The USGA Green Section is confident in its construction guidelines for putting greens. A principle component of the guidelines is to have rootzone materials tested by a competent soil-testing laboratory. Many of the procedures conducted by these laboratories were developed specifically for testing the performance of turfgrass rootzones. As part of its ongoing dedication to use good science to build putting greens, the USGA supports the improvement and refinement of these laboratory procedures.

The Saturated Hydraulic Conductivity project was initiated in 1999 to evaluate documented variability problems in the saturated hydraulic conductivity ($K_{sat}$) method and develop a revised method for use by the rootzone testing lab industry.

Phase I of this project was to complete a laboratory site assessments of each of the testing laboratories to evaluate the implementation of ASTM method 1815-97 used to determine $K_{sat}$. Results indicate the current method insufficiently describes cylinder loading (step 1) and column saturation (step 2) of the method which contributes to interlab method variability in $K_{sat}$ and capillary and non-capillary moisture values.

As a result of the Site Assessments, Phase II of the study was initiated to address the impact of antecedent (initial sample moisture upon laboratory reception) on $K_{sat}$ values.

Preliminary results from four testing labs have provided some key information. With increases in antecedent moisture from 1.0% to 14%, $K_{sat}$ values falls substantially dependent upon lab and rootzone material source. Antecedent moisture variability only affects $K_{sat}$ values and has no bearing on capillary, non-capillary or bulk density parameters. The Phase II results suggest that antecedent moisture contents between 6 and 10% have little influence on $K_{sat}$ values.

Phase III of the study was to develop standard reference $K_{sat}$ columns for assessing percolation tables used by the testing labs. Five standard reference columns have been constructed and tests indicate that these columns provide very consistent $K_{sat}$ values.

Based on these early results, proposed revisions to ASTM 1815-97 are to: (1) specify a antecedent moisture of root zone mixes; (2) develop standardized cylinder loading techniques; and (3) all percolation table designs used in the testing labs will need to be evaluated using standard reference $K_{sat}$ columns.

Summary Points

Lab equipment, loading techniques, column saturation techniques, water temperature, and antecedent moisture content of the rootzone mix were all found to be significant sources of variation in the SHC test.

Research work is being conducted to determine calibration methods to minimize the variation.