

GENERAL PLANTING AND ROOT CARE GUIDE - 1

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SOIL: Is the foundation of all life: Healthy soils produce Healthy plants that sustain Healthy animals!

ROOTS: Must penetrate the soil (Check for compaction and other problems when soil testing) which must have **balanced available plant nutrients to sustain healthy growth.**

TEST TOP AND SUBSOILS for available nutrients, salts, and tilth (for water and root penetration). TPSL[®]'s soil test is the only test that routinely supplies this information on all samples. Sample the Top Soil 0 – 12 inches at least once a year, as well as the subsoil in one - foot increments down through 4 feet or to parent material, every three to four years. Make representative composite samples at each level from four sides of the tree at the drip line (do not combine different depths of samples). If there are large visual or physical differences, keep each sample in a separate bag with explanations. Let the lab do the mixing of different sides if needed.

PLANTED TREES: With a spade or hand trowel, trench outward from the edge of rootball and with a water or air hose expose the root development to be sure they were planted correctly at the right depth and the roots are extending outward and down from the developing rootball, often the roots grow inward and must be adjusted for normal growth. Observe for obstructions, walk ways or drive ways and pavements in the root zone which should extend outward from the trunk up to 1 or 2 times the height of the tree. **Then check the root flares as below:**

NATURALLY OCCURRING AND OLDER PLANTED TREES: Uncover (gently) the root collar and the root flares of the major roots (four to eight in number). The collar is usually a swelling at or near the ground-line at the base of the bark and where the main roots begin to flare outward, before entering the soil to a depth of 8 to 12 inches and then branch to gradually smaller and finer "feeder roots". These main root flares are a transition of ærial trunk tissue to subsoil root tissue. Trunk and root flare tissues **must not** be covered with soil, mulch or stone. Root flares support healthy feeder roots. Smothered root flares are the # 2 cause of declining tree health and eventual death. The # 1 cause is trunk damage from weed-eaters, mowers, other implements and improper staking/guying. The #3 cause is **over-watering**, especially in a suburban setting.

EXPOSE ROOT FLARES CAREFULLY by use of a hand trowel, garden hose water, compressed air, or the commercial pneumatic tool, the Air Spade, as shown in the accompanying diagrams and photos.



DO NOT add mulch or stone, neither plant groundcovers nor shrubs within 4 feet from the base of a large tree or 2 feet from the trunk of a smaller tree.

DO NOT build flower beds at the base of the tree!

FEEDER ROOTS support growth with young fine root hairs that compete with sod and other vegetation from the surface down through the ærated soil to about 6 inches.

This major feeding zone is concentrated from the drip line back towards the trunk about half-way and then that same distance outward from the drip line.

This is the area that needs to be fertilized and covered with mulch - especially young trees.

DISEASE AND INSECTS usually attack stressed and weakened trees (Nature's Law – Survival of the Fittest). They should be identified for short term control while restoring the health of the trees as above and below.

FOLLOW SOIL TEST

RECOMMENDATIONS, balance nutrients, especially lime if Calcium is needed, humus, energy and biological products should also be included. With salt problems, soils require internal drainage and water-soluble Ca.

AFTER THE SOIL INOCULANTS (biologicals) are applied:

Spread a 1/1/2-inch layer (**NO THICKER!**) of woodchip mulch and/or a good livestock-based compost under the canopy of the tree and past the drip line as space permits – **keep mulches away from the trunk**, as noted above. Remember that the roots can generally extend very far beyond the drip line. Application of mulch much thicker than 1-1/2 inches will promote growth of roots upwards out of the soil into the mulch and other problems.

