Cultivating NEW IDEAS

By FRANK S. ROSSI, Ph.D.
Cornell University

There are few maintenance activities that frustrate golfers more than our cultivation programs. Yet, we have learned over the years there are important benefits to conducting these operations.

For many the late season is when most of the cultivation practices are now relegated to as a result of continued golfer pressure to minimize disruption of play. Still, with the variety of implements now available, different grasses and of course different management leading to greater organic mater accumulation, it seems time to rethink our cultivation programs.

Pulling a Coring

Much of the early cultivation research was conducted on native soil growing medium. It was also conducted when we were topdressing infrequently with sand and peat and soil mixes. Several studies found in later years showed that hollow tine cultivation could lead to increases in organic matter levels over time.

A careful review of the historical literature would leave the average person wondering why anyone uses hollow tine cultivation. Having questioned that practice openly in these pages over the years I can say I received my share of repudiation as a malcontent, locked in a ivory tower, and simply unaware of practical golf turf management.

I realized that in spite of the research and the colossal frustration of golfers, golf course superintendents observed a benefit. Furthermore, they would often try and not hollow tine cultivate (or cultivate of any kind) and would say, "my putting surfaces were never as bad as when I stopped cultivating."

As the fervor died down many began to wonder about the need for hollow tine cultivation. In addition, when looking back in the studies, solid tine cultivation (again on native soils) often provided little benefit. But now that times have changed and we have sand and more ways to make a hole, and bentgrass growing in the south and high density grasses and practices designed to promote rooting, it is time to consider simply making a hole.

Poking a Hole

Studies conducted in Arkansas and Nebraska are investigating cultivation programs. First we must consider some differences from the classical research. Most importantly the latest research is conducted on sand based putting surfaces and designed to investigate organic matter management not compaction. Also, the studies now all include light frequent topdressing as well as heavy topdressing at the time of cultivation. Therefore, these studies are conducted under what would be considered standard practices.

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The Arkansas study conducted by John Kaufman under the direction of Professor Doug Karcher compared the effect of scarification with the Graden fitted with 3 different knives to hollow tine coring with tines of various widths, depths and spacings on organic matter levels, efficiency of removal and recovery.

There were stark differences among the treatments and a clear benefit of aggressive scarification, i.e., the 3mm knives provided the greatest reduction in organic matter. However these treatments also were least efficient in removing material as a high percentage of material removed was likely sand and not organic matter. In addition, the scarification treatment took more than two months to reach full recovery.

The tightly spaced 0.25-inch hollow tines set to a 1.5-inch depth seemed to provide the most efficient and overall least disruptive treatment. Organic matter levels were significantly reduced compared to most treatments and plots fully recovered within 10 days. The two questions that lingered for me were infiltration levels (not reported to date) and what would solid tine cultivation have done?

The Nebraska study conducted by Chaz Schmid under the direction of Professor Roch Gaussoin compared hollow tine and solid tine cultivation with various types of less invasive cultivation methods (LIC) i.e., Hydroject, PlanetAir, quad needle tine, bayonet tine, or no LIC treatment. All treatments were light and frequently topdressed as well as topdressed at the time of aerification.

Data from the first year showed there is no difference in organic matter levels between hollow tine and solid tine aerification, but both treatments accumulated less OM then no aerfication. No differences in OM accumulation were observed among LIC methods but the hydroject and needle tine treatments had higher infiltration rates compared to other LIC treatments regardless of the aerification treatments.

This study shows clearly that there appears to be little benefit from pulling a core in sand-based systems, rather there appears to a premium placed on making a hole. The benefits of overall organic matter reduction can be realized with solid-tines and sand topdressing and infiltration maintained during the season with less invasive cultivation.

Our ability to produce high quality turf is constantly improving. A result is that organic matter accumulation and reduced infiltration in sand based systems, trump older concerns of compaction in soil-based systems. Simultaneously, it is vital to keep the golfer's needs in mind especially during difficult economic times by minimizing the frustration of hollow tine cultivation. Finding a cultivation strategy that meets all these criteria is in fact a concept that "needs holes."