

Proper Tree and Shrub Planting

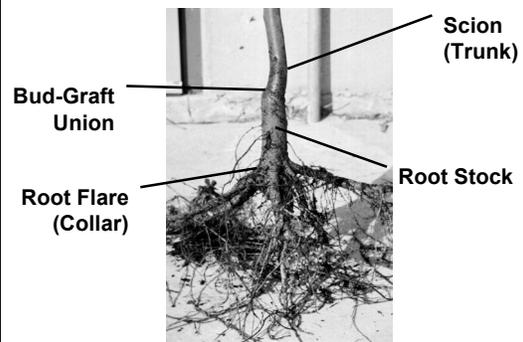
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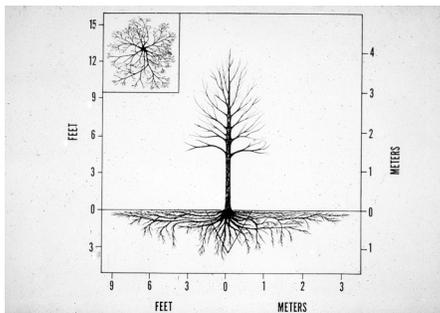
Things to Consider Before Planting

- ◆ **Where to Plant**
 - ✓ Look out for above ground and below ground utility lines or septic fields
 - ✓ Is location big enough, both height and width, to support tree/shrub growth
 - ✓ Call Digger's Hotline **BEFORE** you dig!
- ◆ **Plant the right plant in the right location**
 - ✓ Do a soil test first to determine what can grow in your soil environment
 - ✓ Chose plants adaptable to your soil conditions
 - ✓ Choose cold hardy plants that are pest resistant
- ◆ **Buy only quality nursery stock**
 - ✓ Look at the roots, not just the top

Types of Planting: Balled and Burlapped



Harvesting B&B Trees: Root Loss



Planting Balled and Burlapped Trees

- ◆ **Step One:**
 - ✓ Determine where the root collar is located within root ball
 - ✓ Locate at least two main, large structural roots, measured 3-4" from trunk
 - ✓ Located below the bud/graft union, often 4-12" deep in ball



Planting Balled and Burlapped Trees

◆ Step Two:

- ✓ Dig planting space, not a hole, three times wider than root ball, but not deeper, loosen surrounding soil to encourage root growth
- ✓ To determine proper planting depth, measure the distance from bottom of root ball to root collar, dig no deeper!
- ✓ Leave bottom of planting area undisturbed; need it firm



Planting Balled and Burlapped Trees

◆ Step Three:

- ✓ Before placing tree in planting area, cut and remove lower 1/3-1/2 of wire basket, remove all tags, ribbons, and trunk guard/tree wrap



Planting Balled and Burlapped Trees

◆ Step Four:

- ✓ Gently roll the root ball into planting area
- ✓ Do not drag or lift tree by trunk; this can harm trunk and cause root injury
- ✓ Straighten tree in planting area



Planting Balled and Burlapped Trees

◆ Step Five:

- ✓ Cut and remove remaining upper half/two thirds of wire basket, all burlap (regardless if treated or not), nails, twine



Planting Balled and Burlapped Trees

◆ Step Six:

- ✓ Carefully remove soil from top of root ball to expose the root collar (often 4-12" deep in root ball)
- ✓ Check to make sure root collar is 1-2" above soil grade
- ✓ Roots, not the root flare, should be 1-2" below soil surface



Planting Balled and Burlapped Trees

◆ Step Seven:

- ✓ Back fill remaining planting area with excavated soil, do NOT amend
- ✓ Water as the planting area is being filled to eliminate large air pockets
- ✓ Do not tamp damp soil with your foot; this compacts the soil



