

# PLANTING TREES AND SHRUBS

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*(This handout was written to accompany a power point presentation.)* Trees and shrubs represent a major investment for homeowners, industrial parks, and municipalities. Careful selection of plants, siting, soil preparation, and planting, along with good follow-up care, help ensure success. No amount of good post-transplanting cultural care compensates for insufficient planning or poor planting practices. Also, good planting practices help ensure that the tree or shrub will be healthier and more resistant to disease and insect problems, especially during transplant recovery.

## GENERAL PREPARATION

### TRANSPORT

Transport plants carefully. Protect tree trunks by wrapping with cardboard sleeves or by covering exposed areas of the front-end loader bucket, dolly, etc. to prevent bruising or scarring caused by rubbing of tender bark against metal. Lift balled and burlapped (B&B) or container grown plants by the ball or container only, never by the trunk. Don't allow B&B material to fall, be dropped, or sustain trauma that would loosen the soil in the ball. Injury caused by improper handling may not show up immediately, but will eventually (perhaps a year or two later) manifest itself as cracking or bark separation at the point of damage.

Trees and shrubs in leaf that are being transported in open flatbed or pickup trucks should be protected with a canvas tarpaulin or other material that will prevent desiccation or drying of leaves that will flap madly at highway speeds. Even the top of a tree sticking out of the back of a station wagon needs to be wrapped. Do not leave covered plants in the sun for extended periods of time.

Larger trees can be moved and/or positioned using a mechanical lift-gate, I-beam winch and pulley system, knuckle crane, front-end loader equipped with a boom and chain, or other appropriate equipment. A Vermeer or other brand of tree spade will dig, transport, and position the tree in its new location. Stabilizer legs on a truck improve safety where the weight of larger plants may unbalance a vehicle. Smaller plants can be moved short distances on a low-wheeled cart, hand-truck, or wheelbarrow.

### SOIL

In all cases plant when the soil is moist, not wet. Working with or planting in wet soil can create clods and destroy soil structure. **Run a soil test** to determine whether fertilizer or limestone is needed. Fertilizers are generally not needed until the year after planting unless a soil test report recommends otherwise.

For trees, improve the soil placed back into the hole (backfill) **only** if the excavated soil is of poor structure or tilth and the existing soil contains builder's rubble or is otherwise unacceptable. For container grown shrubs 10 to 30% of soil may be replaced with an amendment such as compost, leaf mold, or moistened, shredded peat. In all cases do not improve any soil to such an extent that when the new roots reach the side of the hole they "refuse" to grow into the surrounding existing or native soil. Loosening and aerating soil is more important. For flower and shrub beds the entire soil area may be improved before shrubs are positioned for planting.

When planting in clay-based soils, the sides of the planting hole may become shiny and smooth during the digging process. This smooth side may create a barrier impenetrable by roots. To prevent this "glazed pot" effect, score (*create small grooves using a 3-prong hand cultivator or similar tool*) the sides of the hole prior to planting.

When planting on a very moist site, even plants that are wet-site tolerant will benefit from placing the soil line of the ball up to, but not exceeding, 3" to 4" higher than surrounding grade. The site tolerance they have once established, they do not have as transplants. (**NOTE:** This does not mean that the plants can be set in a little depression in the ground and the ball covered with a little soil and some woodchips. This is not planting! If the plant must be set higher than 3"-4", then a berm or raised bed with gradually sloping sides should be created.)

## MYCORRHIZAE AS SOIL AMENDMENTS

In some research studies, mycorrhizal fungi have shown promise as restoratives in damaged or altered ecosystems. In healthy soil these fungi are naturally occurring, colonize roots, and improve absorption of water and nutrients. Tillage, synthetic fertilization, fungicide usage, topsoil removal, erosion, home construction, and leaving soil bare are activities that can reduce or eliminate beneficial soil microorganisms.

There are commercial products containing various mycorrhizae that are advertised to help trees and shrubs recover more quickly from transplant stress. If purchasing a mycorrhizal supplement, buy from a producer from our geographical area and read the label to see if the plant(s) you are installing will benefit from that specific mycorrhiza or combination of mycorrhizae. The worse the soil, the more likely that transplants will benefit. There are many different ecto- and endo-mycorrhizae that help some species, but not others. The jury is out about whether the purchase and use of these products actually will speed transplant recovery and ultimate survival. The good news is that they won't hurt anything.

Note: When planting native species, some advantage may be derived from simply adding a handful or two of rich organic duff from the woods to the planting hole.

