Getting To The Root of Tree Problems

John Eisenhower, Integrity Tree Service, Scottsdale, Arizona

Trees have a wide variety of biotic and abiotic problems. These include soil compaction, infertility, insect pests and soil borne pathogens. But two very common problems in the Phoenix area are girdling roots and roots that are too deep in the soil.

Roots Too Deep – A Too Common Problem

Because oxygen is essential for cell metabolism in root tissue, trees often struggle to stay alive when roots are buried too deep. When oxygen is lacking, roots don't function at their optimum level. And when roots don't work, the entire tree system suffers. As go the roots, so go the shoots.

Tree roots end up too deep for several reasons:

- ✓ **Holes are dug too deep at the time of installation.**
- ✓ **Trees are planted at grade but they settle as the planting medium breaks down or air pockets collapse.**
- ✓ **Finish landscaping materials such as decomposed granite or bark mulch are placed over the top of the root ball. Even fine-textured mulch like unscreened ¼" minus decomposed granite can prevent oxygen from reaching the root zone.**
- ✓ **Tree wells built with excavated soil erode and migrate back over the top of the root ball.**

Most trees don't adapt well to deep soil. They begin to suffocate, resulting in root death followed by corresponding dieback of foliage. Some tree species send roots into the upper layers of soil where there is more oxygen. But these roots can lose their normal outward orientation and wrap around the main stem or buttress roots. So even if a tree survives deep planting, it may have to deal with future stem- or root-girdling roots. Some trees develop adventitious roots from the buried trunk tissue. But these new roots are seldom sufficient to provide a tree's long-term water and nutritional needs. A final problem is that trunk tissue is not well-adapted to excessive moisture. When planted too deep, soil can wick water against the trunk tissue. Soggy bark on some trees is an environment conducive to bacterial or fungal pathogens that can destroy the vascular cambium and lead to tree decline or death.

There are several things you can do to prevent deep root problems:

- ✓ **Before buying a tree, look for the trunk flare to be sure it isn't too deep. If you don't see the flare…beware!**
- ✓ **Plant trees at grade, even a little proud to allow for settling. It has been well said, "Don't plant trees; plant roots."**
- ✓ **If applying mulch, only apply a thin layer over the original root ball planted at grade.**
- ✓ **Dispose of excess soil. Don't build large tree wells that tend to erode and deliver soil back over the trunk or trunk flare.**

If you already have a tree with a deep root problem, there are a couple remedial measures you can try. Young trees planted too deep can sometimes be reset. Lift the entire root ball, backfill beneath the tree and reset the trunk flare even with the surrounding grade. Always irrigate while backfilling to eliminate air pockets.

Older trees planted too deep can be re-landscaped by removing the soil above the trunk flare. The excavation radius depends on the size of the tree. I have found that a foot of radius for every 1 to 1.5 inches of trunk diameter (DBH) is adequate. At least try to remove soil to the radius of the original planting container. If the excavation is more than a couple inches deep, landscape stone or other material can be used to build a terrace to prevent soil from collapsing back around the tree.

Girdling Roots

Another serious problem for urban trees is girdling roots. Girdling roots are roots that cross over or wrap around other roots, restricting the flow of water and nutrients upward and the flow of photosynthates downward. The result is decline or death of the strangled root and corresponding dieback of foliage above. There are two main causes of girdling roots. The first cause is soil above the trunk flare. In an effort to colonize the excess soil, roots grow up from the original root ball in every direction, often wrapping around the main stem or across significant lateral roots. As they increase in diameter they eventually reach a critical mass and exert enough pressure to cut off the cambial flow of the trunk or roots they are near. If not identified these roots slowly choke the life out of a tree which, unfortunately, becomes a victim of its own success. The healthier it is, the larger the girdling roots become.

The second cause of girdling roots is poor quality containerized nursery stock. If circling and diving roots develop and are not taken care of at any stage in the nursery, they are passed on to the next sized container. They maintain their deformation forever unless pruned or manipulated when moved to the next container or, if possible, at planting. It is imperative to check for evidence of girdling roots at the time of purchase to avoid placing these trees in the landscape.

Air Excavation

In the past, root collar examinations required hours of tedious work with hand tools. Invariably, damage to roots would occur while excavating around them. Air excavation tools now make it possible to examine a tree's root system quickly, safely and thoroughly with minimal damage to the roots or underground utilities. Soil is displaced and a full view of the root collar can be seen within minutes. If girdling roots or other problems are detected, they can be dealt with immediately and the excavated soil simply replaced when the work is completed.

integrity tree service