# *Comparison and Evaluation of Cultivation Techniques on Ultradwarf Bermudagrass Greens*

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**Objective:**

1. Compare core aeration and aggressive verticutting with sand injection for their abilities to affect organic matter content in the rootzone of ultradwarf bermudagrass greens.

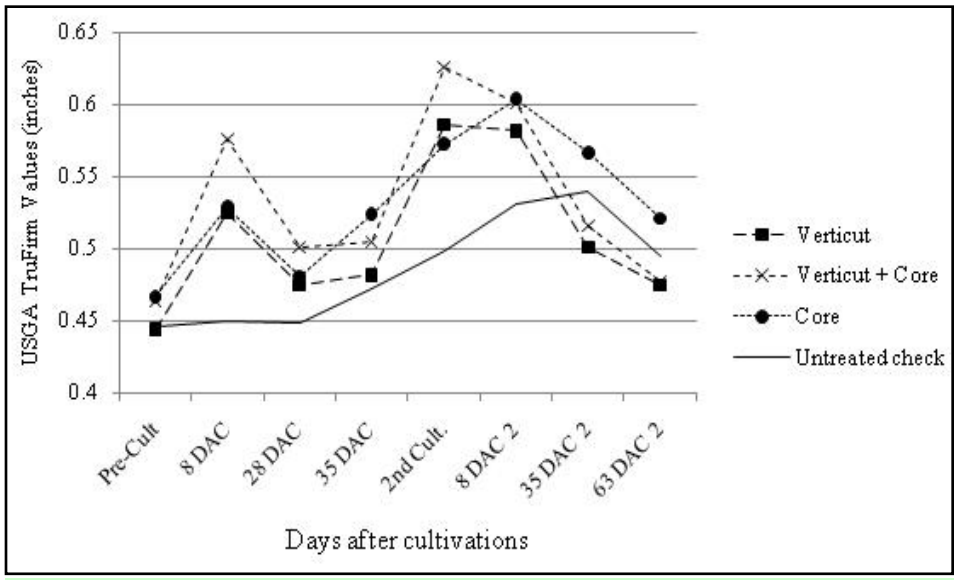
**Start Date:** 2009
**Project Duration:** 1 year
**Total Funding**: $3,000

Two turf cultivation implements were compared in field experiments, a Toro ProCore 648 equipped with 0.5-inch hollow-core top-eject tines on 1.5 by 2.0-inch spacing and a Graden sand-injection machine with 2-mm blades spaced 1.0 inch apart and set to a depth of 1.0 inch on the first pass and 0.5 inch on a second crossing pass. A third treatment combined the core aerifying followed by two passes of the Graden machine (aggressive verticutting).

The single replicate cultivation treatments were performed on a 'MiniVerde' ultradwarf green located in Mesa, AZ on June 7, 2010 and repeated on July 20, 2010. Soil samples were collected from each treatment replicate using a hole-cutter before cultivation on September 30, 2010. Laboratory analysis provided organic matter (OM) content of the samples at increments of 1-inch depth from the surface to 3 inches. Additionally, ball roll was measured by using a stimpmeter, and green surface firmness was measured by using the USGA TruFirm device.

The core-aerifying technique affected 6.5% of the surface area of the green at each event. A total of 13% of the surface area of the green was affected by the two cultivations. The aggressive verticutting implement treated 8% of the green's surface with each pass, and the total was 16% for two passes at each event. The season total was 32% of the surface area affected. The combination treatment affected 48% of the green's surface area.

At approximately 2 months after the second cultivation event, OM in the top 1 inch of the soil-sample core was reduced the most in the combined core removal plus verticutting at 68%. Aggressive verticutting alone reduced OM 55%, and removing cores only reduced OM 36%. The layer between 1 and 2 inches showed




*USGA TruFirm values (inches of penetration) before and after two cultivations on a 'MiniVerde' ultradwarf putting green in Arizona.*

OM reduced 74% by core removal, 68% by verticutting, and 35% by combining the two techniques. At a 3-inch depth, verticutting removed OM 58%, the combination removed 42%, and no change was observed for removing cores.

Ball-roll measurements were the fastest at 3 weeks after the first cultivation event. Ball roll was slightly slower on the treated greens compared to the untreated. Following the second cultivation, ball roll on the treated green exceeded the untreated green. However, there was no consistency for ball-roll measurements among the three treatments. Core-removal treatments tended to have fastest ball roll, and the aggressive verticutting tended to have the slowest ball roll.

The USGA TruFirm data indicated that all of the cultivations softened the green. At about 1 month after the initial cultivation, the green was firmer for all treatments, but not as firm as the untreated plots. At approximately 2 months after the second cultivation event, the aggressive verticutting treatments resulted in a slightly more firm green than the untreated or the core removal only.

Additional visual observations were that the core removal only treatment resulted in a puffy turf that was scalped during regular mowing for approximately 2 months after the second cultivation. The aggressive verticutting treatments had turf infested with rove beetles that pushed up nuisance mounds of soil.

## Summary Points

- Cultivation techniques applied twice reduced organic matter content at various depths on a 'MiniVerde' ultradwarf green.
- The greatest OM reduction of 68% at 1-inch depth was observed for the core removal combined with aggressive verticutting.
- Verticutting alone reduced OM 55%, and core removal alone reduced OM 36%.
- Ball roll was not consistent for cultivation treatments.
- USGA TruFirm measurements showed the green was softer soon after cultivation treatments. The green became firm approximately 1 month after cultivations.
- Verticutting treatments resulted in a slightly more firm green than no cultivation or core removal alone.