Arboriculture & Turfgrass Management

Trees and Turf: Can't We All Just Get Along?

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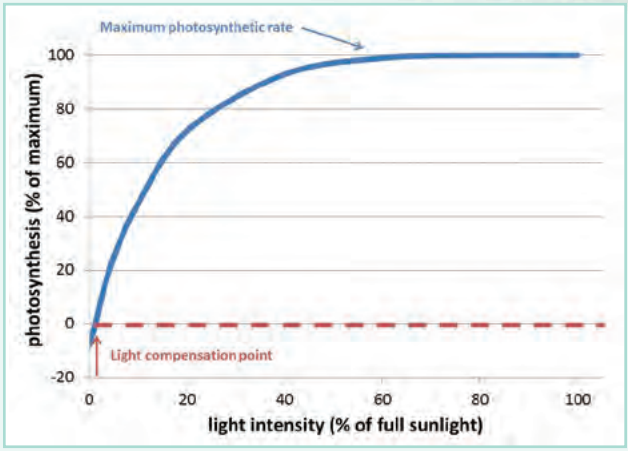
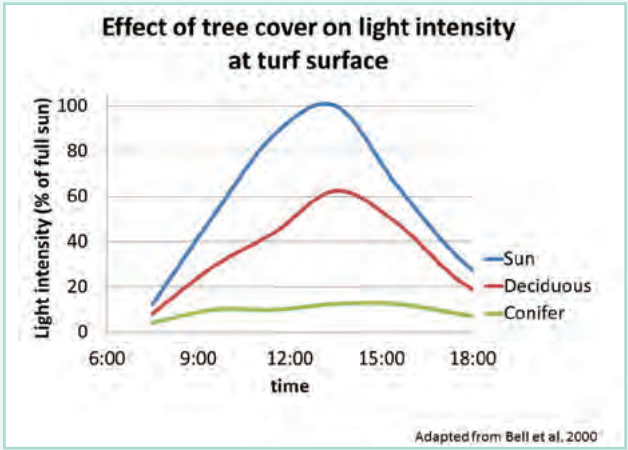
A common view of trees and turf is that they go together about as well as oil and water. Trees and turfgrass can compete for site resources such as water, sunlight, and nutrients; resulting in the common view that it can be an 'either-or' proposition. However, in many situations, such as landscapes and golf courses, we need and want trees and turf to both succeed.

An old axiom of politics states that, "Where you stand depends on where you sit." In the case of Trees vs Turf, views are often shaped by professional roles in managing landscapes. Arborists often have one view; turf managers have another. Clients and property owners, in contrast, often desire both. For example, the primary goal of a golf course manager is to maintain high quality, playable turf; but healthy trees add significantly to c eating a challenging and attractive golf course. On the other hand, many arborists and urban foresters spend most of their training learning to care for trees, but find themsel es in positions where they also manage turf in parks and athletic field . As in any conflict, the first step in esolution is trying to understand the other side. In this article, we'll consider some of the ways that trees and turf interact and then discuss some strategies to ensure the optimal performance of each in a successful landscape.



Turf grasses, like all plants, require sunlight for photosynthesis. Shade tolerant grasses, such as tall fescue and *Poa supina,* are better able to utilize low light levels than shade intolerant grasses like Kentucky bluegrass.



Conifers may cast denser shade than deciduous trees, making it more difficult to establish and maintain turf.

Where the roots are: Most tree feeder roots are in the upper portion of the soil profile. Keeping turf out of this zone increases water and nutrient availability to trees. Photo: Paul Swartz, Michigan State University.

Tree impacts on turf

Trees can impact turf by affecting the environment above ground and below ground. The majority of t ee feeder roots occur in the upper six inches or so of the soil profiles, therefore, trees can compete with grasses for water and nutrients. The largest and most obvious impact of trees on turf, however, is shade. Like all plants, turf grasses need light for photosynthesis. As light levels increase, photosynthetic rates increase until they eventually reach an optimum or maximum level. In general, turf growth and vigor will be greatest if the light intensity reaching the turf is at or near the amount of light needed to optimize photosynthesis. In addition to light intensity, light duration will also impact turf vigor. As a rule of thumb, most turf grasses will require at least one half-day of full sunlight for optimum growth. Turf that does not receive adequate light will have thin blades, slow growth and will not recover from foot traffic as ell as turf with adequate light.

