

Impact of Irrigation Timing, Coupled with the Use of Fans, on Bentgrass Putting Greens

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Objectives:

1. Examine combined and separate effects of fans and syringing on soil temperature and root length density on a 1-year-old bentgrass putting green.
2. Examine combined and separate effects of fans and syringing on soil temperature, root length density, and quality on a newly established bentgrass putting green.
3. Examine the effect of fans and irrigation timing on bentgrass quality and soil temperature, with the irrigation applied as a morning or afternoon application.

Start Date: 2006

Project Duration: two years

Total Funding: \$6,000

In the southeastern United States, hot, humid summers contribute to bentgrass decline. Although cooling fans and water application via syringing are widely used to limit bentgrass decline, there is little data that documents the effectiveness of these maintenance practices.

A series of experiments were conducted at the Auburn University Turfgrass Research Unit (TGRU), Auburn, AL to investigate the effects of syringing (with and without the use of fans) compared to fan only and plots with neither fan or syringing treatments. Syringe treatments were applied by low-volume misting irrigation heads placed at each corner of syringe plots. Syringe applications were applied at three times each day (1200, 1400 and 1600 hrs) for a period of 2 min-

utes per syringe cycle. This run-time applied 1/20th inch of water to each plot at each syringing.

Syringing never affected root length, but the use of fans slightly increased the average root length density, especially in 2000. Significant increases in root-length density due to the presence of fans occurred on August 7, 14, and on July 17 and 24, 2001.

The combined use of fans and syringing always reduced soil temperature below that of any other treatment. Soil temperature was reduced by the various treatments in the following order, with the greatest reduction listed first: 1) syringing + fan, 2) fan only, 3) syringe only, and, 4) no fan, no syringe

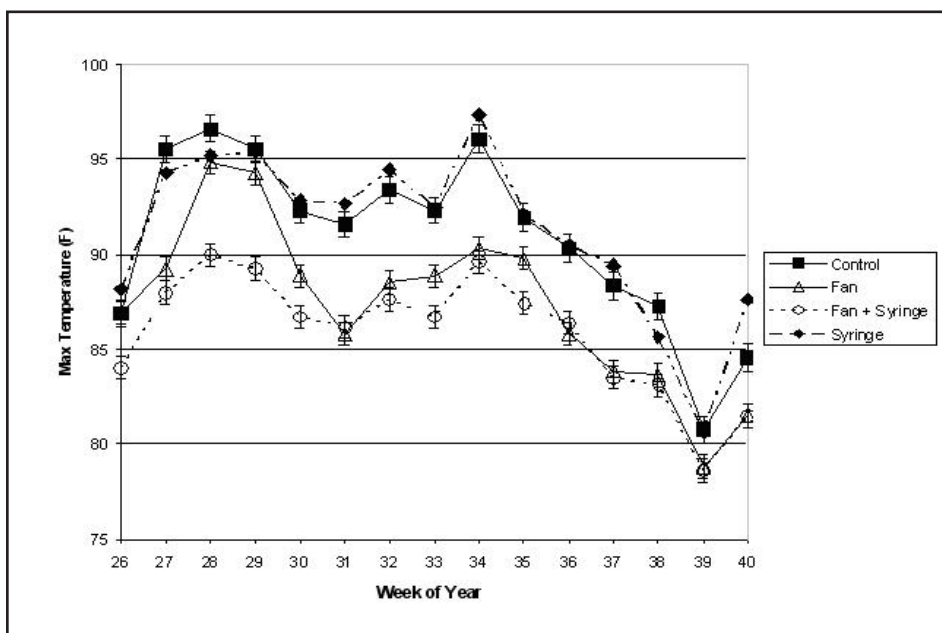
Although there were many weeks when the soil temperature was not significantly different between the fan only and the fan + syringing plots, the visual quality of the turfgrass was significantly greater in the fan + syringing plots, over both years

of the study. This may reflect a cooling effect of syringing in the turfgrass canopy that we were unable to measure with our temperature probes buried in the soil.

In work published by other researchers, soil temperatures of 95° F greatly decreased root numbers in bentgrass. When soil temperatures were reduced to 84.2° F, root growth was less affected. In our work, the combination of fans and syringing kept soil temperatures at 1/2 inch depth below injurious levels (< 80.6° F) for 2 hours longer in a given day, compared to plots in which fans or syringing were not used.

Summary Points

- When fans were run for 24 hours, in some weeks fan + syringing significantly lowered soil temperatures, and in others the use of fans alone was just as effective as fan + syringing.
- In the first study where fans were only run during the hottest part of the day, the combination of fan + syringing was always needed to provide maximum soil cooling.
- When fans were not running, soil temperatures returned to equal those in the control plots within a 3 to 4-hour period. For example, in July, 2000, when fans were shut off at 5 pm, soil temperatures at 1/2 inch were equal to that in the control at 8 pm.
- In both the 2000-2001 and 2002-2003, the use of fans often increased root-length density, while the use of syringing never did. In the 2002-2003 study in some cases syringing alone decreased root-length density.
- An additional year of data collection, coupled with further analysis of the 2007 data, will help us determine if morning or afternoon irrigation best helps bentgrass.



Maximum temperature (F) observed in a bentgrass putting green as affected by fans, syringing, or fans + syringing in Auburn, AL, 2002.