

Using an AIR-SPADE[®] for **Improving Root Systems**

Trees in an established landscape surrounded by turf grass is not an ideal environment for roots



Removing the turf, aerating the soil with an AIR-SPADE, and applying mulch to the surface will greatly improve the conditions favorable to root growth

Healthy Soil Means Healthy Roots

Over 50% of a tree's living tissue is found below the ground. The active roots, those providing the vast majority of a tree's water and nutrients, are located primarily in the top 6" of soil. Factors such as construction damage, soil compaction, competition from turf grass, and other human activities can greatly impact the health of roots as well as the health of the soil itself. Biological activity in the soil is responsible for the nutrients available to trees through the processes of the soil food web.



The productivity of any urban soil is determined by the site characteristics and the quality of the organic matter available for decomposition. Many urban soils are not well suited for tree root growth. However, the physical quality of the soil can be improved with the use of a tool called an 'AIR-SPADE'.

Why Urban Trees Have Stressed Roots:

▶ **Less Water is Available-**

Unless regularly irrigated, urban trees generally have less water available than their counterparts in natural settings. Why? Paved surfaces encourage runoff instead of absorption, and these surfaces cause higher soil temperatures and faster evaporation of rainfall.

▶ **Restricted Root Space -**

Building foundations, streets, driveways, and other obstacles limit the expansion of tree roots and significantly reduce the amount of water and minerals available to the tree.

Tree Root Growth Grass Mulch



Photo: Dr. Gary Watson
Morton Arboretum

▶ **Compacted Soils -**

Urban soils are usually compacted from human activity, and this creates stress for a tree. Soils can become difficult for roots to penetrate, and compacted soils hold much less water and oxygen which are critical for tree health.

▶ **Competition -**

Most yards have a dense layer of turf that surrounds a tree. Turf aggressively competes for minerals and water, which reduces their availability to other plants. Adding several inches of mulch within the dripline of the tree reduces competition with turf, keeps the soil cooler, and holds more moisture.

AIR-SPADE

The AIR-SPADE Tool



Using an air compressor, the AIR-SPADE's specialized nozzle forces air into the soil at 2X the speed of sound. This supersonic air flow can be utilized to reduce soil compaction, increase aeration, and can be used to incorporate organic matter into existing urban soils without damage to the sensitive roots. The AIR-SPADE allows the arborist to physically improve the soil structure to establish an ideal environment for tree root growth.



The AIR-SPADE is an air powered tool that allows an arborist to remove, excavate, or aerate soil without damage to sensitive roots.

The Root Enhancement Process

One of the most common techniques for enhancing the root environment is to AIR-SPADE a circle of soil around the base of the tree. The Root Enhancement Process will create superior soil conditions that will result in a healthier, more sustainable urban tree that adds enjoyment and value to your property.



This mature oak tree is a good candidate for a root enhancement treatment. Its root system could be improved by the removal of competing turf grass, soil aeration, and addition of mulch.



The first step is to remove a circle of turf grass around the tree. The size of the ring will depend on the size of the tree, the soil conditions, and the objective of the treatment.



Using the AIR-SPADE tool, the soil will be churned and aerated to alleviate compaction and increase the suitable habitat for healthy root growth.



Depending on the treatment, organic matter may be added to the existing soil and incorporated in using the AIR-SPADE. This can greatly improve the quality of the soil for root growth.



A layer of organic mulch is then added to the surface. Mulch will help with everything from retaining soil moisture to improving the biological and chemical makeup of the soil to promote tree roots.



The finished treatment. This oak tree's roots are now in an improved environment and will benefit from the increased aeration and biological activity for years to come.



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