The type of t ees providing the shade can also impact the amount of light reaching the ground and turf performance. Large conifers tend to cast denser shade than deciduous trees. Within deciduous tree types there is also variation in the amount of shade cast. For example, honey locusts have relatively thin leaf canopies and allow more light to reach

Certain turf types, such as tall fescues, can tolerate shade, but still require partial sun a few hours a day. Photo: Bob Schutzki, Michigan State University.

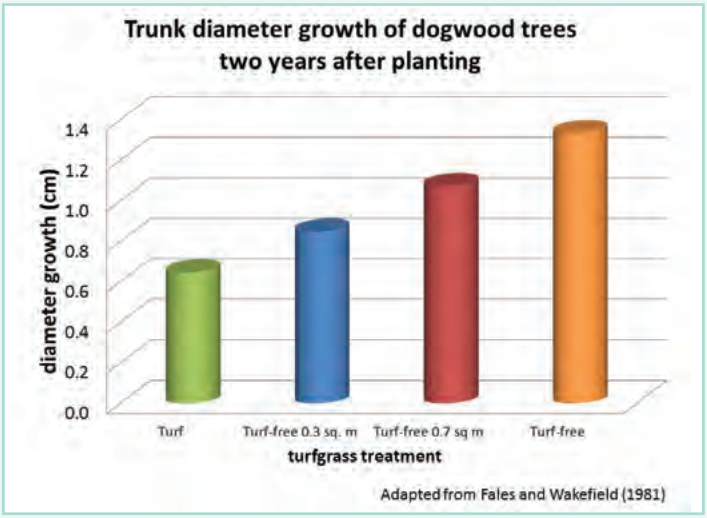
Allowing grass to grow up to the trunks of trees increases tree stress and contributes to "lawn mower blight".

the ground below than many other deciduous trees. Tree shade also alters light quality in addition to affecting quantity of light reaching the turf surface. Tree leaves absorb red light resulting in a lower ratio of red to far-red light than sunlight. Low red to far-red light contributes to thin turf blades and poor root quality, reducing turf quality.

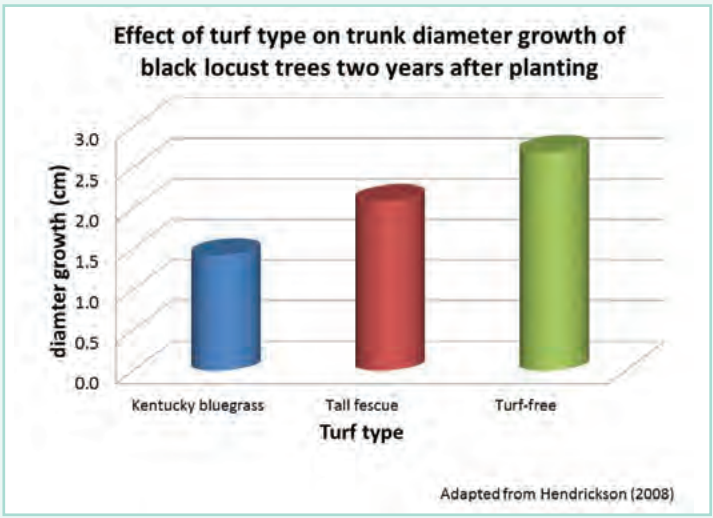
A critical factor to remember when discussing turf response to shade is that turf grasses vary widely in their shade tolerance. The efore, knowing which turf to choose is important when establishing new turf. It's also important to know which type of grass when managing established turf. Fine-leaf fescues, tall fescue, and *Poa supina* have the greatest shade tolerance among cool-season grasses grown in the upper Midwest. Tall fescues can be slow to establish, but have good durability once established. *Poa supina* is very shade tolerant, but remains light green even when fertilized. It spreads via stolons so it can recover from wear, but this trait can also result in it spreading where it may not be desired. Kentucky bluegrass has the poorest shade tolerance among turf grasses planted in the Midwest and usually performs poorly under trees.

In addition to altering the physiology, growth and durability of grass, trees can impact turf in a number of other ways. Heavy tree canopies can reduce air movement and increase relative humidity at the ground surface, which can contribute to turf disease problems. Many tree species produce fruits, nuts or seed pods that can be messy, such as walnuts or sweetgum 'balls'. Trees that are infested with aphids can also create problems for turf as honeydew excreted by the aphids can lead to sooty mold. For deciduous trees, autumn leaf-fall will usually require cleanup. When practical, mowing leaves into turf can be a low maintenance option that helps to conserve and recycle nutrients contained in the leaves. When mowing leaves consider these tips: Maintain at least a 3" mower height, keep mower blades sharp to ensure that they cut leaves rather than mangle them, and mow when leaves are slightly damp to reduce dust and blowing.

