Effects of Winter Foot Traffic on an Annual Bluegrass Putting Green in Corvallis, OR
USGA ID#: 2014-22-511

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RESEARCH SUMMARY (YEAR 2)

- As traffic rates (golf rounds per day) increased turf quality and color decreased.
- The higher traffic rates (220 and 330 rounds per day) caused the greatest reduction in turf quality and color observed in February.
- Traffic at the high rate (330 rounds per day) reduced turf quality and color to unacceptable levels in February and March.
- When temperatures are less than 50° F and solar radiation is less than 300 golf rounds should be restricted to 220 rounds per day.

Objective:

- Evaluate the effects of winter foot traffic rates on an annual bluegrass putting green in Corvallis, OR.

Material and Methods:

Field research was initiated Feb 14, 2014 on an annual bluegrass putting green established in 2009 with sod from Bos Sod, Canada on 12 inches of 100 % USGA sand specified green at the Lewis-Brown Turf Farm, Corvallis, OR.

Experimental design was a randomized complete block with four replications. Treatments were foot traffic applied at rates equivalent to 110, 220 and 330 rounds of golf per day, compared to a control which did not receive foot traffic. Foot traffic rates and timing were derived using methodology defined by Hathaway and Nikolai (2005). Traffic was applied 5 days per week, with one day simulating heavy traffic around the hole. To simulate 330 rounds per day, the traffic times applied from highest to lowest to the 6 foot by 4 foot plots were 8 minutes 40 seconds, 2 minutes, 56 seconds, 32 seconds, and 28 seconds, respectively for the 5 days.

The putting green was maintained at 0.135 inch height with clippings removed. Fertilizer was applied at 1.63 lbs. N per 1,000 ft^2 from Oct 28, 2014 to Mar 26, 2015. Because of the heavy precipitation rates in Corvallis, OR no irrigation was applied from Oct 28, 2014 to Apr 12, 2015.

Response Variables:

Turf color and quality data were collected throughout the 79 day experimental period, Jan 7 to Mar 26, 2015. Turf color was assessed using a 1 to 9 visual rating scale, with 1 equaling straw brown or no color retention, and 9 equaling dark green (Morris, 2104). The color assessments evaluated overall plot color and not genetic color. Turf quality was assessed on a 1-9 scale, with 9 being outstanding or ideal turf and 1 being poorest or dead (Morris, 2014). A rating of 6 or above is generally considered acceptable. A quality rating value of 9 is reserved for a perfect or ideal grass, but it also can reflect an absolutely outstanding treatment plot.

Preliminary Findings:

Turf Quality:

Foot traffic had a significantly negative effect on turf quality throughout the 79 day traffic period January 7 to March 26, 2015 (Figure 1). Foot traffic applied at the high rate (330 rounds per day) produced the greatest reduction in turf quality. The control produced the highest turf quality ratings throughout the study. Traffic at the high rate reduced turf quality to unacceptable values (< 6) in February and March. Reduction in turf quality were the greatest in February, when atmospheric temperatures were the lowest. Regression analysis of the effects of foot traffic on turf quality in the month of February were strongly, negatively correlated (R-square = 0.85; Figure 2).

The average temperature in February was 49° F and the average solar radiation was 183.6, while the average temperature in March was 50.7°F and the average solar radiation was 293. Considering these results, putting greens should be restricted to 220 rounds per day to prevent significant reductions in turf quality when temperatures are less than 50° F and solar radiation is less than 300.

Turf Color:

Foot traffic had a significantly negative effect on turf color throughout the 79 day traffic period January 7 to March 26, 2015 (Figure 3). Foot traffic applied at the high rate (330 rounds per day) produced the greatest reduction in turf color. The control produced the highest turf color ratings throughout the study. Traffic at the high rate reduced turf color to unacceptable values (< 6) in February and March. Traffic at the 220 rounds per day decreased turf color to an unacceptable level in early March. Reduction in turf color was the greatest in February, when atmospheric temperatures were the lowest. Regression analysis of the effects of foot traffic on turf color in the month of February were strongly, negatively correlated (R-square = 0.79; Figure 4).

Future Research:

In 2016, traffic will be initiated again at 0, 110, 220 and 330 rounds per day in January to replicate the results observed in 2015.

References:

Hathaway, A.D., and T.A. Nikolai. 2005. A putting green traffic methodology for research applications established by in situ modeling. International Turfgrass Society. 10:69-70.

