Impact of Sand Type and Application Rate of Fairway Topdressing on Soil Physical Properties, Turfgrass Quality, Disease Severity, and Earthworm Castings

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Objectives:

1. Determine whether particle size distribution and/or application rate will affect turfgrass quality, disease incidence, and earthworm activity.
2. Quantify the effects of particle size distribution and topdressing layer depth on soil physical properties.
3. Use the resultant data to make recommendations to improve the practice of fairway topdressing.

Start Date: 2007
Project Duration: two years
Total Funding: $6,000

Fairway topdressing is a relatively new cultural practice that is being adopted by several golf course superintendents throughout the United States to improve playing conditions. Some of the benefits reported have been improved drainage, less disease, and firmer fairways. The benefits to fairway topdressing seem unanimous, but the practice requires a significant budget, considerable labor, time, and commitment to implement properly. Additionally, many questions remain unanswered with regards to topdressing material selection, application rates, and the turfgrass management implications as the topdressing layer accumulates.

Sands used in USGA putting green construction and subsequent topdressing have been thoroughly researched to optimize macroporosity while maintaining sufficient water holding capacity. However, due to the strict specifications, these sands are prohibitively expensive when considered for use on larger fairway acreage. Therefore, recommendations for fairway sands are often very general. Although selecting a sand that meets USGA specifications for particle size distribution may not be necessary, it is often subjectively suggested that the sand not be too fine or too coarse.

The cost of a USGA sand does not improve the practicality of implementing this program for many golf courses. The impact of using sand that does not meet USGA specifications, however, has not been thoroughly investigated. Particle size distribution will likely affect infiltration and water retention at the playing surface. Topdressing materials that are too fine may retain excess moisture, whereas, a sand that is too coarse may predispose a large portion of the course to moisture stress. The short- and long-term impact of topdressing native soils is unknown.

This study was initiated on an 'L-93' creeping bentgrass (*Agrostis stolonifera*) stand managed as a golf course fairway at the University of Connecticut Plant Science Education and Research Facility in the summer of 2007. The first factor is sand type: fine, medium, and coarse. The second factor is application rate: 4 $ft^3/1000\ ft^2$, 8 $ft^3/1000\ ft^2$, and 12 $ft^3/1000\ ft^2$. A control is also included that receives no topdressing applications. Topdressing applications are kept constant and are applied once per month starting in May and ending in November. This design allows the comparisons of each sand type applied at each of the three rates. The three different rates will also enable the development of three different depths of topdressing over time.

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Weekly data collection includes volumetric soil moisture, soil penetration resistance, turfgrass cover, turfgrass color, and turfgrass quality. Soil infiltration rates will be determined in October/November 2009.

Summary Points

- Topdressed plots showed a faster green-up response than the untreated control plots in mid-April regardless of sand type. Plots that received higher rates of application exhibited a greater greening response than plots receiving lighter rates of application.
- Topdressed plots exhibited less dollar spot incidence than untreated plots. Plots that received higher rates of topdressing had less dollar spots than plots that received lower rates of topdressing, regardless of sand type.
- Topdressed plots exhibited less earthworm castings than untreated plots. Plots that received higher rates of topdressing had less earthworm castings than plots that received lower rates of topdressing, regardless of sand type.
- Topdressed treatments had higher resistance to penetration than the untreated control plots, demonstrating a firmer surface than the untreated controls. The fine sand had the greatest resistance to penetration, followed by the medium sand and the coarse sand, respectively. Plots receiving higher rates of topdressing exhibited greater firmness than plots receiving the lower rates.
- Untreated controls had the highest volumetric soil moisture content in the top 2" of the playing surface compared to all topdressing treatments. The fine and medium sand treatments hold more water than the coarse sand treatments. Regardless of sand type, the higher the rates of application, the less water is held in the top 2" of the playing surface.