

## CULTIVATION METHODS ON TURFGRASS WATER

### RELATIONSHIPS AND GROWTH UNDER SOIL COMPACTION

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Soil compaction is a major problem on recreational turfgrass sites because it adversely effects rooting and water relationships. A principal means of alleviating soil compaction is by cultivation. Limited data exists on the relative effectiveness of different cultivation techniques. In this project, five cultivation methods were compared under compacted soil conditions using Tifway bermudagrass: deep drill aerifier, hollow-tine coring, solid-tine (shattercore) coring, Aerway slicer and Ryan slicer.

On the Cecil sandy loam used in this study, soil oxygen diffusion was not strongly influenced by compaction and cultivation treatment. However, penetrometer resistance, a measure of soil hardness that restricts root growth, increased by 28% with compaction. Except for the deep drill aerifier, all cultivation methods substantially reduced penetrometer resistance and hollow-tine coring was most effective. Root growth in the 8-24 inch soil zone was enhanced by Aerway slicer (53-120%), deep drill aerifier (31-55%), and hollow-tine coring (20-35%) relative to the compacted control. Soil water extraction from difference depths was determined. On a compacted soil, a cultivation method that results in better uptake of soil moisture would be viewed as beneficial. Treatments exhibiting the best water use were hollow-tine coring, deep drill aerification and Aerway slicer. Improved water extraction came from the 4-8 and 8-24 inch zones. Most cultivation methods improved shoot growth (clipping yields) in 1987 but not significantly in 1988. These results reveal that, even on a very tolerant grass to compaction stress, differences in effectiveness of various cultivation methods occur. Cultivation procedures that removed a surface core (hollow-tine) or penetrated 6-10 inches deep (deep drill, Aerway slicer) on this compacted Piedmont soil were most effective in promoting root growth and best soil water use.