



Long Live Your Landscape Trees!

Research on planting container-grown trees offers practical tips for enhancing long-term health

By Tom Tyler

Who would have ever thought that, so many times, when a tree is declining, the problem goes back to how the tree was planted? It was planted too deeply. Over-mulched. Any number of factors that can impact the tree's ability to thrive. If your business prides itself on delivering long-term landscape performance, solving the tree-planting challenge can help you make good on that promise to customers – and boost your business.

One common problem with established trees that prompts property owners to call an arborist is girdling roots. Girdling roots encircle the base of the tree and literally choke it, limiting the movement of water and nutrients that are harvested by the root system up to the tree canopy.

There are no easy or sure fixes for girdling roots. Severing them may impact tree health. But so will doing nothing.

Eliminating circling roots

The best solution is to avoid the problem, from the very beginning, with proper planting techniques that include eliminating circling roots from container trees. Circling roots in the container have the potential to become girdling roots in the ground. If you plant B&B trees, you might think you don't have to be concerned with circling roots. But it turns out that most B&B trees, at some point, are grown in containers. As a result, the potential for girdling roots after you plant them remains.

In nursery containers, roots fill the growing media provided



Photo courtesy of: Bartlett Tree Research Laboratories

Girdling roots, like the one pictured here, are a common problem with established landscape trees. Circling roots that develop as trees grow in containers have the potential to become girdling roots after a tree is planted. Girdling roots can literally choke a tree by blocking the flow of water and nutrients.

in the pot or box. Once they reach the edge of the container, they often begin to circle or dive deeper along the space between the growing media and the container. If this situation is not corrected when the tree is planted, defects can compromise tree health and stability years later.

The problem is exacerbated by the fact that large container trees may have many layers of defects resulting from multiple stages of nursery production. For example, a #15 container may have circling root defects at the #10 and #5 container sizes. This makes planting more difficult because of potential circling-root problems not only on the outside of the root ball, but on the inside as well.

The Bartlett Tree Research Laboratories have been studying how best to manipulate container trees at planting time to minimize or avoid circling root problems as trees mature.

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Disturbing the root ball

Studies conducted at the labs and other institutions show that when root balls are disturbed in a way that breaks or cuts circling (or diving) roots, the long-term health of trees may be enhanced, as compared to trees planted without any root disturbance. In the short-term – up through the first two or three growing seasons – there is often a reduction in tree health and growth. But after those first few years, the trees with disturbed root systems begin to outperform those that have not been treated.

There are many differences in the methods and species studied, but the trends are apparent – the short-term vigor of trees may be adversely affected by root ball disturbance, but the long-term health will be enhanced.

The kind of root disturbance the research suggests is similar to what gardeners do when they score the outside of a container plant or tease out the roots to promote growth into the landscape soil. But it must be more aggressive because of the multiple layers of circling roots in larger container sizes. To correct the problem in container trees, the roots must also be severed inside the root ball.

Use a hand maddock or hand spade to make five or six deep radial, or pie, slices into the heart of the root ball of a typical container tree in a #15 or #25 container.

Another benefit of this aggressive approach to disturbing the root ball is to eliminate the soilless potting medium of container-grown trees. This medium has very low water-holding and nutrient-retention capacity. While these characteristics are ideal for nursery growers

– enabling trees to grow faster with less risk of root disease – they can present problems for landscape trees. It is better for tree roots to have more contact with the soil of the landscape site. Breaking apart the root ball allows that contact to occur.

General planting recommendations

After you invest the time to eliminate circling roots, it's important to follow through with proper planting techniques. The Architectural Graphic Standard for tree planting recommends



Photo courtesy of: Bartlett Tree Research Laboratories

The problem of circling roots is exacerbated by the fact that large container trees may have many layers of defects, resulting from multiple stages of nursery production. Here the circling roots that developed when the tree was in a smaller container are visible.

a planting hole size of two times the root ball diameter — when planting in good soils. But with compacted soils that are low in organic matter, which tend to be common throughout urban areas, the planting hole should be five times the diameter of the root ball. While it is admittedly difficult to meet these standards in many real-world landscape settings, it is important to strive to meet them as much as possible.*

To ensure the most contact between roots and the site soil, water the backfill as it goes in. The resulting slurry, or thin watery mud, more uniformly

moistens the roots and eliminates air pockets. When you do it right, the backfill will be sloppy.

Because the root ball has less soil-less media as a result of disturbing it, the slurried native soil, with its higher water-holding capacity, will also reduce later watering needs.

Aftercare

So now you have a freshly planted tree that you know, because of the root surgery you performed, will do well in the long term but will probably not be as vigorous in the short term. Take steps to support the tree during this transitional period. Engage in a soil management program which will provide nutrients in the specific soil chemistry that trees need – as well as enhance the tree's appearance.

Watering will be important. How much to water newly-planted trees depends on several factors. Soil type, soil structure and tree species are among them.

A general rule of thumb is that five to 10 gallons of water will sufficiently moisten a 10- to 20-inch-diameter root ball that is dried. Or another guide is to apply 10 gallons of water per inch of tree diameter per week when there is no rainfall. So for a two-inch-caliper tree, you would use 20 gallons of water per week in the absence of rainfall.

Mulching will help, too. Apply a two- to three-inch layer of organic mulch to help retain soil moisture. Shredded hardwood mulch, pine bark, even fresh wood chips applied to the soil surface work fine. One of the benefits of organic mulches (versus inorganic ones like river rock or crushed stone) is that, over time, they degrade and return organic matter into the soil, which is often deficient.

Because the tree is under transplant stress, it will be susceptible to pests that



The root ball of this landscape tree shows the multiple layers of circling roots that formed in the container, a condition that will not change when the tree is planted. Disturbing the root ball in a way that severs the layers of circling roots minimizes the problem and enhances the tree's long-term health in the landscape.

it might not otherwise be. An integrated pest management program, which aims to prevent infestations before they take hold, will help.

Quality nursery stock

One of the best ways to give the trees you plant the best chance at a long, healthy life is to buy quality nursery stock. Inspect your stock prior to accepting delivery. One strategy is to order two or three more trees than you need. When the shipment arrives, cut into the root balls of the extra trees to find out if there are circling roots, and if so, how extensive the problem is. If there are multiple layers of circling roots, you will have to inflict considerable damage to each root ball before planting, which can be quite time consuming, not to mention more of a shock to the trees. You might decide not to accept the shipment (aside from the few trees you investigated).

If you accept a shipment of trees with poor root balls and install them

in the landscape, those trees now become your problem. If you guarantee your plant materials, you will be guaranteeing something of lesser quality that will require extra care on your part. The better quality stock and less root surgery you need to do, the better the trees will perform and the better they will look.

Being aware of the possibility of circling roots in container trees – and adequately disturbing the root balls when they are present – will help ensure the long-term health and beauty of your clients' trees. 🌿

* For a complete overview of proper tree planting techniques, consult the International Society of Arboriculture's "Best Management Practices – Tree Planting" booklet. The \$10 publication is available for purchase online at www.isa-arbor.com.

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