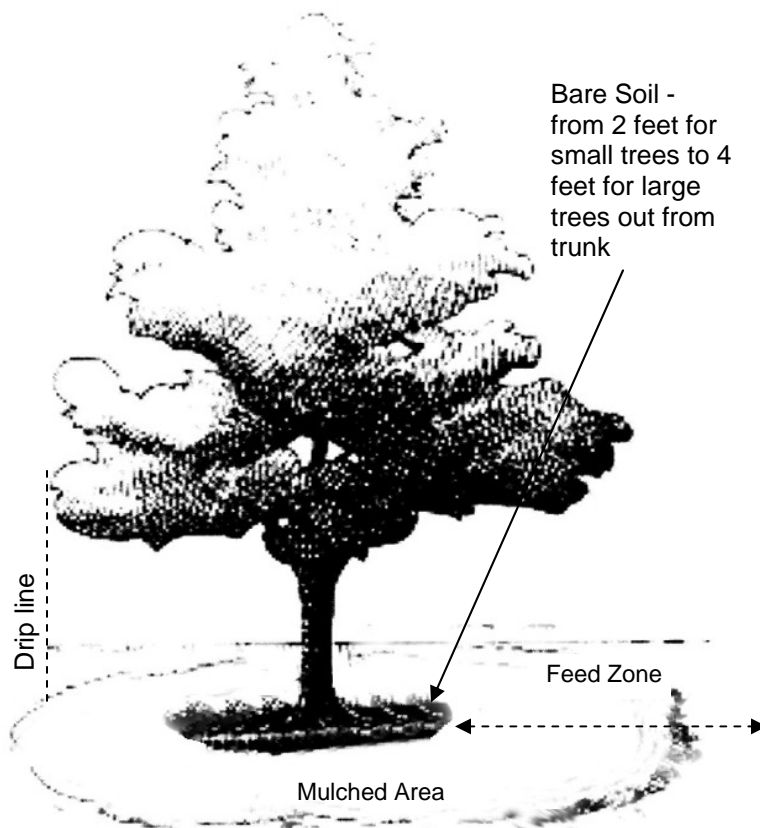
With a water jet on the end of a yard water hose---water jet small holes 12 to 18 inches deep, spaced 24 to 30 inches apart. This moves the nutrients from the compost into the root zone to feed the beneficial microbes in the soil and a (live, active) Soil Inoculant to where they can fight the Pathogens which feed on the roots. Note that biology can store water to be released during drought times. Good soil biology is essential to the health of plants – including trees.

PLANTING – Trees and shrubs are almost always planted too deeply – with the root flares buried – because they are grown and sold that way by the GROWER! **Before** digging the planting pit, remove the tree from the container or remove the burlap from the surface of the rootball and remove the excess soil to expose the flare.

Measure the height of the remaining rootball. Subtract 2 inches and dig the pit to that depth. The root flare should be 2 inches above finished grade. The planting pit should be 2 to 3 times the diameter of the rootball. Bare-root planting will be discussed in a later section.

The pit should have multiple flat sides. If the pit is augured (round – with hard sides), it should be dressed with a spade (sharpshooter) to make the hole have the multiple flat sides. This will help reduce development of encircling roots.

When the tree is removed from the container or burlap, you will almost always see encircling roots. When this is the case, carefully wash the soil from around the roots and straighten them out as best you can [**avoid damage!**] and plant the tree in a hole that is large enough to accommodate the roots when radiating out from the tree.



Do not allow the roots to dry out during this process! Fill the hole with a combination of container soil and native soil. **Water-in thoroughly together with fertilizer** - after backfilling the pit and dressing with mulch.

AN IMPORTANT NOTE ABOUT WATERING – The primary cause of early failure of newly-planted trees is water – usually over-watering, especially in an urban setting. The secondary cause is under-watering.