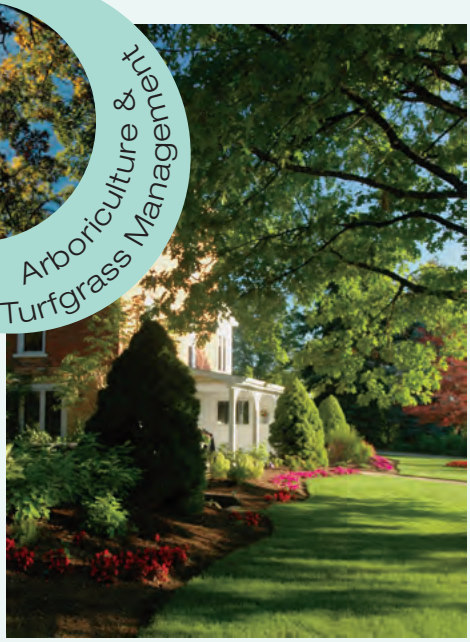
Tree roots can cause several issues for turf maintenance. Large roots can make the turf surface uneven causing trip hazards and even problems for mowers. Some tree species, such as cottonwoods, can produce new shoots (root suckers) from surface roots.



Increasing the turf-free area around a tree improves water and nutrient availability and increases tree growth.



Not all grasses are created equal. Kentucky bluegrass is highly competitive and may reduce tree growth more than tall fescue.



If managed properly, trees and turf do not have to be mutually exclusive.

A high canopy of deciduous trees allows diffuse sunlight and sunflecks to reach the turf surface. Photo: Bob Schutzki, Michigan State University.

Turf impacts on trees

As with most things in life, there are two sides to every story. Just as trees can impact turf, turf can also impact trees. Diameter growth of trees that are maintained turf-free can be twice that of trees with turf competition. The impact of tu f on the growth of trees is largely due to competition for water and nutrients. In fact, the leaf nutrient concentration of trees and shrubs has been shown to increase in proportion to the turf-free area around them. Likewise, increases in tree moisture stress have been linked to reduced soil water content when trees are grown with turf compared to when they are grown without turf competition. The se erity of turf competition with trees also depends on the type of turf. For example, Kentucky bluegrass has been shown to have a stronger inhibitory effect on t ee growth than tall fescue turf.

Managing for trees AND turf

Although turf and trees have the potential to adversely affect each othe , with a little planning and forethought it is possible to have quality turf and quality trees. Here are some key factors to consider.

Minimize conflict points The best way to reduce battles between turf and trees is to give each their own space. This means creating separation between trees and turf by creating mulch rings or mulched beds around trees. This will benefit the ees by providing a competition-free zone for roots as well as keeping lawn mowers and string trimmers a safe distance away. Turf will benefit since it will be out f om under the shade of the trees.

Consider alternatives. If Kentucky bluegrass is struggling in an area due to tree shade, can the turf be replaced with a more shade tolerant grass such as tall fescue? Conversely, can some trees be removed or pruned to improve light penetration to the understory?

Recognize that there are some places where turf won't grow. Even the most shade tolerant turf will struggle if it is in heavy shade all day long.

Look for turf-friendly deciduous trees that cast lighter shade than conifers. Trees with thin crowns such as ginkgo or honey locust allow dappled sunlight to reach the ground, even when the sun is directly overhead. Trees with high, upright crowns result in diffuse sunlight eaching the turf surface. Columnar-formed trees will cast a relatively narrow shadow.

Mulch rings give trees their own space and simplify maintenance operations.

Effect of shade type on Red/Far red ratio reaching turf surface

Shade type	Red/Far red ratio
Full sun	0.995
Deciduous	0.915
Conifer	0.806

Source: Bell et al. 2000.

Effect of turfgrass treatment on leaf nitrogen concentration of dogwood trees two years after establishment

Turf treatment	Leaf nitrogen concentration (%)	
	Year one	**Year two**
Turf	1.73	1.54
Turf-free 3.0 sq.ft.	1.88	1.64
Turf-free 7.5 sq.ft.	2.06	1.89
Turf-free	2.21	2.04

Source: Fales and Wakeland (1981).

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Columnar trees produce a narrow shadow that minimizes total shade over the course of a day.