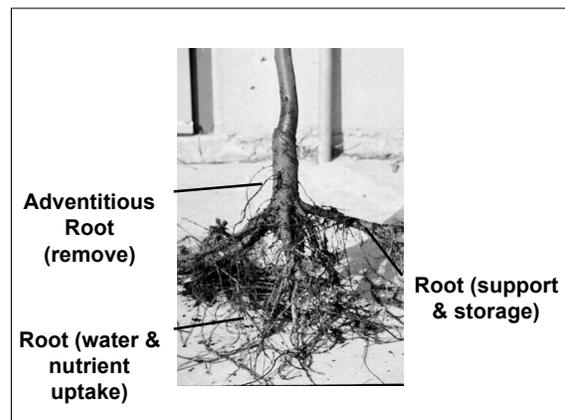
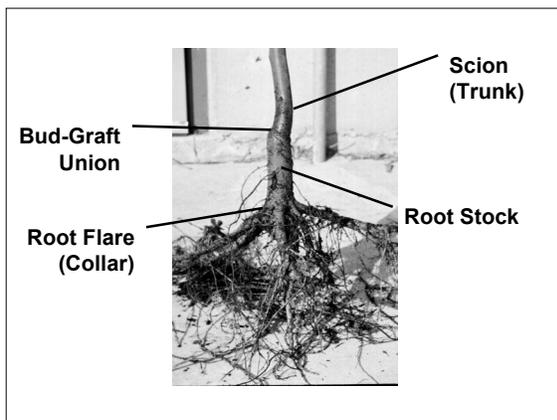
Planting Balled and Burlapped Trees

◆ Step Eight:

- ✓ Water the plant thoroughly after backfilling
- ✓ Newly planted trees and shrubs will need watering often; check every day in hot, dry weather
- ✓ Check wetness of soil directly in root ball, if moist, do not water
- ✓ Plants need 1" of water a week; rainfall is often insufficient
- ✓ Sandy soils need more frequent watering than clay soils



Types of Planting: Bareroot



Bareroot Planting

◆ Method similar to balled and burlapped, except:

- ✓ Inspect root system for circling and girdling roots: must cut girdling roots; avoid J-roots (roots mainly on one side)
- ✓ Easiest of the three to plant, less time, weighs less than B&B, no soil-root interface as no soilless mix is used, very easy to see where root flare originates
- ✓ Plants often dormant, narrow planting window, this is changing with Missouri gravel bed system
- ✓ Some trees can be planted bareroot in spring, fewer in fall
- ✓ Soak roots in water for a couple of hours prior to planting

Bareroot Planting

◆ Method similar to balled and burlapped, except:

- ✓ Planting area is much shallower compared to B&B areas
- ✓ Have undisturbed, small mound on bottom of planting area
- ✓ All roots must be stretched out away from trunk into existing soil on top of mound
- ✓ Crumble soil and fill in crevices around roots by hand
- ✓ Use water to eliminate air pockets
- ✓ Trees will need to be staked

Types of Planting: Container

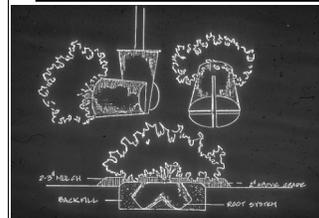
Container Planting

- ◆ Method similar to balled and burlapped, except:
 - ✓ Must remove container prior to planting
 - ✓ Inspect root system for circling and girdling roots: must cut girdling roots
 - ✓ Remove as much as possible the soil mix surrounding the roots as very different properties than soil in ground; leads to interface and bathtub effect
 - ✓ More tedious and time consuming than bareroot and B&B planting

Container Planting

- ◆ Method similar to balled and burlapped, except:
 - ✓ Planting area is much shallower compared to B&B planting areas
 - ✓ All roots must be stretched out away from trunk into existing soil; think of a pancake, not a hole
 - ✓ Crumble soil and fill in crevices around roots by hand
 - ✓ Use water to eliminate air pockets
 - ✓ Trees will need to be staked

Container Planting: Shrubs



Shrubs often do not have a root flare, hence, locate crown at soil surface

Butterfly cut, slice rootball from top to bottom, 1" deep on four sides, or bareroot container grown shrubs prior to planting to avoid soil interface and poor root establishment

Staking Trees

- ◆ When to do it?
 - ✓ All bareroot and container grown trees, some B&B
 - ✓ Windy locations
 - ✓ Area subject to vandalism
 - ✓ Prevents lawn mower blight
- ◆ How to stake?
 - ✓ Do NOT use rubber hose, wire, or other constricting material; will girdle trunk within one year!
 - ✓ Use loose, flexible material: 2-3" wide, canvas or seat belt webbing material either with metal grommets or not
 - ✓ If have metal grommets, place heavy gauge wire through grommets and around tree stakes
 - ✓ If no grommets, place flexible material around stake and staple it onto itself to tighten, but not too tight

