TECHNICAL BULLETIN

DAVEY

Prepared by The Davey Institute

Soil Invigoration

Treatments for Declining Trees and Construction-Impacted Trees

Until recently, treating construction impact or tree decline (or the slow loss of vigor and gradual death of shade trees) was mostly unsuccessful. However, new treatment methods and tools have greatly expanded our ability to treat, and reverse, decline in our valuable shade trees.

SYMPTOMS: Trees affected by construction or decline can show a range of symptoms, including yellowing of leaves, premature fall coloration, undersized foliage and reduced shoot growth (which can give the overall crown of the tree a thin appearance), and eventually death of branches. Left untreated, these symptoms are often followed by death of the tree.

CAUSE: Decline can have many causes, but two of the most common are compacted or poor-quality soil. Soil compaction is so harmful that many trees cannot survive its effect. Compaction often follows construction activities or excessive foot or vehicle traffic. Poor soil conditions (little topsoil and compacted subsoil) are common in landscapes that are left behind after new homes are built. Other possible causes are root injury or cutting, drought, defoliation due to pest problems, lightning injury, or combinations of these factors.

SOLUTION: Treating the soil around large, established shade trees affected by decline is a process called soil invigoration. Supersonic air tools that use compressed air to break up compacted soil and replace it, if needed, are making the treatment of poor soil conditions possible without harming the roots of trees. Depending on the cause of the poor vigor or decline, one of the three techniques described below could be useful in modifying the soil around a tree:

VERTICAL MULCHING: Vertical mulching causes the least disturbance. It is most useful when a compacted layer of soil beneath the topsoil is inhibiting soil drainage and root growth. This process uses a grid pattern of circular holes in the tree's rooting zone. The holes are usually backfilled with a mixture of new soil and compost. Fertilization with Davey's Arbor Green® has proven beneficial with this treatment.

RADIAL TRENCHING: Radial trenching replaces existing soil and provides four or more trenches or channels for root growth. These trenches are created with the supersonic air tool, then filled with a compost/topsoil mixture. Radial trenching is often used when the topsoil is so compacted that it cannot be used again around the tree.

SOIL INVIGORATION: Soil invigoration breaks up soil compaction and adds organic matter (compost) to the existing soil without removing it. A large, powerful air tool is used to fracture the soil, and a smaller air tool is used to work the compost into the soil profile. Only a portion of the tree's rooting area is usually treated the first time.

After the soil invigoration treatments described above, the area can be mulched or returned to turf. Tree owners should be aware of the short-term disruption to the site in exchange for the potential saving of mature, valuable shade trees.

Vertical mulching installs vertical holes that are backfilled with soil and organic matter or other materials. This procedure works well when a compacted layer exists beneath the surface.

Radial trenches are used to replace poor soil and provide channels for root growth. The soil is replaced with a 50/50 mixture of topsoil and organic matter.

Soil invigoration leaves the soil in place and fractures it with the use of a large, supersonic air tool. Organic matter is then mixed into the soil profile.

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