

Getting to the Root of the Problem

Tree roots are far more extensive than most realize and cause turf problems on important playing surfaces. Pruning tree roots every two to three years is a simple, effective option to address this issue.

BY ROBERT VAVREK



The impact of tree roots on turf quality may go unnoticed until a period of droughty weather. When trees and turf compete for water, trees usually win.

To say most golf facilities across the United States are overplanted with unnecessary trees would be an understatement. Myriad turf problems related to dense shade and poor air circulation are topics of considerable discussion and debate during most USGA Turf Advisory Service visits. Trees aren't picky; they cause just as many problems to warm-season turf as they do to cool-season species.

Professional services can be contracted to make an objective evaluation of serious shade problems that affect specific areas of a golf course. Shade issues can also be documented with user-friendly apps for an iPhone/iPad, such as Sun Seeker or Sun Scout. With a little practice, even a quality compass can be used to determine which trees will cause the most shade problems to a particular green or tee. Similarly, a variety of hand-held ane-

nometers are available to determine air movement, or lack thereof, across turf due to trees, brush, berms, or other obstructions.

We feel the warmth of the sun or a cool breeze and can relate to concepts such as shade and poor air circulation causing stress to turf. In contrast, the expansive network of roots that exists beneath a mature tree is mostly out of sight and usually out of mind with respect to how it impacts turf quality. A

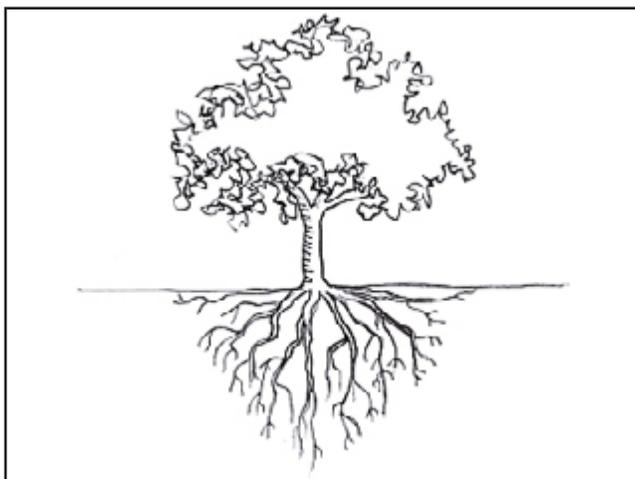


Figure 1. A common misconception is that the root distribution of a mature tree will mirror the size and breadth of the crown. This greatly underestimates the size of the root system and its impact on adjacent turf (drawing courtesy of SULIS University of Minnesota).

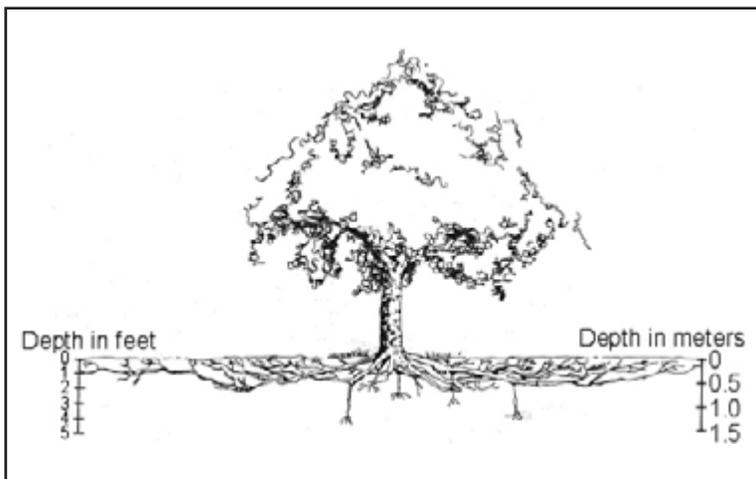


Figure 2. Tree roots affect turf well beyond its drip line as they extend outward from a tree equidistant (or more) to its height. Consequently, the fine feeder roots of a large, mature tree growing very close to a putting green may impact a considerable portion of the green (drawing courtesy of SULIS University of Minnesota).

moisture meter can be used to quantify this competition for water, but what is buried underground is usually ignored. Nevertheless, this oversight can be a significant contributing factor resulting in turf decline during hot, droughty weather.

Part of the problem begins with the misconception of how trees grow. Most believe that the distribution of the root system will mirror the tree's crown, or its branches, leaves, and any reproductive structures (Figure 1). However, tree roots can grow to a distance of two to three times the height of the tree, which is far beyond the drip line of the tree's canopy for most species

common to golf courses. There is mythical importance associated with the area within versus beyond the drip line of a tree, when, in fact, a drip line is nothing more than a simple visual reference that has little, if any, physiological importance to the turf. Unfortunately, this leads golfers to believe that if a putting green or teeing ground is located outside of a tree's drip line, then tree roots will have no effect on the health of the turf.

