TURFGRASS MATTERS

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Eliminating the Guesswork of Shade

New technology documents benefits of tree removal or pruning

Trees are intrinsic to the character of most golf courses, and revered to a fault by most golfers. The conflict between trees and high quality turfgrass, however, is well known among golf course superintendents. From root competition for moisture and nutrients to air stagnation, to excessive shade limiting the photosynthetic capabilities of turfgrasses to survive the stress of intensive management and heavy play, trees and turfgrass are at odds. The conflict between club members and superintendents who suggest tree removal as a means of improving turf condition is even better known.

Newly-enhanced computer technology is available that allows superintendents to document the contribution of specific trees to the shading of golf greens, and then recommend or request removal or pruning on the basis of scientific analysis, rather than conjecture. For those superintendents who have used the service, both the compliance with their recommendations and the improvement of their turf have been gratifying.

Proprietary sun-locating technology was launched two years ago to assist golf course superintendents in quantifying the effect of specific trees or groups of trees on the shading of problematic golf greens. This technology is augmented with new mapping software to graphically demonstrate patterns of sun and shade over time and perform various "what if" scenarios of tree removal and/or pruning.

The process

Without getting too crazy into the underlying science, let's take a quick look at what happens during the process:

- The first step is to "map" the green and surrounding trees using an instrument that is sort of a combined transit, compass and telescope mounted on a tripod. The instrument is set up in the center of the green and oriented toward magnetic north. An assistant walks the perimeter of the green, with measurements taken every 3-15 feet depending upon degree of curvature of the green perimeter. Each measurement includes the differential from true north (expressed in degrees) and the distance (in feet) from the center of the green. This data is entered into a computer, which then uses trigonometry to calculate the area of the green (±3%) and determine its location in three-dimensional space. It's important to note this is not GPS satellite data.

- The same process is performed with the trunk and major limbs of trees (or groups of trees) surrounding the green. A unique ID# is assigned to each tree. Groups of trees with intermingled canopies that can't be separated are treated as one entity.

- Each tree is evaluated as to density of the canopy (% of light passing through), and rated from sparse to dense.

- Each tree is also assigned a crown shape (elliptical, columnar, etc.) so the computer can fill in those spaces not specifically pointed at with the instrument.

- The computer then "crunches the numbers" and determines in which segment of the 360° vista of the green the "blocking horizon" occurs so it can be recorded as well. The blocking horizon is the area behind the already-identified individual or groups of trees that might block some portion of the sun's path and contribute to the shading of the green.

- Once the data for positioning of the green, surrounding trees and the blocking horizon are entered, the computer uses astronomic algorithms to determine the location (and path) of the sun on that specific green at any hour of any day of the year. The sun's position is then compared to the location of the trees (and major branches) relative to the surface of the green to quantify to what extent each tree blocks the sunlight from that green (calculated in square-foot hours).

Historically, the data generated from these complex computer calculations was presented in a tabular spreadsheet format for analysis. With the recent introduction of the mapping software, the data analysis takes on new life as full-color gradient maps showing sunlight duration or shading patterns, and bar charts indicating the number of "square foot hours" of shade contributed by each tree.

The "really cool" part of the software is the ability to run various "what if" scenarios

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