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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, Cook College, Rutgers University in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public. Articles appearing in these proceedings are divided into two sections.

The first section includes lecture notes of papers presented at the 1998 New Jersey Turfgrass Expo. Publication of the New Jersey Turfgrass Expo Notes provides a readily available source of information covering a wide range of topics. The Expo Notes include technical and popular presentations of importance to the turfgrass industry.

The second section includes research papers containing original research findings and reviews covering selected subjects in turfgrass science. The primary objective of this section is to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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Dr. Ann B. Gould, Editor
Dr. Bruce B. Clarke, Coordinator

CREEPING BENTGRASS ESTABLISHMENT AS AFFECTED BY ROOT ZONE MIXTURES

James Murphy, Josh Honig, Stephanie Murphy, Robert Wolverton, T. J. Lawson, Miguel Sosa, Bruce B. Clarke, and Hiranthi Samaranayake[1]

This project is designed to i) improve recommendations for sand particle size distribution and the depth of the root zone by consideration of the microenvironment; ii) evaluate composts as organic additives and inorganic products for root zone mixes compared to peat sources; iii) assess the potential of various root zone mixes to reduce management and resource inputs; and iv) monitor the physical, chemical, and biological changes that occur in root zones as greens mature for understanding factors that contribute to the success or failure of greens.

FIELD RESEARCH

The primary objective in the 1998 growing season was to evaluate the establishment of creeping bentgrass as affected by the sand size distribution and amendment used in root zone mixes. The 37 root zone treatments constructed in either one or two microenvironments of the field research facility at North Brunswick, NJ were seeded to 'L-93' creeping bentgrass turf on 31 May 1998.

Location Effect

- Environment (location) did affect establishment ratings for a few observation dates; however, there was not a strong influence on the establishment of creeping bentgrass in these two studies.

- No significant interaction between location and root zone treatment was observed during the 60 day evaluation period of bentgrass establishment.

- It is expected that environment will have a greater effect on performance of turf maintained at a lower cutting height (<5/32 inch) and receiving compaction treatment during 1999.

Sand Size Distribution Study

- Two finer sand size distributions (not meeting USGA guidelines) had a better rate of establishment than coarser sands. This was likely due to better moisture retention and subsequently better nutrient availability in those finer sands.

- The coarsest sand size established well; after 60 days, however, the performance of the plots declined. This may be an initial indication of the limitations of coarser sands.

Amendment Study

- A greater affect on the establishment of bentgrass was observed in the amendment study compared to the sand size distribution study.

- Generally, increasing the rate of amendment with soil and peats enhanced establishment. This was likely due to increased fertility and/or moisture retention in these mixes. However, establishment ratings for the 20% soil and 20% peat treatments after 40 DAS became similar to respective lower amendment rate plots. This may indicate the development of stresses associated with low air-filled porosity in the root zone.

[1] Associate Extension Specialist in Turfgrass Management, Graduate Assistant, Stephanie's title, Robert's title, Lawson's title, Miguel's title, Extension Specialist in Turfgrass Plant Pathology, and Hiranthi's title, respectively, New Jersey Agricultural Experiment Station, Cook College, Rutgers, the State University of New Jersey, New Brunswick, NJ 08901.

- As expected, the greater fertility of ZeoPro plots enhanced establishment. Both ZeoPro and Profile (inorganic) amendments enhanced establishment up to 40 DAS compared to unamended sand.

- ZeoPro maintained high establishment ratings up to 60 DAS, whereas Profile plots were more similar to the unamended sand after 40 DAS.

- Additional establishment data for all amendment treatments constructed in the enclosed environment are currently being summarized.

Plan of Work for 1999

- A preventive fungicide program will be employed during the winter of 1998/1999; however, a curative program will be used periodically during the 1999 growing season to assess differences in disease incidence.

- Mowing height will be reduced from the current 0.325 inch to 0.15 inch or lower.

- Compaction will be applied with a water-filled roller on a weekly basis.

- Plots will be routinely rated for performance (i.e., quality, density, color, and stress).

- Plots will be evaluated for biological, chemical, and physical properties.

LABORATORY RESEARCH

Research studies in the laboratory have been conducted to evaluate the influence of sample preparation on saturated hydraulic conductivity (Ksat). The saturated hydraulic conductivity (Ksat) measurement continues to be a highly variable measurement within and among USGA testing. An understanding of the source of this variability would improve testing procedures and benefit the golf course construction industry. A possible source of the variability is the phenomenon of air entrapment within "saturated" laboratory packed cores. Four studies assessed the influence of core diameter, antecedent moisture content prior to saturation, and saturation method on Ksat variability, as affected by air entrapment.

Effects on Ksat

- Increasing core sample diameter (2 to 3 inches) resulted in higher sample densities.

- Ksat rates for sand:peat and sand samples increased as the sample moisture content at time of saturation decreased. Greater sample moisture content at saturation apparently results in a sufficient amount of "pore necks" being filled with water that subsequently encloses air-filled pores during saturation (entrapped air). Conversely, a relatively dry sample provides open passages for the expulsion of air during saturation. Thus, dry sample cores did not entrap as much air during saturation and have higher Ksat.

- Vacuum saturation procedure demonstrated the importance of removing entrapped air from core samples. Vacuum saturation of sample cores increased Ksat rates compared to saturation at standard air pressure.

Temperature affects the solubility of gases in water. Water and room temperature can vary greatly within and between laboratories over time, and consequently could influence the air entrapment and Ksat of core samples. These factors are currently being evaluated for their effect on Ksat by varying water temperatures relative to ambient air temperatures in the lab.