Staking and Wrapping Trees

- ◆ How to stake?
 - ✓ Want a little slack to allow for tree movement; stimulates trunk caliper growth; too tightly staked, tree will fall over when stake removed
 - ✓ Drive 2" diameter stakes into surrounding soil, outside of tree root ball
 - ✓ Must remove after one year!



Proper Staking of Trees



Proper Staking of Trees



Staking and Wrapping Trees

- ◆ Tree wrap, is it needed?
 - ✓ Used mainly to protect trunk during shipping
 - ✓ Must remove packing material; additional tree wrap is not recommended
 - ✓ Wrapping material placed tightly against trunk increases relative humidity underneath: increases canker fungi
 - ✓ Raises temperatures next to trunk: sunscald
 - ✓ Wrap can hide wounds created at nursery

Types of Mulches

- ◆ Types of mulches:
 - ✓ **Organic mulches:** pine bark, composted hardwood bark, pine needles, leaf compost, wood chips
 - ✓ Organic mulches provide favorable environment for beneficial soil microbes and worms
 - ✓ Over time, organics can improve soil structure and add a moderate amount of nutrients to soil and add beneficial fungi and bacteria
 - ✓ Avoid use of sawdust, grass clippings, colored mulches (shredded pallets that are dyed), peat, manure as mulch: some contain weed seeds, higher C:N ratio, repels water, washes away easily, can trap too much moisture, low aeration
 - ✓ **Inorganic mulches:** cobblestones, pebbles, recycled shredded tires, stone, lava rock; plastic; none of them add any organic matter

Mulches

- ◆ Qualities of a good mulch:
 - ✓ Allow water and oxygen to pass through (very important)
 - ✓ Conserves soil moisture and moderates soil temperature
 - ✓ Controls weeds; keeps lawnmowers and weed whips away from trunks
 - ✓ Ease of application
 - ✓ Readily available and not too expensive

Mulches

- ◆ Qualities of a good mulch:
 - ✓ Longevity: wind and erosion resistant, does not break down fast
 - ✓ Cation exchange capacity: not high or else microbes will tie up the soil nitrogen to break down the mulch (organic mulches only)
 - ✓ Non-toxic to plants and pets
 - ✓ Fire resistant: dry pine needles and peat can be a fire hazard
 - ✓ Aesthetics: natural looking, not a gaudy color

Mulching

◆How to mulch:

- ✓ Mulch plants at time of planting
- ✓ Pine bark and composted hardwood bark last the longest and look the best
- ✓ Add 2-3" of mulch (clay soils) or 3-4" of mulch (sandy soil) on top of planting area
- ✓ Mulch should NOT touch the trunk of trees or be mounded on top of crowns of shrubs
- ✓ NO mulch volcanoes, very damaging, will kill the tree!

Mulching

◆How to mulch:

- ✓ Pull mulch away from base of plants by 3-6" to avoid keeping trunk/base too wet and limit rodent feeding
- ✓ Mulched area should be as far out as possible; the larger the area, the more beneficial
- ✓ Replenish mulch as needed over the years
- ✓ Do NOT have grass growing right up to trunk of plants; turf VERY competitive with tree roots for water and N

Proper Mulching



Watering

◆Watering:

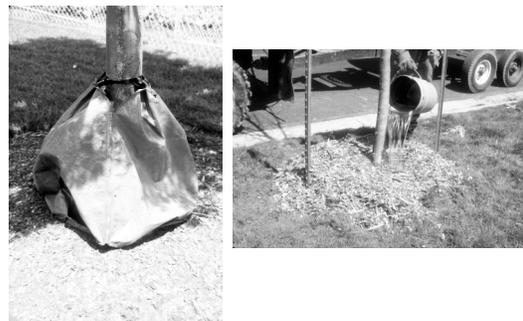
- ✓ All plants, regardless of when transplanted, need 1" of water a week during the growing season
- ✓ Frequency: sandy soils need more frequent watering with lower volume; clay soils hold moisture longer and need less frequency, but more water applied
- ✓ Do not rely solely on rainfall!
- ✓ Do not allow water to puddle on top of soil for long periods of time; indicator of poor drainage