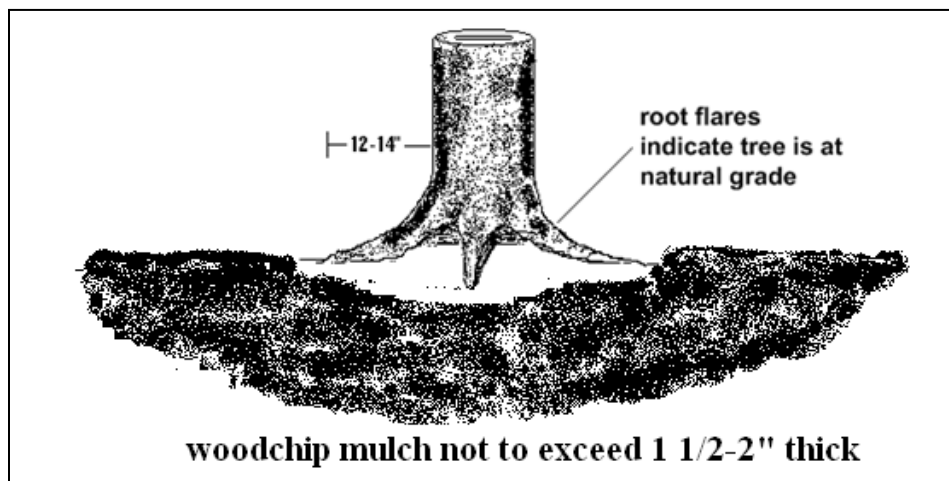
A NOTE ABOUT FERTILIZATION – Fertilization of newly-planted trees has been generally ignored or discouraged by most “authorities”. It seems to be based on the idea that since trees are slow-growing plants, fertilization is not necessary. This attitude defies all logic. A newly-planted tree needs to rapidly develop root growth to stabilize in the soil, endure against drought and of course to promote growth of the tree. A properly fertilized tree can show dramatic early-stage development over one that is not. Further, proper fertilization will reduce the stress and shock of transplant and strengthen it against disease and insect pressures. Rapid development of the root system also can greatly reduce the time guys (if necessary) are needed.

FERTILIZATION CONSIDERATIONS – A dilute water-soluble combination may be used and incorporated into each watering session for the first year. The goal is to provide balanced nutrition with some additional Nitrogen to promote growth after the first year. Initially, pelletized chicken compost (approximately 9-2-2) may be incorporated with the back fill soil. Note that since fertilizer is included in each first-year watering session, is important to not over-fertilize! Too little is preferable over too much! Application rates will be suggested in a later paper.

STAKING / GUYING – Is generally a really bad idea and should be done only when there is some compelling reason – specifically, when there is a strong prevailing wind causing the tree to lean or blow over, or the soil is extremely wet and is unable to support a tree at the time. The cambium layer (immediately under the bark) is easily damaged by restraints and stakes/restraints should be left in place only for the minimum amount of time necessary for the tree to stabilize – usually, 1 to 3 months, maximum – or when no rootball motion is observed..

Restraints around the trunk should be cushioned to accommodate radial trunk growth and to avoid damage to the bark. **Guys should not be pulled tight** – leave enough slack for some lateral trunk movement and vertical growth. **Do not** use bare wire or twine directly around the trunk! Ideally, loose elastic loops should be used. Further, it is the constant flexing of the trunk by the wind that causes the trunk to develop physical strength and promote new root growth. Remove stakes/guys when the rootball no longer moves. This indicates that the new roots have anchored the rootball.

Correct Small Tree Layout



Really Bad Ideas – But Typical



Volcano Mulching –

Piling up mulch in a cone around the trunk.

A great place for trunk decay, disease and insects to flourish.



No Root Flare.
Serious trunk damage.
The tree is doomed.



Just how tall are these trees,
really?
How far down are the
Root Flares?

Here's one that's not getting away! This tree and the others shown have been left staked way past when that might have been necessary. ...and the Root Flare?



Note the banjo-string-tight guys... Also, note the berm (**duck ring**) built around the tree – aids in hand-watering for the first few weeks or months after planting, but should be removed, together with the stakes, afterwards. In none of these installations were Root Flares evident.

These are unremarkably bad installations, as they are typical for most installations.

At another location, a good example of Parks Department solution to tree problems – if the tree isn't doing well, water it. If the tree still doesn't do well, water it some more. When it dies, it will be a mystery.

Note the algæ in the surface of this tight heavy clay. Clays hold water really well. This soil will have very little organic matter, little Oxygen and little biological activity. Note the strange root flare. First step in remediation: **Stop watering!** →

Note also that the grass is sparse and unhealthy.



Another Really Bad Idea – Using Edging Around The Rootball Perimeter!



...and note Volcano Mulching – no bare soil!