Many also visualize trees growing like a carrot with a large, deep taproot. Quite the opposite is true, because a majority of tree roots will be found in the upper few feet of the soil profile

(Figure 2). The fine roots compete with turf for soil moisture and nutrients and are notorious for clogging drainage pipes, while the larger surface roots of shallow-rooted trees can directly affect the playability of bunkers, tees, and fairways.

Why ignore the detrimental effects of tree root competition when the issue is so easy to address? Simply prune the roots to a depth of at least 24 inches with a rock saw, stump grinder, trencher, or vibratory plow at an appropriate and convenient distance between the trees and affected turf. Use the smallest width of trencher that will do the job, because the wider the



Tree roots that clog perforated pipe are a common cause of drainage failure on golf courses, especially in sites where willows, cottonwoods, and other shallow-rooted trees have been planted.



Tree roots exposed at the surface obviously affect playability. However, roots growing just below the soil surface can be a hidden hazard to golfers.

trench the bigger the mess. A vibratory plow may be the best option because it causes the least amount of surface disruption. No doubt, there will be occasional issues with rocks or large roots that need to be addressed, but no more so than would be necessary to install irrigation or drain tile.

Research indicates little injury to trees from a reasonable amount of root pruning, which should placate any vociferous tree enthusiasts. After all, a tree spade can remove as much as 90 percent of the root system during transplant, and these trees hardly miss a beat with proper care.

Forget about using root barriers such as plywood, metal sheeting, or plastic in a trench to prolong the beneficial effects of pruning. New roots will grow beneath barriers and frost heaving will slowly push them out of the ground. Severing roots will naturally stimulate new growth from the cut ends, so these operations will need to be repeated every two to three years for maximum benefit. It would not hurt to document the exact location of the trench with wire or permanent landmarks to make subsequent pruning operations proceed more efficiently, especially in sites with rocky soil.

Is there a need to keep the trenching or plowing a "safe" distance away from a tree? Recommendations vary widely, but conservative rules of thumb would

be to cut roots no closer than five times the diameter of the offending tree (Miller and Neely, 1993) or no closer than half the distance between edge of the drip line and the tree. These recommendations make more sense for those installing underground utilities or sidewalks, where it may be necessary to cut roots within a few feet of a mature tree. It is not likely root pruning extremely close to trees would need to be done on a golf course. Besides, when trees are so close to high-value playing surfaces that cutting roots is not practical, then perhaps the best option is to remove the trees.

Sometimes only one path is available for root pruning operations based on topography, architecture, and proximity of trees to playing surfaces. When more than one option is available, choose to cut the roots nearer to the trees versus immediately adjacent to the affected turf. As mentioned above, cutting roots will stimulate a flush of new root growth, so cutting roots as far away from a green or tee and as close to the problem tree as possible will protect this high-value turf longer. It will also mean root pruning will not be required as frequently.

Use common sense. Don't disrupt the root system of any tree that is leaning, especially the roots on the side of the tree that are supporting the extra weight. If the tree is unsafe, then

it needs to be removed. If common sense is in short supply, then operating heavy equipment such as trenchers and plows is not a good idea anyway.

Root pruning tends to be one of those maintenance practices that is constantly put on the back burner at most golf facilities. No one disputes its value, but it is difficult to allocate significant labor and equipment to an issue that only becomes obvious during hot, dry weather. Yet, with severe droughts affecting more courses in recent years, using less water and making sure every drop will be utilized by the most important vegetation type (i.e., the turf) on the most valuable piece of property (i.e., the golf course) at the facility makes sense. Root pruning key areas of the course will help you derive more benefit from a limited resource. Make this practice a priority and get to the root of the problem.

LITERATURE CITED

Miller, F. D., and D. Neely. 1993. The effect of trenching on growth and plant health of selected species of shade trees. *J. Arboric.* 19(4): 226-229.

[BOB VAVREK](#) discusses tree issues and other concerns that affect turf health and playability during *Turf Advisory Service visits to golf facilities in Iowa, Nebraska, Minnesota, Wisconsin, and northern Illinois.*



A heavy-duty vibratory plow can make quick work of severing tree roots without causing significant damage to turf. A rolling operation over the plow slit will make most surface disruption disappear. Be sure to locate and mark irrigation and underground utilities prior to root pruning operations.



Tree roots compete with turf for water and nutrients, yet the stress to adjacent turf is usually ignored. The beneficial effects of severing tree roots become obvious during droughty weather, as seen in the improved turf performance to the left.