Watering

◆Watering:

- ✓ Will need to water several times a week newly planted material during the first season; dries out very quickly
- ✓ Check wetness of soil directly in root ball, if moist, do not water
- ✓ Drip emitters, soaker hoses, gator bags, or trickle, steady stream work better than regular hose (water runs off and applied too quickly)

Proper Watering



Fertilizing

◆Fertilizing:

- ✓ Do NOT fertilize the first two years after transplanting
- ✓ Want roots to grow first
- ✓ Over fertilized trees will produce excessive shoot growth at expense of root growth
- ✓ Exposed/cut root tips after transplanting are target for soil pathogens; they use fertilizer as nitrogen source and quickly multiply in soil
- ✓ Can start to fertilize the third year after transplanting, depending on size of tree; over 3" caliper, wait another year or two as more transplant shock with bigger trees

Pruning

◆Pruning:

- ✓ Do NOT prune top to balance root system at time of planting; top produces carbohydrates needed by roots to grow new root system
- ✓ At time of planting, only remove dead, diseased, dying, damaged, or rubbing branches
- ✓ Less is better
- ✓ At year three and then on, yearly maintenance pruning is needed

Establishment Period after Planting

Establishment Period = 3 – 12 months depending on USDA Hardiness Zone per diameter inch of tree

2" Tree in Zone 9 = 3 months/inch

2" Tree in Zone 4 = 12 months/inch

Gilman and Watson

Root and Top Growth of a 1" Caliper Tree

A 1" caliper tree would have a root diameter of 4.5 feet. Less than 5% of the root system is transplanted.



Based on 18"
of root
growth/year
Watson, G.

First Year. The tree is under severe water stress soon after transplanting. With good care the stress diminishes, and the root system diameter should increase to 4.5 feet, 100% of the original, by the end of the first year. Roots and top are now balanced and tree should grow with normal vigor

Root and Top Growth of a 4" Caliper Tree

A 4" caliper tree would have a root diameter of 18 feet. Less than 5% of the root system is transplanted in the root ball.



Based on 18"
of root
growth/year

First Year. Root system diameter increases to 6 feet, 9% of original volume. With less than 10% of the absorbing roots to support a full crown (top), the tree is often under severe water stress, inhibiting top growth, including bud formation

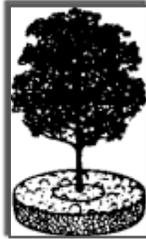
Root and Top Growth of a 4" Caliper Tree



Based on 18"
of root
growth/year

Second Year. Root system increases to 9 feet, 23% of original volume. The tree remains frequently under water stress, inhibiting current season growth.

Root and Top Growth of a 4" Caliper Tree



Third Year. Root system diameter increases to 12 feet, 41% of original volume. As root/top balance is gradually restored, the tree is exposed to less water stress and growth improves.

Root and Top Growth of a 4" Caliper Tree



Fourth Year. Root system diameter increases to 15 feet, 60% of original volume. The effective rate of root generation accelerates as the overall diameter of the root system increases

Root and Top Growth of a 4" Caliper Tree



Fifth Year. Root system diameter increases to 18 feet, 100% of original volume. Roots and crown are now balanced and the tree should grow with normal vigor.

Smaller trees have a shorter establishment period.

Smaller trees get bigger faster.

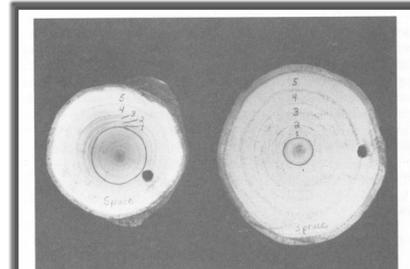


Figure 11 — When planted at the same time, a smaller tree can establish more quickly. The tree on the right, which was smaller in diameter when planted (indicated by circle), grew larger in 5 years.