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Water Retention of Sand-Based Root Zones with Organic and Inorganic Amendments

Doug Karcher, Ph.D.,
University of Arkansas
(karcher@uark.edu)

Objective

Determine the water-holding capacity of sand root zones (meeting USGA recommendations) modified with various amendments and determine the effect of amendments on grow-in rate and dry down characteristics of creeping bentgrass established in the amended root zones.

Summary

Previous research has shown that while some inorganic amendments increase the total water-holding capacity of a root zone, they may have little impact on plant-available water. Given that the cost of inorganic amendments is greater than peat, it is important to understand the benefits of inorganic amendments so superintendents can make well informed decisions when selecting amendments.

Moist sand: amendment root zones were mixed at the appropriate ratio and were packed into cylinders and plant-available water was determined through laboratory testing procedures. The same sand: amendment root zones were packed into lysimeters, established with creeping bentgrass in the greenhouse and were subjected to a dry-down period during which irrigation was withheld.

Results

- All root zone treatments met USGA recommendations except for capillary porosity in the sand control.
- In the laboratory, reed sedge peat was the only amendment that significantly increased plant-available water compared to the sand control.
- Increasing amendment ratios from 10% to 20% enhanced germination, but the difference was significant in only one of two trials.
- Diatomaceous earth enhanced establishment rate, green cover during dry-down and resistance to wilt, but using it for putting green construction would greatly increase costs. Long-term studies must be conducted to determine whether this product has long-term benefits compared to traditional peats.
- This experiment was performed in a controlled setting that favored turfgrass growth. The results might be different if this experiment were performed under field conditions that included foot traffic, mowing stress and greater environmental variability.

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