

Soil Physical Characterization of Aging Golf Greens

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Objectives:

1. Determine long-term effects of a USGA-specification rootzone mix with and without soil on physical, chemical, and microbiological factors.

Start Date: 2001

Project Duration: 4 years

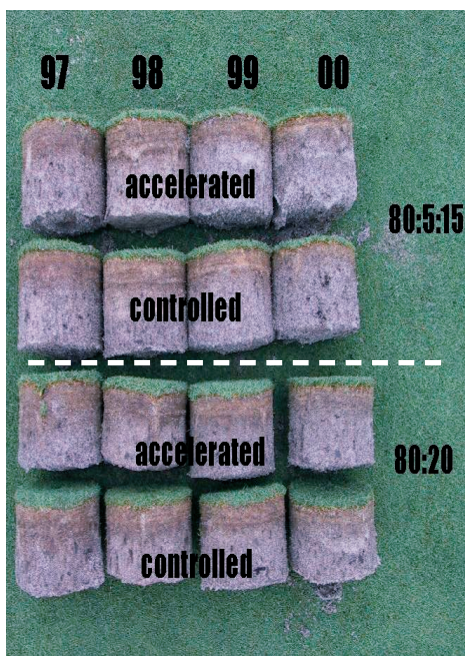
Total Funding: \$109,285

The three-year project is a focused extension of the previous USGA project: Grow-in and Cultural Impacts on USGA Putting Greens and their Microbial Communities. Emphasis is being placed on characterization of the long-term effects of rootzone mix and grow-in procedures on soil physical parameters.

Results to date indicate that as a green matures, soil infiltration is not affected in the first two years after grow-in, but decreases significantly in the third year after grow-in and continues to decrease as the green matures. A rootzone mix containing soil, however, does not decrease more, or at a faster rate than a rootzone mix which does not contain soil. Important to the project is identification of conditions causing the decrease in infiltration.



A series of four experimental putting greens were built in successive years at the Seaton Turfgrass Research Facility at the University of Nebraska to study the long-term changes in physical, chemical, and microbial aspects of various putting green rootzone mixes.



Cores taken from greens established in '97, '98, '99, and 2000 demonstrate the differences in organic matter buildup depending on whether the rootzone contains soil. The cores above the dotted line were taken from rootzones containing 5% (vol/vol) soil.

Visual inspection of sample cores indicates an increase in accumulation of organic matter as identified by a darkening of the soil profile in the rootzone (see figure). As a green matures, it appears that the depth of organic matter accumulation increased over time with greens that are more than four years old having a visible organic matter accumulation 3-4 times thicker than a green that is less than two years old.

The deposition of particulate organic matter may partially explain the decrease in water infiltration due to "sealing" of pore space with relatively fine organic material in the larger pores of the sand-based rootzone mix.

Future plans include characterization of three rootzone mixes located at the Arbor Links Golf Course in southeast Nebraska. In 2001-2002 Arbor Links was constructed with three different rootzone profiles (USGA specification with and without

peat moss and a California rootzone) on 18 holes (6 holes per rootzone) offering an excellent opportunity to evaluate agronomic as well as economic implications of the various rootzone profiles.

Summary Points

- Soil infiltration was not affected in the first two years after grow-in, but decreased significantly in the third year after grow-in and continues to decrease as the green matures.
- As a green matures, it appears that the depth of organic matter accumulation increased over time. Greens that are more than four years old have a visible organic matter accumulation three to four times thicker than a green that is less than two years old.
- A rootzone mix containing soil, however, does not decrease more, or at a faster rate than a rootzone mix which does not contain soil.