MANAGING BENTGRASS DURING SUMMER STRESS

Elizabeth Guertal
Department of Agronomy and Soils
Auburn University

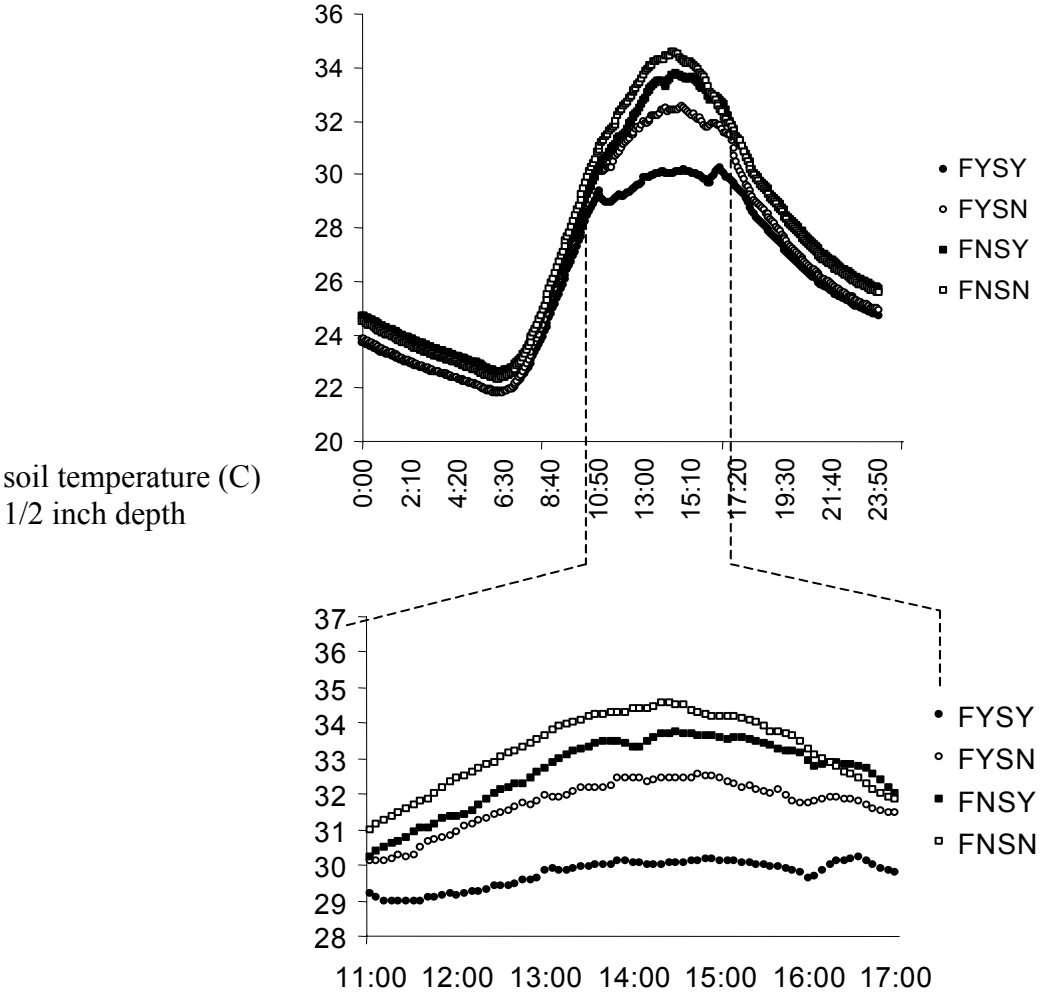
It is well known that summer stress can cause reductions in bentgrass rooting and growth. Tools commonly used by superintendents for aiding stressed bentgrass turf may include syringing, fans, aerification, or use of growth stimulants. Cooling fans or underground cooling units are widely employed throughout the southeastern U.S., while hand-watering or syringing is more widespread throughout the nation. Growth stimulants may include a hormone to encourage rooting, or a perioxide-based spray to encourage oxygen production in the soil.

At Auburn University we have recently completed studies which evaluated the combined and individual effects of fans and syringing on the ability to cool the turfgrass canopy and promote growth in bentgrass turf. The syringe applications were applied to turfgrass plots using misting irrigation heads, which applied a 2-min. water spray at noon, 2 and 4 pm each day. Soil temperature readings (1/2 inch deep in the soil) were collected at 5 minute intervals during the entire two years that the study was performed. Additional collected data included turf color and quality, and weekly rooting depth of the Crenshaw bentgrass.

Figure 1 illustrates the effect of the fans and the mist syringing on the soil temperature in the bentgrass putting green. The top box of Figure 1 illustrates a 24-hour day, starting at midnight and ending at 11:30 p.m. Differences between treatments become evident when the fans were turned on at 11:00 a.m, and lasted until the fans were turned off at 5:00 p.m. Syringe treatments were also applied during this time. The bottom box of Figure 1 is from the 11:00 a.m. until 5:00 p.m. period, providing a better view of treatment differences. The lower two data lines on the figure (open circles and solid circles) shows the effects of running the fans and a combination of fans + syringing in a humid Alabama climate. When the fans were running, there were significant drops in soil temperature. As a reference, a soil temperature of 32C is 89F, and a soil temperature of 24C is 75F.

Perhaps of more importance to northern bentgrass managers, the use of syringing also lowered soil temperatures. Although the reduction in soil temperature was not as great as using fans (open circles) or fans + syringing (solid circles), the use of syringing alone (solid squares) did reduce soil temperature below that of the untreated control plots (open squares). Weekly root samples collected during each summer did not show an increase in root depth due to the impact of fans or syringing. Turf quality was improved by the use of fans, fans + syringing, or syringing alone.

Figure 1. Effect of fans and syringing on cooling of bentgrass greens, Auburn, AL, August 15, 2000.



Another project we recently completed at Auburn University was an evaluation of an oxygenator spray. This commercial product is used by many of our superintedents to encourage aeration of their greens during summer stress, and to discourage black-layer production. This experiment was conducted on two native soil bentgrass putting greens located on golf courses near Auburn, AL.

Applied treatments were two oxygenator sources plus an untreated control. Oxygen sources were: 1) a commercial source that consisted of hydrogen peroxide, acetic acid and peroxyacetic acid, plus a stabilizing agent added at a 1:1 ratio; and, 2) hydrogen peroxide purchased from a local drug store. The oxygen sources were applied at the labeled

recommended rate (64 fluid oz/A in 50 GPA) using a $C0_2$-pressurized backpack sprayer. All sprays were applied at the recommended rate at three timings: 1 time/month, 2 times/month (sprays applied every-other week) or 4 times per month (sprays applied weekly). All plots were irrigated immediately after application, following label instructions.

We collected root-length growth data at monthly intervals, and also used an oxygen sensor to see if differences in the soil oxygen diffusion rate developed in the treated plots. Oxgen diffusion readings were collected at various times throughout the study, ranging from immediately after spraying to one week after application.

Figure 2 illustrates that root length of the treated bentgrass plots was either unaffected or negatively affected by the spray treatments. At the 90 day sampling the application of hydrogen perioxide reduced the length of the bentgrass roots as compared to the untreated control, at one of our test locations. At the second location there was never a significant difference in root length due to any of the oxygenator sprays. There was never a difference in soil oxygen diffusion rate due to any spray application, at either location.

Figure 2. Root length density of Crenshaw bentgrass as affected by oxygen spray treatments.