Stem Girdling Roots (SGR’s) and The Rest of the Story

By Richard J. Hauer

Hello Americans, this is not Paul Harvey. You know what the news is. In a minute (seven paragraphs to be exact), you’re going to hear ... the r-r-r-rest of the story!

Page One. In 1994, Northfield, Minnesota, a crisis is brewing in the urban forest. Something is amiss with the urban trees. Norway maple trees are showing signs of old age, yet they are in their teens and twenties. They are just mere teenagers and young adults of the tree world and they are showing their ills through wilting and scorched leaves and the striking dieback of twigs and branches in the canopy (Figure 1).

Could it be as simple as Verticillium Wilt, the disease caused by the soil-borne fungi such as Verticillium albo-atrum and Verticillium dahliae? Verticillium wilt produces symptomomatic wilting and scorching in the canopy of the tree and discoloration of the wood xylem in cross-section. Folks, these trees certainly were showing signs of wilting and scorching in the canopy. Hopefully, a simple verification by leading tree experts would put this story to rest and solve the mystery.

Cindy Ash and Gary Johnson enter the picture. Both are trained in classic tree pathology and understood how to diagnosis the tree patient in situ among their urban forest friends. Each knows their way around a Petri dish as much as they know their way around the urban forest. But something was wrong with a diagnosis as simple as Verticillium Wilt. The wilting of leaves in the canopy was not like that caused by

Figure 1. A healthy Norway maple tree and one showing severe decline from stem girdling roots.
Verticillium. And what about staining in the wood xylem? What staining! None was found in the trees that these arboreal masters touched and examined. Even more, something was strange as these trees had stems that looked more liked telephone and telegraph poles coming out of the ground, rather than the normal tapering of stems that deciduous trees from the angiospermous world so commonly exhibit.

Lucky for us, Cindy and Gary had a tool. Oh yes, a tool that each and every one of us has learned to master at some point in our life. A tool that we call a hand trowel. Upon digging and removal the soil to expose the magnificent underworld of the tree, they observed something abnormal. Abnormal is just the opposite of normal and one must understand what is normal to determine what is abnormal. Roots radiating away for the central stem like spokes on a wheel is normal and what a tree is genetically trained to do from life within the first several days as a germinating seed and weeks later as a growing seedling (Figure 2). But these trees had something new, something different or abnormal. They had roots circling around the stem (Figure 3). In some cases, this fortuitous finding by the simple removal of soil and exposure of the roots led to not one but several roots wrapping around the stem. Even more so with several trees, there were layers of encircling roots as the depths beyond the surface was explored. Would this be the end of the story?

Now for Page Two. Gary and Cindy left that day with questions. Was this an isolated case of a few trees gone bad? Or was this something even bigger? The only way to find out was to apply principles first taught to us in elementary school and later honed in middle and high school, possibly even in college and as a professional - science. The scientific process involves making observations and recording them. Document what you see and compare this to what is already known. From this we make conclusions. Well, Professor Johnson did just that. First, the records of those trees in Northfield were noted. Then more observations were taken from the trees within the urban forest of the Minneapolis and Saint Paul metropolitan region. Tens, then hundreds, and eventually over a thousand observations were recorded. The presence or absence of encircling and girdling roots, depth to the structural roots that radiate away from the stem, diameter and species of tree, and recording on the general health of the tree was noted.

These scientifically based observations led to a discovery: buried root systems are not good for trees and tree roots systems buried by soil can become short-lived trees. Not every case of buried root system led to a tree becoming ill at a young age.
The Plymouth Avenue and Legacy Village Green Teams

By Barb Spears

A green thing is happening in North Minneapolis! Trees are getting planted and flowers are blooming, but it’s much more than that. Community residents are taking an active role in planning, planting, and serving as stewards of their environment.

With major funding from the USDA Forest Service and the Minnesota DNR MnReLeaf Program, a project was started in July 2004 to create a model community forestry program in the inner city. North Minneapolis residents created their vision for Plymouth Avenue. The vision includes education, inventory, reforestation, brownfield greening, conservation employment training and a commitment to ongoing stewardship.

Tree Trust and the Northside Residents Redevelopment Council (NRRC) have worked together to facilitate this project. The first step taken, in January 2005, was the formation of the Plymouth Avenue Green Team. The team members are 12 very active citizens, plus many other individuals who help out when they can. Since then, the Legacy Village Green Team has also been formed.

The Green Teams have had many notable accomplishments since January 2005, such as:

- The creation and implementation of landscape plans for Humboldt Pocket Park and Givens Legacy Park.
- The formation of a partnership with the Northside Garden Club and North High School.
- The completion of a residential tree assessment of approximately 1,300 trees.
- The creation of a landscape design plan for the intersection of I-94 and Plymouth Avenue through MN/DOT’s Community Roadside Landscaping Partnership Program.

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