

High-Frequency Light Weight Rolling Affects Putting Green Speed and Quality

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Photo by Jay Richards

Mower-mounted vibratory putting green rollers

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Summary. Rolling putting greens is a cultural practice that many golf course superintendents are using to increase putting green speed. Research shows that putting greens constructed according to United States Golf Association (USGA) specifications can be rolled six times per week and result in no decline in overall turf quality. However, the effects of rolling putting greens more than 6 times per week are unclear. Therefore, the objective of this study is to determine if rolling the putting surface more than six times a week to increase ball roll distance produces a decline in turf quality or water infiltration. Three different rolling treatments (applied

two times per day, four times per day, and eight times per day) were chosen to evaluate the effects they would have on putting green speed, turf quality, and water infiltration. Plots rolled eight times per day produced significantly faster green speeds compared to plots rolled two and four times per day. Plots rolled two times per day consistently had the highest quality, and though there were some small differences in water infiltration, all remained above the acceptable infiltration rate for a sand-based putting green.

Abbreviations: USGA (United States Golf Association)

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Light-weight rolling of putting greens is a cultural practice that is continuing to gain popularity among golf course superintendents wishing to increase putting green speed. A recent study concluded that putting greens constructed according to USGA specifications (USGA, 1993) can be rolled six times per week and result in no decline in turf quality (Richards, 2008, 2009). However, there are occasions when a rolling frequency of more than six times per week may be desired. Many golf course superintendents go to great lengths to improve putting green speeds for tournament play, and therefore, may consider a more aggressive rolling program that exceeds six times per week. There has been little research performed to determine how often the putting surface can be rolled to improve green speed without causing a decline in turf quality. Therefore, the objective of this study is to determine the effects that high-frequency rolling on putting greens has on ball roll distance, turf quality, and water infiltration.

Materials and Methods

This research was conducted at the Arkansas Agricultural Research and Extension Center in Fayetteville, Ark. on a 6-yr-old 'G2' creeping bentgrass (*Agrostis stolonifera*) putting green that was constructed according to USGA specifications (USGA, 1993). Mowing, fertilizer, growth regulator, and pesticide application, aerification, irrigation, and topdressing were uniform across the experimental area throughout the study and were consistent with typical golf course putting-green management practices.

The study consisted of three different rolling treatments: two times per day, four times per day, and eight times per day. Each treatment was applied six days per week and replicated four times for a total of 12 plots (5 by 60 ft). Treatment application began 30 June 2008 and continued for six weeks until 7 August 2008. Rolling treatments were applied using a commercially available greens roller (True Surface Vibe V Vibratory Greens Rollers, Turfline, Inc., Moscow Mills, Mo.) mounted on a triplex greens mower (John Deere 2500B, John Deere Co., Moline,

Ill.). Putting green speed and turf quality were evaluated once per week. Green speed was determined by measuring ball roll distance with a Pelzometer (Nikolai, 2005). On each plot, three golf balls were rolled in opposite directions and the six resultant ball roll distances were averaged. Turf quality was determined by rating each plot on a scale from 1-9, with 1 being poor, 6 being minimal acceptable quality, and 9 being exceptional. Six weeks after the first rolling treatment was applied, water infiltration measurements were conducted using a double-ring infiltrometer (Turf-Tec Double-Ring Infiltrometer, Turf-Tec International, Tallahassee, Fla.) and a mariotte siphon (Gregory, 2005). The mariotte siphon was used to maintain constant head pressure in the center ring of the infiltrometer. Infiltration was measured to assess the compaction of the surface layer of the putting green.

Results and Discussion

Ball roll distance. There were no significant differences between plots rolled two times per day and those rolled four times per day with regard to ball roll distance (Fig. 1). However, plots that were rolled eight times per day produced green speeds, on average, 10 inches faster than those rolled two or four times per day. Differences in green speeds between plots existed after just one week of applying treatments. After three days of rolling applications, plots rolled eight times per day produced green speeds 14 inches longer than plots rolled two times per day and 12 inches longer than plots rolled four times per day (data not shown). This increase in green speed was likely a result of the thinning of the turf that occurred on the plots rolled eight times per day rather than a smoother putting surface.

