

Getting To The Root of Tree Problems

Landscape and tree care professionals are frequently called on to visit sites with dead or dying trees. Often the owner or property manager is distressed, wanting answers and remedies to the problems from which their special trees are suffering. In many instances, examinations of the aboveground parts of the tree yield little or no diagnostic information.

A method that will aid in the examination of the belowground parts is the Root Collar Excavation (RCX). A RCX involves removal of soil from around the base of the tree trunk to get an idea of the support root condition and orientation (Figure 1).

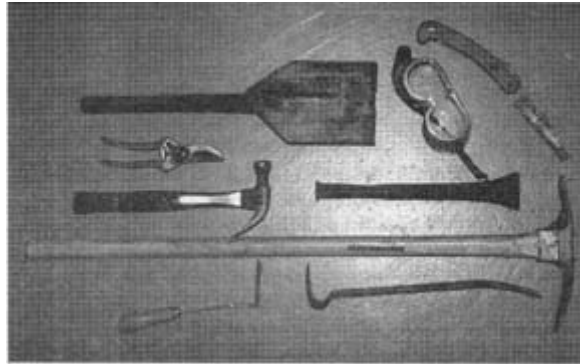


Figure 1. Tools useful in performing a RCX.

From top to bottom

- Folding shovel - To remove soil
- Goggles - To protect eyes, as necessary.
- Pruning saw - To remove limbs near soil line
- Knife/or shears - To remove burlap or string
- Hammer & chisel - To remove girdling roots
- Flat pry bar - To pull girdling roots away from trunk
- Mini-pick - To remove soil from around root collar
- Weeding hoe - To remove soil from around root collar
- Soil probe (not pictured) - To collect soil samples and check moisture

Why should you perform a RCX? If you don't see an aboveground cause for the problem, then the only other place to look is below ground (Figures 2 -3). The first thing to look for is the root flare. Is it visible above the soil line? If the trunk resembles a utility pole stuck in the ground, then the tree is planted too deeply or the soil around it has been regraded. Girdling roots will often suppress trunk growth so that one side of the tree will not have a flare. In 1990, a leading tree company excavated the collars around

393 trees and found 93 percent planted too deeply.



Figure 2. This White Pine shows no aboveground cause of yellowing.



Figure 3. Excavating the root collar of the tree shown in Figure 2 revealed that it was in the ground too deeply.

Planting Too Deeply or "Too-Deep Syndrome"

"Too-deep syndrome" (TDS) does not necessarily start with planting in the landscape, but may begin during nursery production. Sometimes container stock that is transplanted into larger pots is buried during the process. Balled and burlaped trees fall victim to TDS in the nursery when excess soil is piled around them during cultivation and digging. As a result, the roots become too deep in the ball.

When TDS occurs in the landscape, it is often due to planting holes that are dug too deep. Backfill is placed at the bottom of the hole; the root ball is set on the backfill, the soil settles and the root ball sinks. The tree may be initially planted to specification (10 percent of the root ball aboveground), but with subsequent settling of the soil, the tree may ultimately end up too deep.

Figure 5. Excess mulch results in bark decay and the production of adventitious roots.

A more common and easily corrected cause of TDS is excess mulch. Mulch should never be piled up around the trunk (Figure 4). Never apply more than 2-3 inches of mulch. Excess mulch reduces the amount of oxygen reaching the roots. As a result, the roots grow into the mulch (Figure 5). During a drought the mulch often dries out and the roots in the mulch die from desiccation. Remember that a

leading cause of failure of newly planted material is improper installation.



Figure 4. This is an example of excess mulch. Never pile up mulch around the trunk.



Figure 5. Excess mulch results in bark decay and the production of adventitious roots.

Planting too deeply can lead to several problems:

- Trees become more susceptible to wood-boring insects and basal canker-causing *Armillana* and *Pytophthora* fungi. However, these problems alone do not cause death. Death arises from the moisture held in the excess soil, or in mulch that is in direct contact with the bark. The moisture penetrates the bark, suffocates the phloem cells and disrupts the translocation of food from the leaves to the roots. The result is weakened wood and a stressed tree that is susceptible to borer and fungi attack.
- The roots of trees planted deeply will grow towards the surface. If the grass is planted under the tree, the grass roots will compete with the tree roots for nutrients and moisture.
- Trees that are too deep in the ground are more susceptible to frost cracks.
- Suckering shoots will grow from the underground portion of the trunk.
- Girdling roots may form that will choke the trunk.

Trunk Girdling

Trunk girdling may lead to tree decline (Figures 6-7). Plastic strings, synthetic burlap and girdling roots can encircle the trunk and slowly cut off water and nutrient supply to part of the tree, much like a tourniquet inhibits blood flow to an arm. Girdling roots often suppress trunk growth so that one side on the tree will not have a flare. Girdling roots can be caused by other factors besides improper planting depth, including:

- Spiraling roots that develop in the nursery pot.
- Digging a planting hole that is too small.
- Addition of soil amendments and fertilizer to the backfill soil at planting. Changing soil texture may restrict root growth out into the surrounding soil.
- When planting holes are dug with an auger, especially in heavy clay soil, the sides of the hole are compacted and may become glazed. Wall glazing may lead to root circling and eventual girdling of the trunk.

On smaller trees, girdling roots should be cut and removed. On older trees, weigh the injury caused by removal versus benefit. If the tree has survived for a long time, it may be best to leave it alone.



Figure 6. If large girdling roots are to be removed, they should be removed during dormancy (Only if they have not grafted to the trunk).



Figure 7. This root, although not an immediate problem, may eventually girdle the trunk or interfere with other roots.

***Educating
People To
Help Themselves***

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