

Fall Potassium Fertilization and Winter Traffic Effects on ‘Crenshaw’ Creeping Bentgrass Putting Green Playability and Performance

Study Duration: October 2014-May 2016

USGA Support: \$6,000

Principle Investigator:

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Questions exist over the winter traffic tolerance of creeping bentgrass (*Agrostis stolonifera*) putting greens, and additional enquiries exist concerning the potential benefit in winter traffic tolerance from supplemental fall potassium (K) fertilization in the transition zone. Traffic on morning frost can be detrimental to turf health, and afternoon traffic has the potential to negatively affect turf health when growth rate is decreased in the winter. Additionally, previous studies have shown the effects of traffic on frost covered turf both before and after the prescribed traffic treatment time implemented in this study (8:00 AM), so there is a gap in the data that, if filled, may prove to be largely beneficial for golf course managers. A modified roller was used for the study (Fig. 1). This study was also conducted to evaluate fall-applied potassium fertilizer's effects on turf playability and performance on ‘Crenshaw’ creeping bentgrass putting greens when subjected to varying amounts of traffic.

After one season of data collection, several trends emerged from the analysis. In terms of chlorophyll content, there were statistical differences in readings based on the interaction between potassium levels and morning rolling levels (Fig. 2). For potassium levels of 0 and 3.66 g K m⁻², there was no indication of a significant difference in chlorophyll contents for the number of morning rolls. However, for the potassium level of 7.32 g K m⁻², the chlorophyll contents for 0 morning rolls were significantly higher than the chlorophyll contents for 4 and 8 morning rolls.

Additionally, there were statistical differences in chlorophyll contents based on morning rolling levels. During weeks 9-13, the chlorophyll contents for plots receiving 0 morning rolls were higher than the chlorophyll contents for plots receiving 4 or 8 morning rolls, but there was not an indication of a significant difference between chlorophyll contents for plots that received 4 and 8 morning rolls. For all other weeks, there was not an indication of any significant differences in the chlorophyll contents for plots that received 0, 4, and 8 rolls.

There were also statistical differences in chlorophyll contents based on afternoon rolling levels. Comparisons of the chlorophyll contents for plots that received 0 and 6 afternoon rolls did not indicate any significant differences except for weeks 15 and 17. Plots that received 6 afternoon rolls had statistically higher chlorophyll contents than plots that received 0 afternoon rolls.

When analyzing NDVI readings, there were statistical differences based on morning rolling levels. For weeks 5 through 13, the NDVI readings for plots that received 0 morning rolls were significantly higher than the NDVI readings for plots that received 4 and 8 morning rolls. There were no other indications of a significant difference for the different morning rolling levels during the other weeks.

Ball roll speed also showed a statistical difference in measurements based on morning rolling levels. For month 3 (February), the ball roll speed for plots that received 0 morning rolls was significantly lower than the

ball roll speed for the plots that received for 4 and 8 morning rolls. There were no other indications of a significant difference for the different morning rolling levels during the other months. (Fig. 3)

Figure. 1. The Roller Used for the Study



Figure 2. Profile plot of chlorophyll contents for potassium levels by morning rolling levels interaction

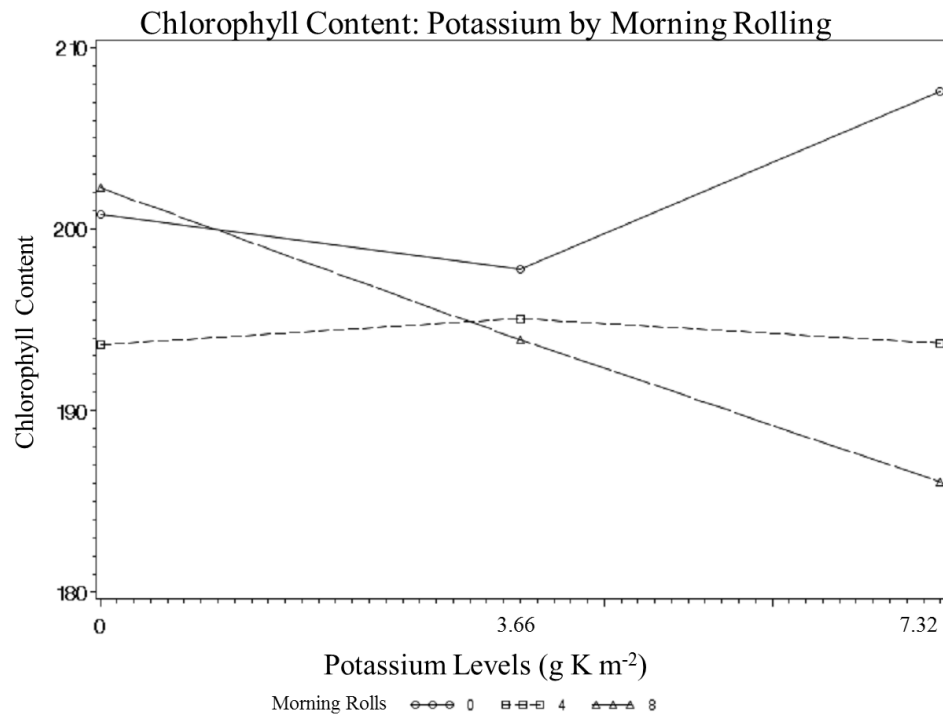


Figure 3. March 7 2015 of the treatments of plots with 0, 4, and 8 rolling times at 8 am on the last frost event of the winter

