

and tissue samples were collected in October 2009, and June and October 2010. Results indicate that fertilizer treatments resulted in higher tissue N, P, and K levels than the untreated control for the October 2009 and 2010 samplings. However, the untreated control had higher tissue Ca, Mg, Mn, and Fe levels than the fertilized treatments. Among rootzones, higher soil N, P, and K values did not result in higher tissue N, P, and K values. After two years, there was no significant decrease in soil nutrient values for the foliar alone treatments, with the exception of nitrate-N which decreased from October 2009 to 2010.

Stop 6. Green Speed and Slopes: Golfer Survey

Dr. Thomas A. Nikolai

How do golfers perceive green speed? Certainly there are many factors that influence the perception of green speed and slope might be the greatest influence. This stop will take a break from research plots and allow participants to participate in a survey by putting up and down a slope and determining green speed.

Stop 7. Fairway and Approach Rolling Programs to Decrease Pesticide Inputs and Enhance Playing Quality.

Thomas Green, Dr. Thomas A. Nikolai, Dr. J.M. Vargas, Jr., N. Dykema and Dr. John N. Rogers, III

Ten-years ago very few golf courses rolled their putting greens on a regular basis due to the belief that this cultural practice was detrimental to turfgrass health and the underlying root zone. Currently, the majority of golf courses in our country roll their greens on a weekly basis, many at a frequency of three times per week, or greater. This increase in lightweight rolling may be directly attributed to a United States Golf Association (USGA) funded study performed at Michigan State University (MSU) from 1996-2000. Significant contributions from that study include that lightweight rolling decreased dollar spot, brown patch, localized dry spot, and broadleaf weeds, while increasing turfgrass rooting without increasing compaction on a regularly top dressed green.

Given all those benefits, the truth remains that lightweight rolling is performed primarily to increase green speed because, although a reduction in dollar spot incidence was afforded, even a small percentage of dollar spot on a putting green is viewed as unacceptable due to the nature of the game. However, the same amount of dollar spot that may be unacceptable on a putting surface could be viewed as acceptable on a fairway, particularly if fungicide applications are reduced and/or methods of rolling are efficient.

In 2011, MSU initiated a study to investigate the viability of rolling fairway/approaches to determine if the mechanical practice can reduce turfgrass pests in the fairway and result in firmer landing to improve playing quality. While it may seem intuitive that benefits from lightweight rolling on the putting green would be duplicated on a fairway, this may not be the

case given the differences in root zone and maintenance practices utilized between the sites. These differences include, but are not limited to, mowing frequency, mowing height, clipping return and sand topdressing, with putting greens typically being sand topdressed and having clippings removed.

The study in this proposal is part of a comprehensive approach to understanding the potential for fairway rolling. Specific questions that will be addressed during the entire study include the following.

1. What rolling frequency is required for reduction in disease incidence? Although dollar spot suppression was noted on greens rolled three times weekly, is this the appropriate amount of rolling on turf not mowed daily?
2. Does sand topdressing in combination with rolling affect the suppression of dollar spot or other turfgrass diseases? Sand topdressing is a standard practice on putting greens today, and this practice is moving out into fairways. Information of this combination of practices is vital.
3. Can rolling increase fungicide efficacy or possibly even eliminate the need for or frequency of fungicide applications in fairways? Clearly, if rolling can increase the number of days between fungicide applications, superintendents will show an interest in this practice.
4. Research indicates that rolling on putting greens can noticeably increase green speed for up to 48 hours. What frequency of fairway rolling (1, 3, or 5x per week) is required to increase surface firmness, which is related to customer satisfaction?

Specifically, the initial fairway/approach study evaluates direct and interacting effects of two cultural practices (different rolling frequencies with and without sand topdressing) to determine whether they will impact turfgrass pests and organic matter accumulation (thatch). Results from this study should lead to the development of fairway/approach management programs that conserve natural resources and reduce maintenance costs, while improving playing quality without loss of aesthetic appeal.

Stop 8. Summer stress on annual bluegrass fairway and dollar spot irrigation study

Nancy Dykema, Dr. J.M. Vargas, Jr., and Liewei Yan

Dollar spot remains an important disease on golf course turf in terms of the percentage of golf course pesticide/fertilizer budgets that are spent to control it. In an effort to manage this disease, possibly with lower fungicide inputs and water conservation efforts, the effects of irrigation frequency and volume are being studied to determine whether carefully managed irrigation can play a role in reducing the incidence of dollar spot. This research focuses on differentiating among irrigation regimes, based on timing, frequency, and application volumes,