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Surface Root Syndrome

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Trees in the landscape are highly prized and provide many benefits to you and your home. However, those shallow roots that appear on the surface of our lawns can create real headaches, especially when trying to grow lush turfgrass. Tree roots growing at or slightly above the soil surface are called surface roots.

Where do surface roots come from?

Genetics determine the characteristics of root growth in a tree, but generally speaking, tree roots develop similarly among temperate zone species. Roots that grow horizontally from the upper part of the taproot are called lateral roots. These roots, which include surface and shallow roots, are often the most vigorous and form the main framework to support and anchor a tree.

These shallower roots rise to the upper, nutrient-rich layers at the surface of the soil. Then, as traffic occurs—such as mowers and foot traffic—the soil is eroded away, exposing the roots and creating a maintenance challenge.

This form of root growth is found to be especially common in trees growing in the riparian zone, or an area where streams, rivers, and wetlands are located. Examples of trees with shallow root growth include maples, sycamores, willows, and some ash species. Their roots naturally grow close to the soil surface to escape saturated or wet soils more quickly. However, any tree can develop surface roots in heavy, compacted soil or wet soil, or as a result of erosion from foot traffic. Disturbed soils such as those found in the urban forest are usually compacted, making root development more difficult.

Surface roots can present challenges for mowing the lawn and growing grass. They can cause damage to equipment and become trip hazards in the landscape. When trees and grass compete for moisture and nutrients, the tree roots usually win due to the prolific network of roots that stretch far past the drip line of the crown.

Roots are denser near the trunk, so grass growing over or near these surface roots may become thin and lose its dark green color as a result of the fight for nutrients and lower light intensity. So the question is, How can surface root issues be improved without compromising tree health?

Common approaches and their problems

Although there have been many attempts to solve the surface root issue, there are few options available to tree owners that won't adversely affect the tree. Do not use the following approaches, which are common but not recommended:

Removing visible surface roots by cutting or grinding

Cutting or grinding out surface roots can be one of the worst decisions for tree care if done indiscriminately. Doing this will reduce the ability of the tree to absorb nutrients and water, which can adversely affect tree health and possibly cause it to die. Also, since those large roots serve as an anchor to keep the tree strong and upright, damaging or removing these roots can severely reduce stability, which might cause the tree to fall over in heavy winds.

Figure 1. Surface roots are common on riparian-species trees. (*Erich Saiter*)

Figure 2. Lawns are a challenge to maintain and mow with shallow-rooted trees. (*Lindsey Purcell*)

Proper root pruning or root surgery is possible but should be done by a professional arborist. Visit the International Society of Arboriculture website at www.treesaregood.org to locate a tree-care professional near you.

Adding a heavy layer of topsoil to cover exposed roots

This approach is commonly used by tree owners. However, adding only topsoil will likely create long-term problems with the tree and possibly lead to its death.

Roots need oxygen because, like leaves, roots respire too. The soil serves as a site for air exchange to allow roots to breathe in addition to absorbing the water and nutrients the tree needs.

If the soil is compacted or additional soil is added, the roots are basically smothered and can't get any oxygen from the air, causing the cells in the roots to die. Without those root cells, the rest of the plant will die.

In some cases, a light layer of one-half compost and one-half soil mixture spread less than 2 inches deep can create a temporary remedy to restore the turf, but the roots will most likely grow back to the top again.

Figure 3. Large roots are critical for the stability of the tree and lead to important feeding roots. (*Erich Saiter)*

Figure 4. Mulching to the drip line of large trees with shallow roots is the best solution. (*Lindsey Purcell)*

Planting a raised flower garden or groundcover over surface roots

This is another commonly used approach, but the effect is the same as just adding soil. Any additional soil coverage will reduce the gas exchange between the tree roots and soil surface, causing a decline in tree health and potentially the death of the tree. Also, added soil or vegetation near or against the trunk will cause decay and further compromise tree health. The planting process can be damaging to the roots as well, regardless of whether annuals or perennial groundcovers are planted.

Use wood mulch for best results

The best solution for bothersome surface roots is simply to mulch. Wood mulch is the best way to cover tree roots above ground. Adding 2 to 3 inches of wood mulch reduces the need to mow over the roots, which can compact the soil around the roots. A mulched root zone increases moisture retention and provides an improved growing environment for the tree. Also, it achieves a cleaner landscape look where it is otherwise impossible to grow decent turf. For best results, create a mulch ring that extends out to the dripline, if possible, or at least to where the surface roots have dissipated enough for healthy turf growth.

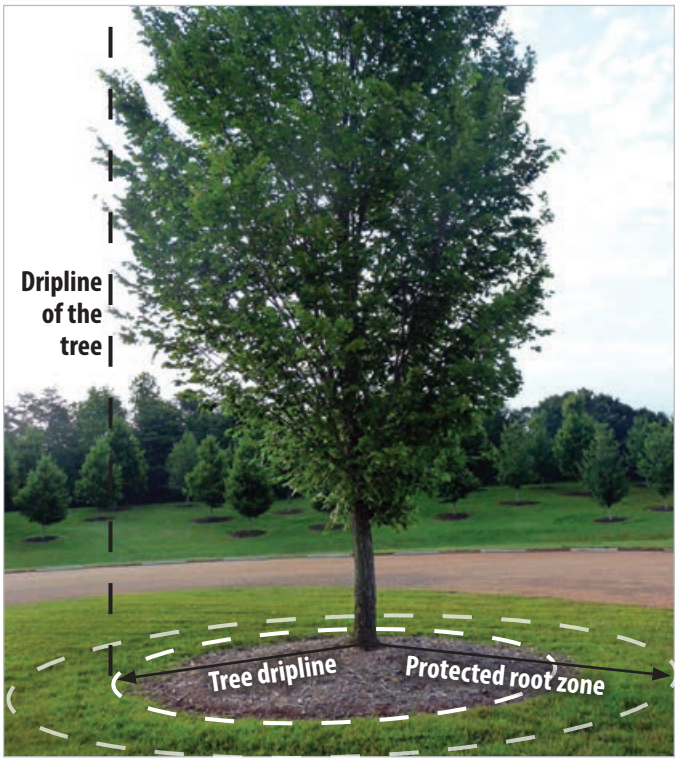

Figure 5. Extend the mulch ring out to the dripline of trees with surface roots. *(Lindsey Purcell)*

Figure 6. Grouping trees together in large mulch beds provides a better growing environment for trees, reducing compaction and improving tree health. (*Lindsey Purcell)*

Figure 7. Individual trees with large root flares and buttress roots can be mulched to improve maintenance concerns. (*Lindsey Purcell)*

Gravel or stone mulch products can be utilized in specific situations, but there are some negatives to their use. Using rock or stone mulch can compact soil, while using more organic mulch can improve aeration in the root zone. Also, stone mulch can heat up the soil temperatures where applied and create stress issues for the tree. Any mulch product should be advantageous to the tree, not create additional challenges.

Conclusion

When dealing with surface root syndrome, be certain that any mitigation does not compromise tree health and increase the risk for tree failure. These troublesome roots are a challenge for good landscape management. However, they can also provide opportunities to make a positive change in the landscape and create an environment where trees and turf can survive harmoniously together.

For more information

Tree Care Tips: Roots and Hardscapes, Tree Care Industry Association, https://treecaretips.org/roots-and-hardscapes/most-popular/

Trees and Turf publication, International Society of Arboriculture, https://www.treesaregood.org/portals/0/docs/treecare/Trees_Turf.pdf

International Society of Arboriculture website, www.treesaregood.org