Morris, K.N. 2014. A Guide to NTEP Turfgrass Ratings. National Turfgrass Evaluation Testing Program. Beltsville, Maryland. p. 1-5.

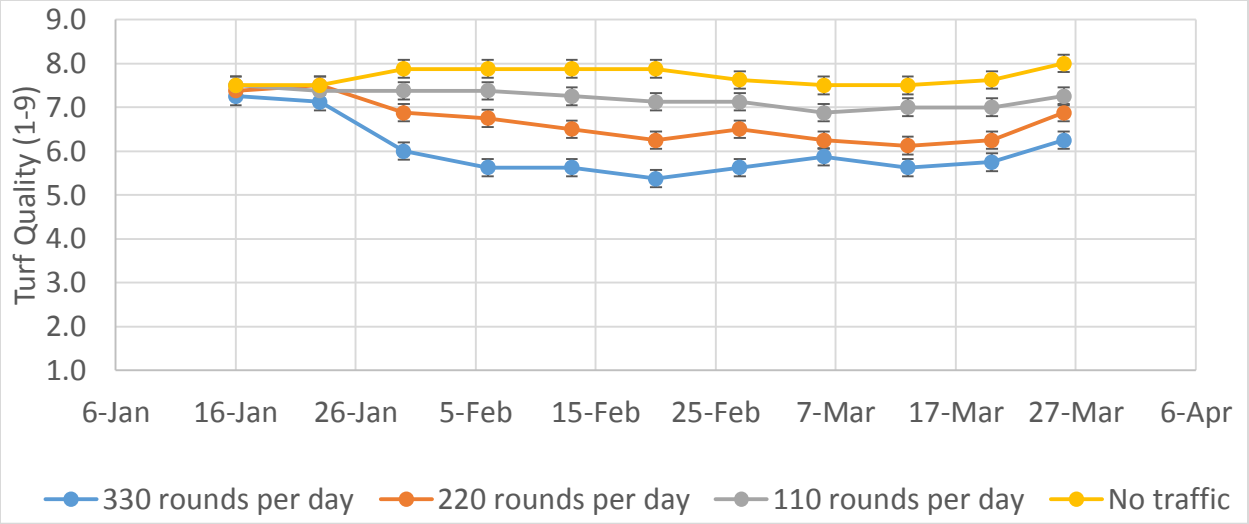

Figure 1: Effects of foot traffic on turf quality (1-9 scale, 6 or greater acceptable) on an annual bluegrass putting green from January to March 2015 in Corvallis, OR. Points with overlapping error bars are not significantly different at a 0.05 level of probability.

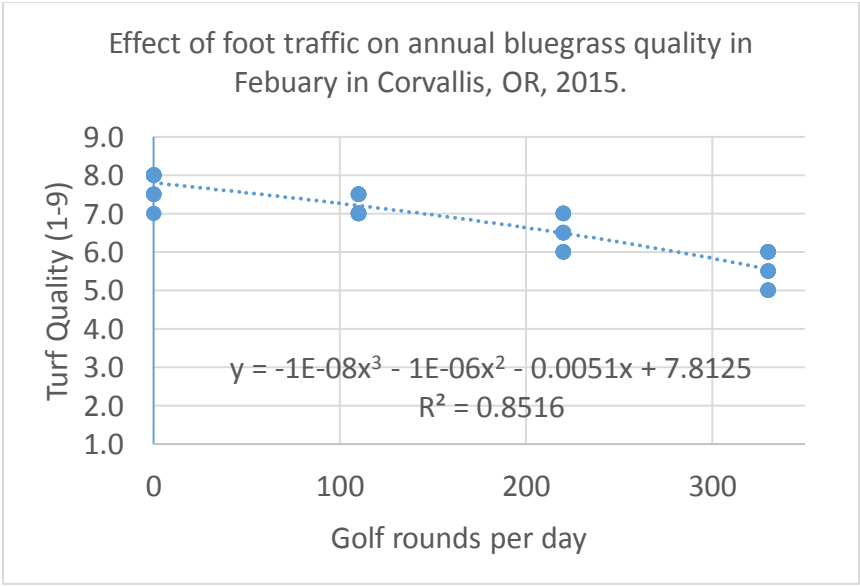

Figure 2: Trends in turf quality (1-9, 6 or greater acceptable) across golf rounds per day (0, 110, 220 and 330) on an annual bluegrass putting green in Corvallis, OR in February 2015. 64 data points collected across 4 replications, 4 traffic levels and 4 data collection dates (Feb 6, 13, 20 and 27).

