2016-29-579

Nitrogen Fertilization of Newer Bentgrass Cultivars

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Creeping bentgrass (*Agrostis palustris* Huds.) is the most common turfgrass used for putting greens in much of the northern United States. However, its high quality surface means that use will always be pushed southward, into areas for which it is marginally adapted. Newer cultivars of bentgrass are often underrepresented in research, and thus the objective of this work was to examine the performance of newer creeping bentgrass cultivars at two southern locations, when managed under varying nitrogen (N) fertilization rates.

Beginning in March 2016, experiments were conducted at the Atlanta County Club (ACC) (Marietta, GA) and University of Georgia – Griffin (Griffin, GA) on established (seeded Sept 2015) USGA-type putting greens consisting of 'Pure Distinction', 'AU Victory', '007', 'V8', 'T1' and a 'Penn A1/A4' mix. Nitrogen treatments were solution urea at 0, 0.2, 0.5, 1.0, 1.5 and 2.0 g N m^{-2} (0, 0.05, 0.10, 0.2, 0.3 and 0.4 lb N 1,000 ft^{-2}) sprayed every other week in a spray volume of 90 gpa (2 gallon 1,000 ft^{-2}). There were 4 replications of each N Rate/cultivar treatment. Collected data included relative color and quality, green firmness, and root and shoot densities.

General effect of N rate on turf quality: In the early spring (Feb-May) of 2016 bentgrass quality, color and shoot density generally increased as N rate increased, regardless of cultivar. However, with the onset of summer heat bentgrasses fertilized with the two highest rates of N were severely affected, with significant tissue damage and death. Thus, in 2017 N applications in the two highest treatments were adjusted to weekly applications. In 2017 application of the highest rates of N on a weekly basis prevented the damage observed in 2016.

Interaction of N rate and cultivar on dry weight of roots: The interaction of N rate and cultivar was not significant for root length, shoot density, and bentgrass color or quality, at either location. However, the interaction was significant for dry weight of bentgrass roots. This was because the cultivars T1, Pure Distinction, AU Victory and V-8 often had higher relative root dry weights when no N was applied, with a substantial reduction in dry weight when the top two N rates were applied. The cultivar 007 and the Penn A1/A4 blend were less affected by N additions, with lower root dry weights across all rates of added N.

Shoot densities of the selected cultivars: At the ACC June (2016) shoot density was highest in Pure Distinction, followed by AU Victory, and then shoot density in 007, Penn A1/A4, T1 and V8 were equal. June root length density was greatest in T1, followed by V8, with root length density in all other cultivars equal. Shoot density was often maximized at N rates of 2.2 to 2.8 g N m^{-2} mo^{-1} (0.5 to 0.6 lb N 1,000 ft^{-2} mo^{-1}), a total of approximately 2 lb N 1,000 ft^{-2} $year^{-1}$. But, root length often decreased as N rate increased. Shoot density of the cultivars occurred in this general order, from highest to lowest: Pure Distinction = AU Victory > 007 > Penn A1/A4 blend = T1 > V8. Root length of the cultivars was often the reverse of that observed with shoot density, with a general order (from longest to shortest) of: T1 > V8 > 007 = Penn A1/A4 blend = Pure Distinction = AU Victory.

Summary: Two years of observation revealed that cultivars tended to perform similarly across a range of N rates. The highest rate of N was not needed for the highest quality turf, and it significantly reduced root growth. Nitrogen rates of between 2.2 to 2.8 g N m^{-2} mo^{-1} were needed for best color, quality and shoot density, but those rates had to be applied as weekly split treatments to avoid summer damage via phytotoxicity.

Figure 1. Creeping bentgrass cultivars performed similarly across a range of N rates, and the highest rate was not needed for the highest quality turf.

