliage on plants when spread as a mulch layer. Bark that has a noticeable odor or causes your eyes to burn should not be immediately spread under plants. Instead, spread the mulch in a non-plant area to ventilate the harmful vapors.

For 3 inches of spread mulch, a 2 cubic foot bag will cover 8 square feet, a 3 cubic foot bag will cover 12 square feet and a 1 cubic yard (27 cubic foot) bulk load will cover 108 square feet.

Staking and guying trees

Do not stake trees unless it is absolutely necessary. Stake only for special situations such as high-wind areas, very sandy soils, very large or top-heavy trees, or for protection from vandalism, heavy foot traffic or equipment damage. Otherwise, allow the tree to develop naturally, strengthening as it grows.



The depth of an organic mulch should not exceed 3 inches after settling.



Before digging the hole, measure the root ball depth.



Check the hole depth before planting.



Burlap may be removed from the upper surface of a B&B rootball.



Watering after planting is very critical.

Acknowledgment is given to **DR. DAVID HENSLEY**, former professor - ornamentals, as an original co-author of this fact sheet.

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