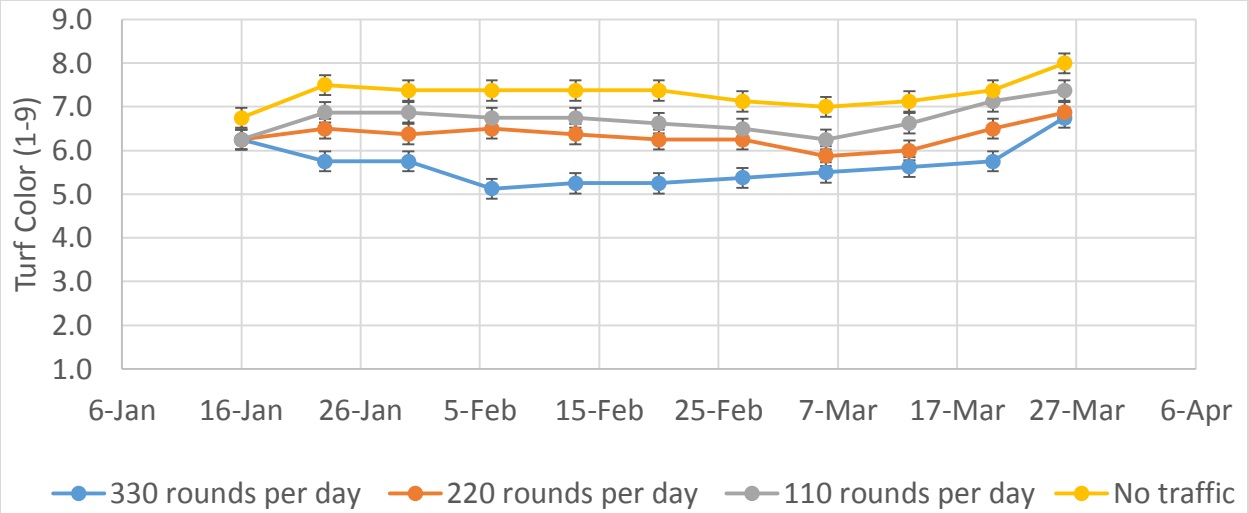

Figure 3: Effects of foot traffic on turf color (1-9 scale, 6 or greater acceptable) on an annual bluegrass putting green from January to March 2015 in Corvallis, OR. Points with overlapping error bars are not significantly different at a 0.05 level of probability.

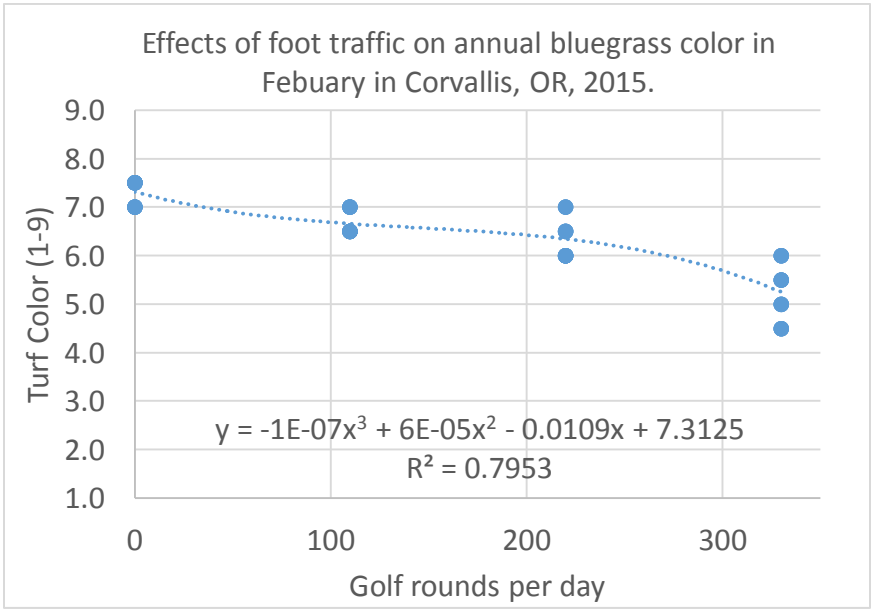

Figure 4: Trends in turf color (1-9, 6 or greater acceptable) across golf rounds per day (0, 110, 220 and 330) on an annual bluegrass putting green in Corvallis, OR in February 2015. 64 data points collected across 4 replications, 4 traffic levels and 4 data collection dates (Feb 6, 13, 20 and 27).