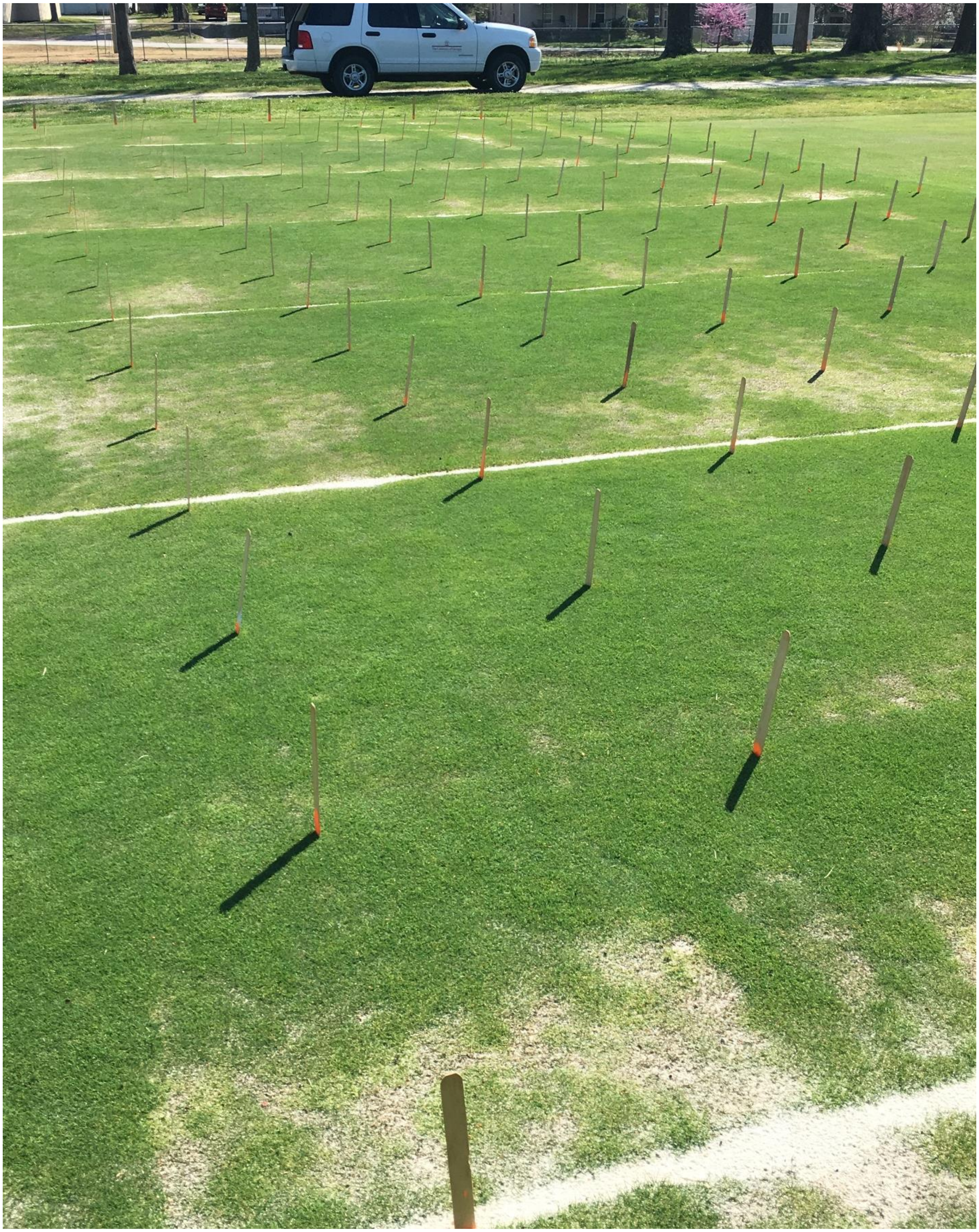

Figure 2. Nitrogen rates from 2.2 to 2.8 g N m^{-2} mo^{-1} were needed for best color, quality, and shoot density, but those rates had to be applied as weekly split treatments to avoid summer damage via phytotoxicity.