Turf quality. Treatments consisting of rolling two times per day provided better quality than those rolled four times per day, which produced better quality ratings than plots rolled eight times per day (Fig. 2). Overall quality for all treatments remained acceptable (>6.0) until day 16 (Fig. 2). At this point, turf quality began decreasing for all three treatments. Plots rolled

four and eight times per day began producing unacceptable quality ratings. All plots rolled two times per day remained above minimal acceptable quality throughout the study. The reduction in turf quality on plots rolled four or eight times daily was mostly attributed to thinning of the turf. However, plots rolled four times per day did remain acceptable throughout the study. Because this study was conducted in the middle of the summer, thin areas were very susceptible to becoming very hot during the day thus causing them to decline even more rapidly.

Water infiltration. Though there were no significant treatment differences, all three treatments possessed water infiltration rates higher than 36 inches per hour (data not shown), which exceeded rates that are acceptable for a USGA sand-based putting green (USGA, 1993). Over a 1-2 month period, a light-weight roller like the Tru Surface Greens Roller will not likely cause surface compaction, especially in situations where the rolling frequency is only three to six times per week.

This study shows that rolling can be done as often as four times per day for two weeks without a decline in turf quality. Over a six-week period, high-frequency rolling of up to eight times per day did not negatively affect water infiltration, but rolling eight times per day had a detrimental effect on turf quality after two weeks. Therefore, golf course superintendents can implement high-

frequency rolling programs on their putting greens for short periods of time and see no detrimental effects on overall turf quality or water infiltration.

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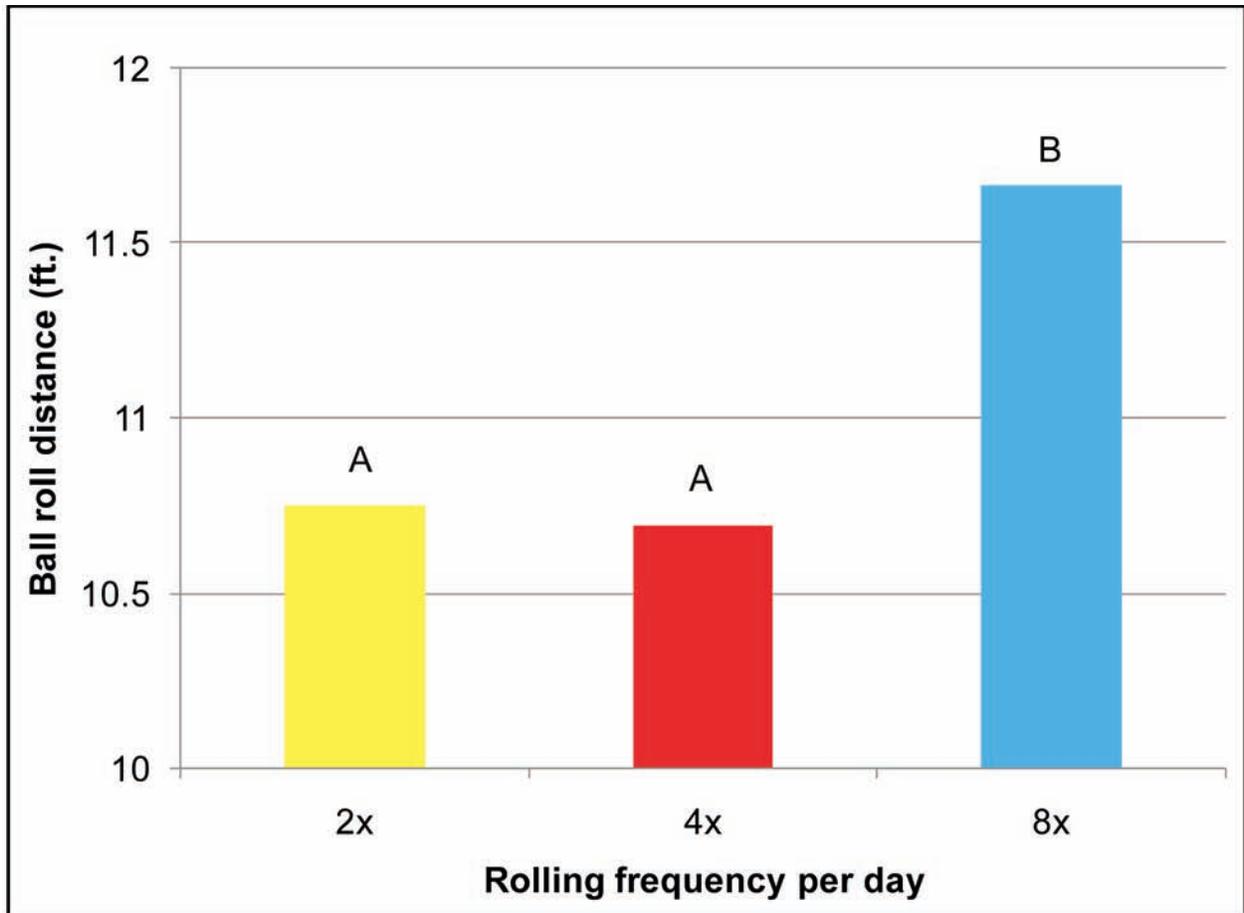