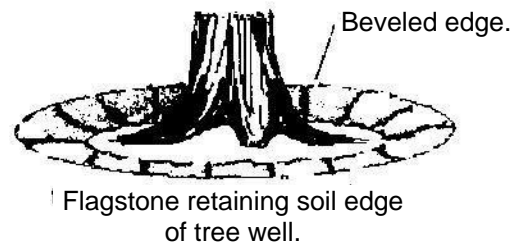
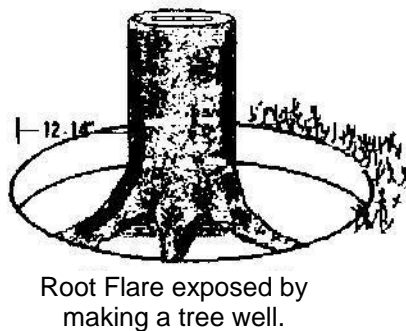
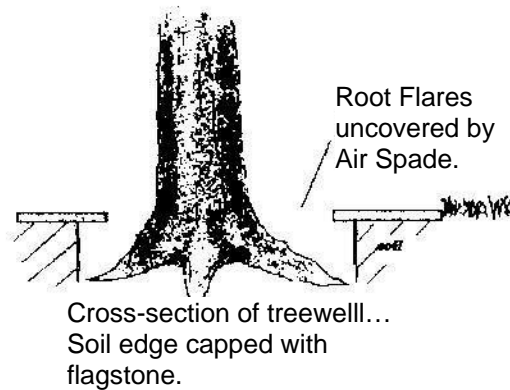
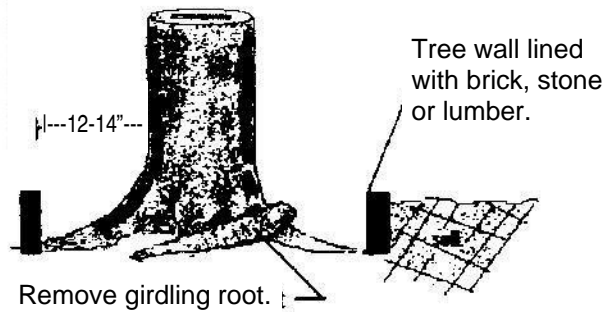
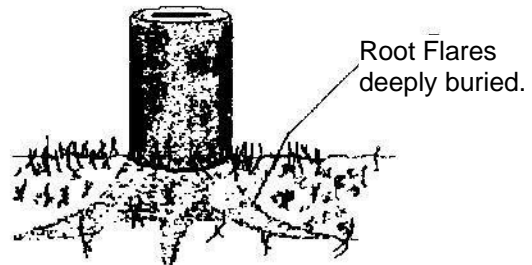
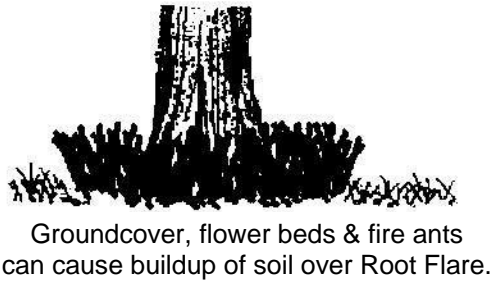
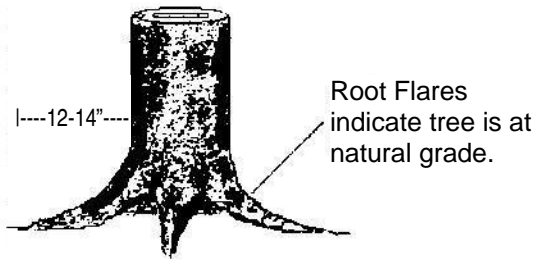
Here are about all the root problems a mature tree can have in just one package! Edging around the rootball – flower bed and mulch around the tree – root flares buried – girdling roots... The several trunks will very likely eventually split off.



References:

**G. Sandy Rose, ASCA <GSandyRose.com> - Shade Masters, Inc. (Principal Contributor),
Malcolm Beck – GardenVille <www.MalcolmBeck.com>,
Howard Garrett <www.DirtDoctor.com>,
University of Missouri <www.conservation.state.mo.us>,
Air Spade <www.air-spade.com>**

Root Flare Situations and Corrective Measures



1. **DO NOT** scrape or scar roots!
2. **DO NOT** use a shovel!
3. **USE** an Air Spade, hand trowel or garden hose.

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