

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,

and their effect on dollar spot incidence. In addition, dollar spot resistance levels are being compared among three creeping bentgrass cultivars.

Stop 9. Pest Management on Tees and Greens

Dr. David Smitley and Terry Davis

Mounds made by ants and earthworms can look bad and interfere with play on high quality tees and greens. Research funded by the Michigan Turfgrass Foundation has identified new and reliable products to reduce mounding by ants and earthworms.

Long-term Suppression of Ants on Golf Courses. Analysis of research supported by MTF from 2008 - 2010 clearly shows that superintendents can expect 6 months of ant suppression following a single application of Aloft, Arena or Meridian at the highest labeled rate when applied in May or early June. In ¼-fairway plots (replicated 6 times) we were able to reduce ant mounding by 90% compared with only a 50% reduction in our standard-sized plots (10' x 20'). This means that if golf course superintendents treat 30' beyond the edges of tees, greens and fairways, it will reduce re-colonization and dramatically improve ant control, especially along the edges of fairways, tees and greens.

A New Product is Being Tested for Suppression of Mounding Caused by Earthworms. In the past we have relied heavily on the benlate-type fungicides (thiophanate methyl) and Sevin (carbaryl) for suppression of earthworm activity on tees and greens. Unfortunately, thiophanate methyl is expensive, and carbaryl may not last much more than 2 weeks. A new tea-leaf extract product is being released this year. It is called EarlyBird. In a test at Kalamazoo Country Club, earthworm mounding was suppressed by 50% for at least 3 weeks after application. EarlyBird is sold as a fertilizer. More data will be collected at 4 and 6 weeks after application. Data after 3 weeks is shown below (Table 1).

Table 1. Mean number of earthworm mounds per 100 ft² plot in replicated plots on a tee at Kalamazoo Country Club before and following application of EarlyBird at three different rates on April 25th, 2011. Data are means of four replications.

Treatment	Earthworm mounds per 100 ft ²	
	April 25, 2011	May 9, 2011
Control	155	212
3 lbs per 1000 ft ²	148	146
6 lbs per 1000 ft ²	149	121*
9 lbs per 1000 ft ²	155	102*

* Means followed by an asterisk are significantly different from the control treatment (P = 0.05).