Fig. 1. Effect of rolling frequency on ball roll distance. Bars not sharing a letter are significantly different according to Fisher's least significant difference test ($\alpha = 0.05$).

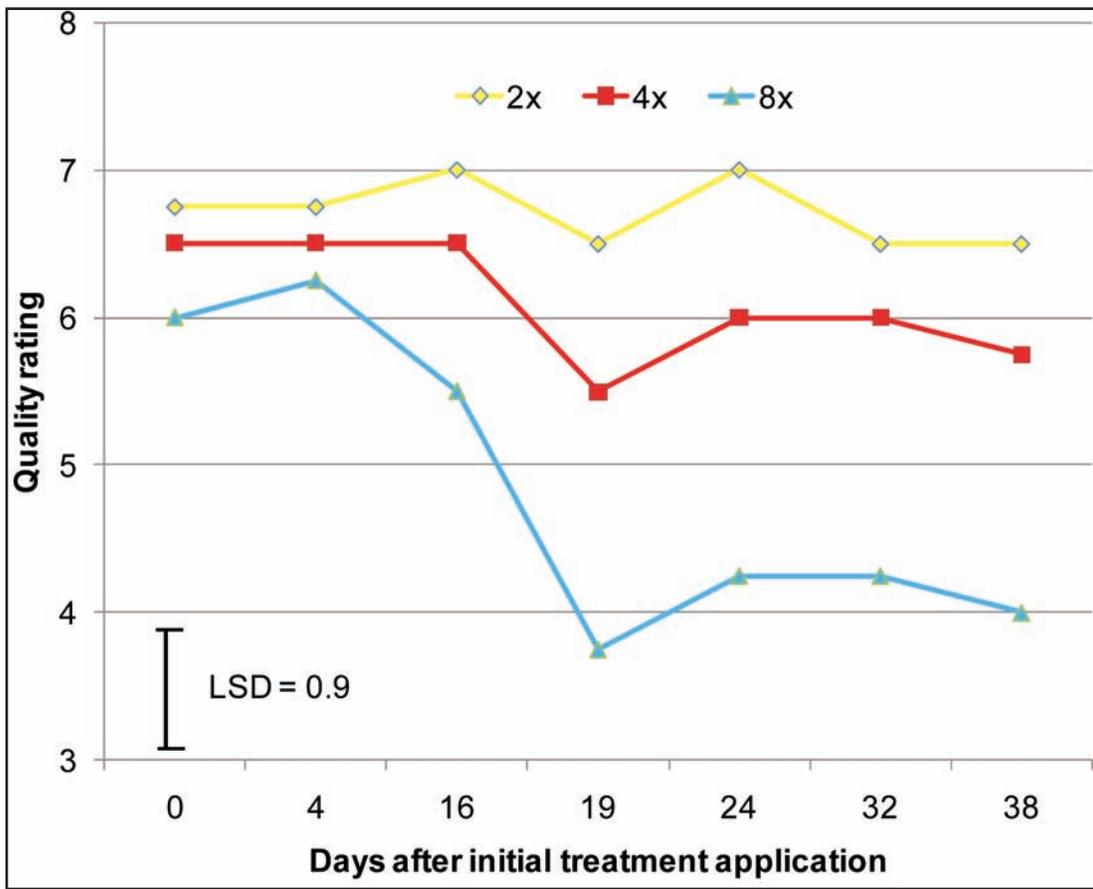


Fig. 2. Putting green quality as affected by rolling frequency over time. Error bar represents Fisher's least significant difference value ($\alpha = 0.05$).