

Root Invigoration Program

By Kelby Fite, PhD, Plant & Environmental Science
& E. Thomas Smiley, PhD, Urban Forestry

Bartlett's Root Invigoration Program is designed to repair damaged soils and promote an efficient soil environment which optimizes fine root performance. This procedure is useful to prevent decline in aging trees, promote growth in younger trees, prepare planting beds, stimulate the recovery of trees damaged by construction, and aid establishment of newly planted trees, among other uses. This program creates a natural, forest-like soil in the developed environment. These soils provide for efficient uptake of higher levels of water and nutrients by the fine root system, resulting in an improvement in tree health.

Our root invigoration is a comprehensive program that begins with site evaluation consisting of a tree and soil analysis. The physical and chemical properties of the soil are assessed to determine the treatment area and level of amendments necessary to achieve satisfactory results. This treatment is frequently employed on declining trees so an assessment of plant health, including pests and problems that may cause the decline, must be performed during the initial evaluation process.

Soil moisture is critical to this program. Dry soils must be irrigated to a depth of 6-8 inches prior to treatment. After treatment, consistent irrigation will be necessary to achieve desired results. The success of root invigoration relies heavily on the proper application of water both before and after treatment.

Once soil moisture levels are adequate, turf or other dense ground cover must be removed. The soil is then loosened and cultivated to a depth of 6-8 inches (15-20cm) using an air tool designed to excavate and till the soil while minimizing disturbance to the root system (Figure 1). This same tool is also used to excavate the root collar (transition area from trunk to roots), which may be buried by excessive soil or mulch. Based on prior soil and tree analyses, nutrients,

Figure 1: Soil decompaction and amendment using an air tool



mycorrhizal fungi and organic amendments are applied and incorporated using the air tool. This program may be completed in stages to accommodate client or site restrictions. Typically, the treatment will begin adjacent to the trunk and extend outward toward the dripline; however, the size and shape of this area are determined by the site evaluation and owner preferences.

Once irrigated to settle the soil and ensure root-to-soil contact, a 2-3 inch layer of organic mulch is applied. Sufficient soil moisture should be maintained for

weeks or months following the process, which will require regular irrigation if precipitation does not occur. Trees should be monitored for insects, diseases and cultural problems that may arise and hinder program response.

The result of this process is a decompacted, fertile, biologically-active soil which now mimics soils of undisturbed forests and is an optimal environment for the uptake of water and nutrients by fine roots. Most trees respond within a few years of treatment by producing very efficient fine feeder roots to take advantage of the improved soil conditions (Figure 2). The program is best implemented as a preventive measure to alleviate soil stress before decline of the tree is noted. Once decline begins, it is challenging to reverse, but this program is designed to take a holistic approach to relieve stress on root system function and restore tree health.

Figure 2: Fine root growth in organic layer 10 months after treatment



Typical candidate trees are those which have been recently transplanted, are struggling to establish, have limited soil volume, construction-damaged, aging, or those that will be underplanted with shrub or herbaceous plant material (Figure 3).

Figure 3: Red maple one year following root invigoration (right) compared to one without treatment (left)



Founded in 1926, The Bartlett Tree Research Laboratories is the research wing of Bartlett Tree Experts. Scientists here develop guidelines for all of the Company's services. The Lab also houses a state-of-the-art plant diagnostic clinic and provides vital technical support to Bartlett arborists and field staff for the benefit of our clients.