Shady Characters

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NEARLY EVERY golf course has some shady characters hanging around — big trees that shade out good quality turf. It's not a new problem, and yet not everyone seems to understand the factors associated with growing turfgrasses in shade. A host of components are involved; the trick is to adjust management programs to offset the factors inhibiting growth.

Oftentimes tree root competition is as much of a problem if not more than the shade itself. And other factors must be considered when evaluating poor turf areas surrounded by trees:

1. Shade exposure — morning, afternoon, duration of shade cover?

2. Are the trees deciduous or evergreen?

3. Do the trees affect air circulation?

4. What type root system (shallow or deep) do the trees produce?

5. What is the degree of canopy or overhang in relation to the troubled turf area?

It is impossible to determine the best means of correcting a tree/turf problem until each of these questions is considered, and when the weather is at its worst, these factors are the most troublesome. During the winter, shade greatly extends the period when the soil is frozen or when frost remains on the turf. This can induce a tremendous amount of winterkill in warm-season grasses. It can intensify winter damage and desiccation in cool-season grasses.

Even in winter, deciduous trees frequently cast enough shade to damage closely mown turf areas. On collars and putting green perimeters, adequate cutting height usually is enough to offset the slight shade from deciduous trees.

Figure 1. (Top, right) Shade cover 2 p.m. on May 1.

Figure 2. (Right) Shade cover at 2 p.m. on January 15.

Figure 3. (Above) Foot traffic on and off a green plus tree root competition can be devastating to the turf.

Figures 4 and 5. (Top, left) Root pruning can be as thin as a knife blade . . . or as wide as a ditch digger (left).

The relationship between cutting height, shade, and root competition will be discussed later.

SHADE, especially in the morning, reduces the photosynthetic processes within the grass plant. Growth is greatest in the morning, and so morning shade is more detrimental to overall grass health than afternoon shade. Thus, the need for shade evaluation in terms of morning or afternoon coverage is vital before considering tree thinning or removal. If adequate morning light can reach putting green surfaces, then some afternoon shade can be dealt with using other management techniques.

Because of the closer cut, putting surfaces are more affected by shade and tree root competition than collars and approach areas. Frequently when trees surround greens, the shade alone is enough to put the grass in a borderline stress condition. Add the stress of a very low cutting height and the grass usually cannot survive. If putting surfaces become thin from shade and/or root competition, adding increased height can once again create an acceptable grass cover. Raising the cut allows the grass to withstand the shade conditions because of the increased leaf area. In other words, there is now more leaf area to assimilate the filtered sunlight, and photosynthesis is again at an acceptable level. One must weigh the good versus the bad growing conditions and tip the scales to the side of good management.

It is no secret that higher height of cut on grasses must be maintained under shady or root competition conditions. The increased leaf area and resultant photosynthetic rate make better root development possible. Proper soil pH as well as phosphorus and potassium levels must also be maintained to keep the turf as vigorous as possible. Providing the proper management techniques to an environmentally stressed area keeps the scales tipped to the favorable side.

Trees adjacent to putting greens often cause poor air circulation, and we know air circulation is essential to the health of all turfgrasses. Stagnant air pockets on golf courses increase disease and insect infestations. The lack of air circulation causes humidity to increase, which favors disease development. Good air circulation also allows the plant to reduce heat buildup by increasing evapotranspiration rates.

A GOOD TREE maintenance practice around greens is to raise the canopy to a minimum of 15 feet. Higher canopies provide improved air circulation and additional sunlight in the winter when the sun's declination is much lower. Shadow lengths vary considerably from summer to winter. This is illustrated in *Figures 1* and *2*. In the winter, raised canopies allow sunlight to penetrate to frozen areas and significantly increase thawing.

While tree root competition is a real problem, it's frequently ignored. Trees remove tremendous amounts of moisture from the soil and take nutrients along with it. Tree roots have a much greater power to absorb than turfgrasses. Tree root pruning is an effective means of controlling invasion into putting greens, collars, or tees. It must be repeated routinely, however, because of regrowth and reinvasion.