## STAKING AND WRAPPING

Staking is unnecessary unless trees are large, top heavy, or planted where winds are strong. Use untreated stakes that are 1 1/2" to 2" square and will extend out of the ground 2/3 the height of the tree. Position stakes perpendicular to the prevailing winds. Drive them 12" into the soil at the bottom of the planting pit for good support.

Connect the stakes to the tree with belt-like straps (preferable) or with wire threaded through 12" of sturdy rubber hose. **Never** allow bare wire to come in contact with the trunk. Leave some slack in the wire or strap to allow some movement of the trunk. Even if stakes are left in the ground to protect against vandals or other injury, **always** remove wire or strapping after 1 year to prevent girdling (*damage to the trunk that cuts through the bark into the heartwood completely around the tree.*). Unstaked trees should be checked 2-3 weeks after planting. If they are leaning, stake them at that time.

Research indicates that trunk wrapping to prevent frost cracking and sunscald of the bark is not necessary. Frost cracking and sunscald are usually secondary to mechanical injury such as improper transport, root injury or flush-cut pruning and will not necessarily be prevented by using tree wrap.

## PLANTING PROCEDURES

### BALLED AND BURLAPPED (B&B) PLANTS

B&B plants have their roots in a rounded soil ball wrapped in burlap or other material for transport. The labor of digging, wrapping, and lacing the ball or placing it in a wire basket and the weight that must be transported make them more expensive than their bare root or container-grown counterparts. Advantages of using B&B material are that larger trees and shrubs can be moved, there is less damage to the root system, and once they are balled and burlapped, the plants can be replanted at almost any time.

- 1 Handle the ball carefully to avoid loosening soil from around roots. Hold plant by the ball only; never carry it by the trunk.
- 2 Dig a hole that is approx. 2-5 times the diameter of the ball in width (minimum 12 inches wider), and the same depth as the soil ball. (The hole may be sloped to grade up from the deepest area to 12 inches deep at the edges. This is the depth of expected root development) Firmly tamp the bottom of the hole if soil was loosened in the digging process. Score the sides of the hole to prevent a "glazed pot" problem. Before the plant is placed in the hole, **re-check** the width and depth of the ball, so the tree will not have to be taken out of the hole if the first measurement was incorrect.

- 3 Position ball in hole. Be sure the ball is at proper level by laying a spade or shovel across the top of the rootball. The handle should touch or be 1"-2" above the surrounding soil. If there is any possibility the plant may settle deeper into the hole as the fill settles, plant so the root flare (area where the support roots grow out from the base of the trunk) is slightly above grade. This **root flare must be visible** at the top of the ball when the burlap is laid back, but now would be the time to check. If the flare has been buried in the digging process, gently scrape away soil at the trunk of the tree until support roots, not just adventitious roots, are found. If necessary, add soil under the ball until this root flare is even with or slightly above surrounding grade.
- 4 Backfill around the soil ball two-thirds the hole's depth with loosened soil. Settle soil carefully to eliminate air pockets. Do not stomp on or in any way compact soil. If tree is to be staked, insert stake in the hole.
- 5 Loosen and lay back biodegradable burlap, checking again to be sure the root flare is at the right level. Remove all rope or string at trunk or stem. (Synthetic or non-biodegradable burlap must be removed completely or trimmed off as low as possible.) If the ball is in a wire basket cut away at least the top eight inches of the basket with wire snips.
- 6 Water thoroughly. Allow to drain. Add backfill to ground level. Water again.
- 7 Prune dead or damaged branches. Do not prune the leader or other healthy live tissue unless a major structural problem must be corrected. Shaping is generally done after the first growing season.
- 8 If desired, create a small ridge of soil around the perimeter of the hole to prevent runoff if the tree has been planted on a slope. (This ridge should be unnecessary on level ground if the hole is large enough and if the planting soil has been properly aerated and has not been compacted during the backfill process.) Apply mulch 2" to 3" deep. Do **not** pile mulch on or closer than 4 inches from the trunk or crown of the plant.
- 9 If tree is staked, attach straps loosely to stake allowing some side-to-side movement of the trunk.

### **BARE ROOT (BR) PLANTS**

Bare root material is planted while dormant, so the season is limited to early spring and fall. Many trees up to 2 to 1/2" caliper can be planted BR. Two advantages of bare root planting are the reduced cost (no ball has to be dug and wrapped) and the greatly reduced weight of the tree. Some plants, like flowering and Kousa dogwood, can be planted bare root only in spring.

