USGA Sponsored

Research *You Can Use*

Can Annual Bluegrass Putting Greens Be Healthy And Fast?

Oregon State University research shows that daily rolling, along with higher mowing heights, provides high-quality turf and excellent green speeds.

DR. ROB GOLEMBIEWSKI, TOD BLANKENSHIP, CGCS, AND BRIAN McDONALD

Over the past 30 years the successful management of golf course putting greens in the United States has generally been associated with green speeds, which can be traced back to the introduction of the Stimpmeter® in the late 1970s. The goal of the USGA in introducing the Stimpmeter was to give golf course superintendents a tool that would assist them in creating consistent putting conditions across the entire golf course.

With the advent of the Stimpmeter, many cultural and chemical practices have been implemented through the years by superintendents in a quest for the "perfect" firm, fast putting greens. Among these practices include lowering mowing heights or increasing mowing frequency, reducing irrigation and fertilizer amounts to limit plant vigor, applying plant growth regulators to limit vertical growth, or employing other devices like rollers. Some or all of these practices may be implemented at any one time to optimize putting green speed, which is measured in terms of ball roll distance (BRD).

With the advances in mowing equipment, some golf course superintendents are now mowing greens as low as 0.075" in an effort to satisfy golfers' continuing desire for faster speeds. These low mowing heights are extremely dangerous to the overall health of the turfgrass plant. During the summer months, putting greens maintained at these low heights of cut often lose density, lack vigor, recover slowly from wear, and exhibit poor resistance to pest infestations. Dr. Thom Nikolai (Michigan State University) reported that mowing heights on creeping bentgrass putting greens could be raised from 0.125" to 0.156" during the summer months, if combined with lightweight rolling, to maintain green speeds and an overall healthier turfgrass stand. Lightweight rolling is conducted to smooth and improve turf canopy uniformity on putting greens as well as to increase BRD.

Mature Poa annua *plots were all maintained the same way for all testing purposes.*

Overwhelmingly, green speed research to date has focused primarily on creeping bentgrass. The objective of this research study was to investigate the effects of various mowing and rolling regimes on annual bluegrass (*Poa annua*) putting green speeds.

MATERIALS AND METHODS

The research trial was conducted at the Oregon State University Lewis Brown Research Farm located in Corvallis, Oregon, on a 100% annual bluegrass (*Poa annua* cv. Northwest Poa Greens) putting green. The treatments (Table 1) were chosen to compare the effects caused by different roller technologies and mowing and rolling frequencies on annual bluegrass putting green speeds. Each treatment plot (3.33 ft x 15 ft) was replicated three times for a total of 30 plots.

TGIF Record Number 175226

Table 1
Treatments for research trial

Treatment	Roller
Mow Daily (Check)	—
Mow Daily (Check)	—
Mow Daily – Roll M, W, F	Gas
Mow Daily – Roll M, W, F	Electric
Mow Daily – Roll Daily	Gas
Mow Daily – Roll Daily	Electric
Roll Daily – Mow M, W, F, Sa	Gas
Roll Daily – Mow M, W, F, Sa	Electric
Alternate Mow & Roll Daily	Gas
Alternate Mow & Roll Daily	Electric

All mowing was performed using a walk-behind greens mower (Jacobsen PGM 22) set to a cutting height of 0.150". Rolling treatments were performed with a Smithco® gas roller (845 lbs.) or with a Smithco® electric roller (1,140 lbs.). The plots were mowed at 8:00 a.m., and immediately following mowing operations, rolling was applied as a single pass across plots. In 2009, plots were fertilized (0.15 lbs N/1000 ft^2) and topdressed weekly. In 2010, plots were fertilized every 10-14 days and topdressed biweekly. Putting green speed was evaluated daily by measuring ball roll distance with a Stimpmeter in the morning (9:00 a.m.) and in the early afternoon (2:00 p.m.).

RESULTS AND DISCUSSION

All ball roll distance data were averaged over the two-year trial length. The effect of rolling when averaged across all treatments was significant (Table 2). Both the gas roller and electric roller provided approximately a one foot increase in BRD when compared to the non-rolled plots. It is interesting to note is that no BRD differences were observed between the gas and electric rollers, even though the electric roller is 300 pounds heavier than the gas roller. This illustrates the point that heavier is not necessarily better when it comes to BRD.

Table 2
Ball roll distance as influenced by gas and electric rollers

Treatment	AM	PM
No Roller	—	—
Gas Roller	+9"	+7.5"
Electric Roller	+11"	+9"

Table 3
Influence of various mowing and rolling combinations on annual bluegrass ball roll distance

Treatment	AM	PM
Mowed Daily	—	—
Mowed Daily / Rolled MWF	+9"	+7.5"
Mowed & Rolled Daily	+17.5"	+14"
Rolled Daily / Mowed MWFSa	+12"	+10"
Alternated Mowed & Rolled	+2"	+1.5"

Table 4
Comparison of ball roll distance on a creeping bentgrass and annual bluegrass putting green as influenced by various mowing and rolling combinations

Treatment	Bentgrass Green Speed	Annual Bluegrass Green Speed
Mowed Daily	—	—
Mowed Daily / Rolled MWF	+12"	+9"
Mowed & Rolled Daily	+23"	+17.5"
Rolled Daily / Mowed MWFSa	+20"	+12"
Alternated Mowed & Rolled	+5"	+2"

Every 15-foot-long plot was tested twice daily, at 9 AM and 2 PM, for all testing purposes.

Since no differences were observed between the two rollers, mowing and rolling treatments were averaged across all roller treatments (Table 3). The greatest increases in BRD were observed with mowing and rolling daily (+17.5 inches), followed by rolling daily and mowing four days a week (+12 inches). Mowing daily and rolling three days a week, along with alternating mowing and rolling, also resulted in positive BRD. The afternoon measurements were comparable to the morning, with an average decrease of two inches. Dr. Doug Karcher (University of Arkansas) and his research team determined that golfers cannot distinguish between green speeds of six-inch differences or less. Based on these findings, there was no distinguishable difference in green speeds from morning to afternoon. These data would indicate that golf course superintendents can maintain desirable annual bluegrass green speeds throughout the day, following an appropriate mowing and rolling regime in the morning.

Based on the significant annual bluegrass BRD increases obtained with various mowing and rolling regimes, we decided to compare the differences (Table 4) with those previously reported on creeping bentgrass. The data, while not identical, mirror the effects of the various mowing and rolling treatments for creeping bentgrass and annual bluegrass.

Annual bluegrass exhibited slightly lower green speed increases for all treatments compared to creeping bentgrass; however, in 2010, mowing at 0.150" and rolling daily provided an average BRD of almost 11 feet. This is significant because a survey conducted by the USGA during the summer of 2010 showed that more than 90% of the respondents preferred putting greens with BRD ranging from 9 to 11 feet.

CONCLUSIONS

The results indicate that annual bluegrass putting green speeds can be significantly increased by rolling in combination with higher mowing heights, and that the increases observed are not lost from morning through the afternoon. In addition, the quality and overall health of the putting green are greatly improved as a result of the higher height of cut. It is recommended that all golf courses consider raising mowing heights and implementing a rolling program, because this is truly a win-win situation for both the golf course and the golfers.

ROB GOLEMBIEWSKI, PH.D., assistant professor, Horticulture (golembir@hort.oregonstate.edu); TOD BLANKENSHIP, CGCS, M.S. candidate, Horticulture (blanket@hort.oregonstate.edu); BRIAN McDONALD, research technician, Horticulture (mcdonabr@hort.oregonstate.edu).