In Our Uncertain World What Can We Do To Give Trees Every Advantage?

By JOHN LLOYD, Ph.D.
Rainbow Treecare

One of the more difficult tasks for an arborist is to tell tree owners that it may be time to pull the plug on their tree. More times than not they have an emotional attachment to the tree that has shaded their house for the last half century. This situation will become more prevalent with Emerald Ash Borer joining Dutch Elm Disease and Oak Wilt as chronic issues throughout Minnesota. While losing a tree to these pests and diseases is difficult, at least it is considered an act of nature. It is easier to accept that a tree dies of "natural" causes rather than "unnatural" causes. The more difficult scenario to address is when the cause of death could have been prevented. With a new emphasis on programs in soils and root care, we are coming across many situations of unhealthy trees that could have easily been avoided or remedied early on in the trees life.

The number one preventable tree problem seen in the landscape is girdling and circling roots. Arborists are typically called on site when the foliage of the trees becomes thin and chlorotic. Without examining the tree below the soil line, these symptoms can be mistaken for nutrient deficiencies. By digging down around the base of the trunk with a hand spade it can be determined if the trunk is being restricted by circling roots *(Norway Maple close-up on Page 23)*. If we are lucky, there may be only one circling root that can easily be removed. More commonly it is necessary to dig down through two to three layers of roots that are circling the trunk. In situations where girdling has been happening over a longer time span (10 – 15 years), the roots can form a shelf around the base that constricts the trunk keeping it from expanding and may also cut across major support roots for the tree (Shelf of circling roots). This makes for an extremely hazardous tree. When circling roots are suspected and confirmed by an initial examination an expert in root surgery should be called. They are responsible for examining and excising the roots and have the final decision on whether or not the tree is too girdled to continue. An examination and excision of one tree can take between 1-4 hours (Excising circling roots). As with any surgery, aftercare is essential to help enhance the remaining roots that are supporting the tree.

Girdling Root Syndrome appears on this Norway Maple.

All the research on girdling and circling roots has shown that the problem is directly related to techniques of producing and installing trees. The syndrome is not a natural phenomenon. It can be traced back to circling roots in pot production, to j-rooting of field nursery stock, to deep planting of trees when they are

(Continued on Page 23)

Left: Excising roots

Trees-

(Continued from Page 22)

installed, and to inconsistent site preparation at the time of planting. Roots are lazy. They grow where they can easily penetrate the soil substrate and where they can easily obtain resources. In pot production, the resources concentrate along the edge of the pot and so will the roots. With copper and air barriers the roots will stop at the edge, but without, they will circle around the edge of the pot. A similar phenomenon occurs with trees planted in clay without soil modification. The roots will go where there is the least resistance and therefore will concentrate around the edge of the planting hole.

Some roots may eventually make it out beyond the planting hole, but those that are circling will create the problem for the tree as it continues to grow.

The majority of a trees active root system is in the top six inches of soil where the majority of nutrients and water is available. In sandy and loamy soils the roots will penetrate to the top foot or 12 inches of soil. If primary roots aren't able to access those resources, they will decline, or try to shoot up into that zone of enrichment. In many cases, where primary roots are buried, trees will produce roots from the trunk tissue that is also buried. These roots develop, because the true roots aren't able to support the tree's physiological need for water and nutrients. While these trunk or "epicormic" roots will help the tree survive, they are also prone to breakage, infection and are the most likely to cause girdling of the trunk (epicormic root girdling photo).

This situation can be prevented by making sure that new trees are planted at grade and that any landscape modifications do not mound additional soil of the top of established trees in the landscape.

Researchers have talked about Girdling Root Syndrome (GRS) or Stem Girdling Roots (SGR) at every conference I've attended over the last 15 years. I've been witness to new growing technologies and planting procedures that work to prevent the syndrome (pots with copper and air barriers, bare rooting balled and burlapped trees to find the true root flare, widening the planting hole etc.). I've also been able to assist various local, state and national green industries to revise planting and growing specifications to reduce the risk of circling roots at planting. Yet all too often arborists are called on to sites that were planted just recently (<5 years ago) with trees that have circling roots and were planted too deep. The question is "why"? We have the science that shows us how to avoid the problem, we have the specifications that explain how to properly grow and plant trees, we also have many green industry sponsored educational and training programs that teach how to properly grow, harvest and plant trees to prevent the development of circling roots. We also know that the cost to make changes up front is much cheaper than having to remedy the situations after the fact. So, what else can be done?

Close-up of Girdling Root Syndrome on a Norway Maple.

There are rumors that some companies are going to start selling trees that are certified circling root free. As arborists, we fully support this effort and hope that it will gain traction industry-wide and will involve design and planting partners. A good root system is only as good as its planting space. Many arboriculture firms in the region are willing to inspect and work with landscapers for the cost of a consult $100/hour to help ensure that optimal planting specifications are met.

As EAB begins to decimate the ash in our region we will be selling and planting more trees than since the initial days of Dutch Elm Disease. This is an opportunity to prove that we as an industry can provide better products and services to our clients. In the long run it may reduce the need for our root excavation services, but that's a good cost of progress. In 15 years it'd be nice to look back and say that girdling roots are a problem of the past because we implemented the cure!

(Editor's Note: Reprinted with permission from the Minnesota Nursery & Landscape Association" with the article. Dr. Lloyd is the Research and Science Director for ainbow Treecare. He is also the Director of the Urban Forestry Institute. Photo credits SRG Norway Maple distance. - J. Lloyd, Rainbow Treecare (RTC) SRG Close-up. - J. Lloyd, RTC Excising circling roots.- J. Lloyd, RTC Shelf of circling roots - T. Nelson, RTC)

Shelf of circling roots