- 1 Transport plants under a tarp to reduce drying. Store plant away from drying sun and wind if it cannot be planted immediately. Keep roots in their original package or pack in a moist medium, such as peat, compost, or wood chips.
- 2 When you are ready to plant remove packing material and soak roots in a bucket of water for from 30 minutes to 12 hours. Trim any broken, damaged, or excessively long roots. Preserve as many fibrous roots as possible. Remove damaged branches. Do not prune the leader or other healthy wood.
- 3 Dig a large hole. (Three times the diameter of the expanse of roots is best. One foot wider than the root mass is the bare minimum.) Score the inside of the hole to prevent a "glazed pot" effect.
- 4 Spread roots over a cone of backfill. Position plant so it will be upright (plumb) and at the same depth it was in the nursery, never lower. The root flare must be even with the surrounding grade. Plants with a taproot should be planted into a flat-bottomed hole. Graft unions should be at or slightly above the soil line. **Re-check** by using a spade or shovel laid across the hole. The handle should line up with the nursery soil line and the root flare on the BR plant.
- 5 Backfill hole 1/3 with soil. Shake tree occasionally to settle soil around roots. Firm soil gently to eliminate air pockets. Water thoroughly. Allow to drain. Insert stake, if tree is to be staked.
- 6 Add remainder of loosened backfill even with surrounding ground. Water again.

- 7 Create a small ridge of soil around the perimeter of the hole to prevent runoff if the tree is planted on a slope.
- 8 Apply mulch 2"-3" deep. Keep mulches at least 4 inches away from the trunk.
- 9 If tree was staked, attach straps loosely to stake allowing some side-to-side movement of the trunk.

### CONTAINER PLANTS

Plants in containers have the advantages of intact root systems, lower cost than B&B material, and a long transplant season. A disadvantage is that they can become severely pot bound if they are kept in their containers too long at the nursery or anywhere else. Roots can bend and wrap around inside the container, creating the potential for future girdling root problems. Handle plant by the container only.

- 1 Dig a hole at least 2 times the width of the ball and the same depth. Score the sides of the hole. Check the depth by placing the plant in the hole, container and all. Adjust depth so top of soil is even with or slightly above the top of the hole.
- 2 Remove the container (even fiber pots) carefully and completely. Cut away larger containers with tin snips.
- 3 **IMPORTANT:** Twisted and girdling roots and matted root systems are often a problem with container material. If necessary, make several vertical slices with a sterile knife/razor through the sides of the outer layer of roots and the growing medium an inch or so deep. Cut up through the bottom of matted roots about 6 inches. Spread out roots of pot-bound trees. Trim broken or damaged and excessively long roots.

The soil balls of plants like rhododendron and azalea may also be "**butterflied**" by slicing through the center of the ball about three inches down from the crown and entirely through the center of the ball (the effect is like creating a pair of pants out of a skirt.) The ball is pulled apart slightly at this slit to enable it to be planted over a cone of soil in the hole. This method also allows for the roots to be higher in the soil, a "must" for these shallow rooted plants.

- 4 Since most container material is in a highly organic potting medium, up to 30% of the backfill can be amended with an organic material such as compost or moistened peat. Be sure the amendments are thoroughly blended into the soil. Add this improved soil to hole. Firm soil lightly to settle.
- 5 Position plant at proper level in the hole. Wedge a clod of soil or some backfill under the soil mass if needed to support the plant in an upright position.
- 6 Fill hole about 1/3 with backfill, firming lightly around base of ball and carefully eliminating any air pockets. Insert stake, if tree is to be staked.
- 7 Water thoroughly, allow to drain. Add backfill even with surrounding ground. Water again.
- 8 Apply 2"-3" of mulch. Do not pile mulch on the trunk or crown of plant.
- 9 If tree was staked, attach straps loosely to stake allowing some side-to-side movement of the trunk.

The "rule of thumb" for determining the necessary size of the root ball is that it should be approximately 12" of root ball for every inch of trunk diameter at 4" above ground level for deciduous trees with a caliper of 6" or less. The ball on evergreens can be a little smaller. The depth of the ball is about 2/3 the diameter. Soil weighs about 110 lb./cu.ft. An easy method for computing approximate soil ball weight is to square the diameter of the ball in feet, multiply this figure by the depth of the ball in feet, then take 2/3 of this total and multiply by 110. This gives the approximate weight of the soil in pounds. A 5-6' tall tree with a 16" wide ball may weigh about 100 lb. A 1 1/2" to 1 3/4" caliper tree with a 22" root ball may weigh about 260 lb.