STOP #7

HOLLOW AND SOLID TINE CULTIVATION

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Compacted soil can limit aeration, water infiltration and rooting, making the turf more susceptible to stresses. Aerification, or coring, is commonly used to relieve these problems and others. The major objectives of coring are to: 1) improve water infiltration, 2) disrupt surface layers of soil and/or thatch, 3) enhance thatch control, 4) improve aeration and 5) enhance rewetting of hydrophobic soils.

Considerable interest has arisen regarding the use of solid tines on coring units for cultivation of putting greens. With the elimination of soil cores, reduced labor and interference with play are definite advantages of solid tine cultivation. Opponents of this practice are concerned about the potential compaction problems which may be associated with the use of solid tines, particularly at the bottom of the coring hole.

The objective of our research was to evaluate both hollow and solid tine cultivation. A field study was initiated in May 1984 comparing hollow and solid tine coring on a Penneagle creeping bentgrass green grown on a loamy sand soil. Coring was performed at two soil moisture levels and two compaction levels.

Results have shown both hollow and solid coring were effective in relieving surface soil compaction. However, hollow tine coring was consistently more effective in the evaluations made in this study. Both tines significantly loosened the soil surface although this loosening response is not as long lasting with solid tine coring compared to hollow tine coring. Both tines can increase aeration porosity in the soil. Aeration porosity refers to the large soil pores in which root growth and movement of water and air occurs. Due to removal of soil, hollow tine coring was more effective in increasing aeration porosity than solid tine coring.

Thus, solid tines cannot be considered a replacement of hollow tine coring as a routine practice. However, solid tine coring could be used as an effective supplemental practice when hollow tine coring is considered unwise because of dessication potential or interference with play. Solid tine coring would allow for a quick loosening and opening of the soil surface to increase water infiltration and aeration into the coring holes, yet the holes close quickly since no soil or turf is removed.

Cultivation with either tine in noncompacted soil appears to be resulting in a compacted region at the bottom of the cultivation zone. Water movement is dramatically reduced through this compacted region. Root development in and below this compacted region has not been inhibited thus far. Results have demonstrated cultivation pan formation may not be of great concern in highly compacted soil.

Noncompacted plots have been prone to considerable mower scalp in this study. However, plots cored with hollow tines have shown less susceptibility to scalp by the third year of treatment. This response is most likely due to the topdressing effect of hollow tine cultivation since soil is returned after coring is performed.