One of the best tree root pruning devices is a subsoiler or vibratory plow. Its use every two to three years will keep root boundaries in check. If a trencher is used, one wall of the trench should be lined with some type of sheeting (heavy plastic or building tar paper) to provide a more permanent barrier. Tree roots often extend well beyond the foliage canopy of the trees; their small feeder roots have all the absorptive power. Keeping them out of putting greens, collars, and tees will eliminate moisture and nutrient loss from the soil and give the turfgrass a chance for survival.

Additional P and K fertilizations and water applications are needed on turf infested with tree roots. A plant physiologist once stated that an oak tree three feet in diameter at chest height can move over 1,000 gallons of water up its trunk in a day if the transpiration rate is high. With this type of ground water removal, it is no wonder that turfgrasses quickly show sparse or even droughty conditions under or around trees.

A TREE-THINNING program is often the best, perhaps the only answer to better turf in dense, heavily wooded areas. Panicky members believe tree-thinning is a clear-cut operation (we've all seen tree-thinning in power line rights-of-way), but this is not the case when we speak of golf courses. Each tree that is to be removed or kept must be carefully studied and carefully selected. Terminology is important. Instead of "thinning," "selective pruning" or "selective thinning" might be a better choice of words. "Tree clearing" is definitely out!

Removing a percentage of small trees in a given area may make healthier growing conditions for the remaining ones while eliminating severe shade and air circulation problems in the future. Also, by selectively pruning strategic limbs on larger trees, specific shade problems may be eliminated without tree removal. No one likes to remove trees, but on the golf course, someone must decide whether trees or grass are more important. Try selectively pruning, limbing, root pruning, and other means of tree/grass management. These practices alone often will allow the trees and turf to live compatibly together.

During golf course construction, carefully select the trees that will remain or trees to be planted on the course. Anticipate their mature size and shape, their influence on growing conditions for the turf, and the playability of each hole. Considerations for selecting trees for golf courses include the type and vigor of the root system and the density of the canopy they produce. These factors are important in determining the distance from a green that a tree should be planted and the shade the tree will create for a green or tee. If morning shade problems are eliminated, there will be little possibility that removal or significant thinning of the tree will be necessary in years to come. Again, remember the difference in winter arc versus the summer arc of the sun's path across the sky. An upright tree such as a poplar is less of a problem in the winter than a wide-spreading tree such as an evergreen or certain deciduous trees.

Tree shapes also affect the aesthetic qualities of each golf hole. Placing trees near approach areas requires an understanding of canopy overhang, shade/root competition, and how the mature tree size will affect the approach shot.

If a green is to be highlighted with a particular tree, then that tree must be fitted to its particular needs, be it a low, wide-spreading canopy or a tall tree producing a narrow canopy. Giving these considerations to tree placement and planting means significantly fewer tree problems and grass problems in the future.

LONG-RANGE landscape programs should be established for every golf course. They will insure proper selection and placement of plant materials. How many times have you seen a tree overhanging a bunker or preventing direct advancement of the ball from a bunker? This happens because mature tree size was not given consideration at planting time. Thus, an unfair situation is created when, with proper planning, it need not have occurred.

The most efficient way to insure proper landscape design is to consult with an architect regarding the shape and stature of various trees and how they will enhance the playability of the golf course. A reputable landscape architect will provide specimens of trees that have those characteristics and are adapted to your area. Other landscape values such as spring or fall color, leaf drop, or evergreen color should also be worked into the tree planting program.

Debris from trees grown in close proximity to putting greens presents another turfgrass maintenance problem. Leaves, seed pods, twigs, etc., must be blown off the putting surface every morning before mowing in the spring and fall, or any time a wind storm passes. Maintenance around and on such greens is also increased because of decreased efficiency in mowing, increased time needed to mow perimeters, and increased equipment damage caused by exposed tree roots.

While tree competition with closely mown turf is a tremendous problem, it can be eliminated by proper planning, selection, and placement. Word selection is a key in establishing a good tree maintenance program. The membership must be assured that the superintendent's intention is to prune and thin trees selectively to improve the golf course — not to destroy the trees so the grass may grow. Use strategy to sell the idea! Tree thinning and pruning do not have to be nighttime jobs!

If your golf course does not have a comprehensive, well-designed tree program, consider starting one soon and prevent tree and turf problems in the future.