we also know that temperature, moisture, pH, and a range of other factors all can have a large effect on microbial activity. Could fungicides last longer, and provide extended control, under certain temperature or moisture conditions that decrease microbial activity? Another example is the power of the sun, which uses powerful ultraviolet and infrared radiation to stimulate degradation of fungicides into non-reactive metabolites. Is it possible that fungicides last longer, and provide extended disease control, in shaded areas of the golf course because of the less intense light? These are both complex questions that require a complex answer that is not currently available. But the next time you can't figure out why disease broke through on hole #1 but not hole #11, be aware that the fungicide applied to hole 1 might not react the same as the same fungicide applied to hole 11.

University of Wisconsin Research

Research undertaken by myself, along with Dr. John Stier and Dr. Jim Kerns from the departments of Horticulture and Plant Pathology, respectively are trying to answer some of these pesticide fate questions as they pertain to snow mold control. Snow mold control in Wisconsin and much of the Midwest is important for many reasons. First off, snow molds can cause serious damage to maintained turfgrass under extended periods of snow cover. Second, the snow mold fungicide application(s) is the single largest chemical expenditure at many facilities. Lack of disease control with such a costly application can provide a serious blow to the finances of the club, not to mention to the long term job status of the superintendent.

Most golf course superintendents put their snow mold fungicides down well before snow cover arrives, a practice supported by most turfgrass pathologists. But what if several weeks, or even months go by until snow cover arrives? What if an early winter snowstorm melts and leaves weeks of open ground before more snow arrives? Is there any fungicide remaining for protection? Should the superintendent attempt to reapply fungicide in January? These are all scenarios that have plagued Wisconsin and Midwestern superintendents the past couple of winters, and were the impetus behind our research. In brief, our research is investigating the rate of fungicide degradation on snow-covered turf compared to the rate of degradation on turf lacking any kind of cover. Iprodione and chlorothalonil were applied alone and in a tank mix on creeping bentgrass grown at fairway height at the OJ Noer center in early December, after which an initial fungicide concentration reading was obtained. Snow was applied to the snow covered and removed from the uncovered plots shortly after the fungicide application, and subsequent samplings are being undertaken every seven days for five weeks.

From this research we hope to obtain more information about the activity of fungicides in a winter environment and how it affects snow mold control. Stay tuned in the coming months for more updates on the project's progress, and for any early recommendations resulting from the data. Special thanks to the Golf Course Superintendents Association of America, Wisconsin Golf Course Superintendents Association, and Northern Great Lakes Golf Course Superintendents Association for critical funding of this project.

Table 1. The six physical and chemical processes that affect fungicide fate in a turfgrass system (adapted from Sigler et al., 2000).

1)	Solubility-based movement in water -Just like fertilizers, different fungicides are more soluble in water and can be moved several directions in the turfgrass system.
2)	Sorption/desorption to surfaces -Adsorption refers to the pesticide binding to soil particles and/or organic matter, and soils with high adsorptive potential (ie high clay content) can tightly bind pesticides and make them unavailable to the plant.
3)	Abiotic degradation -Primarily this means photodegradation stimulated by sunlight, but some fungicides are susceptible of converting to inactive forms via alkyl hydrolysis in high pH environments.
4)	Biotic degradation -Both fungi and bacteria can be highly active in fungicide degradation. Activity depends on temperature, pH, moisture, and previous fungicide exposure.
5)	Volatization -Volatization refers to the ability of a pesticide (or other compound) in solid or liquid form to turn into a gas, decreasing its pesticide activity. Air temperature, droplet size, and the chemistry of the pesticide all affect the ability to volatize.
6)	Plant uptake -Uptake of the fungicide can lead to further metabolization by enzymes present within the plant, in addition to performing its desired function.

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What's New With the Badger Turf and Grounds Club?

By Mike Rzadzki, *Horticulture Student, University of Wisconsin-Madison*

Winter is that time of year where everything calms down on the golf course. While the turf on courses around Wisconsin is dormant, turfgrass students at UW-Madison are not, and you might be curious what the Badger Turf and Grounds Club has been doing.

We started this school year with a general turf club meeting where members gave presentations on their summer employment and what they learned from the experience. It was a great way to spend our first meeting as well as to welcome some new members to the Badger Turf and Grounds Club.

In late October we toured Lurvey Sod Farm in Whitewater, Wisconsin. We saw a full-scale sod production facility, where they grow Kentucky bluegrass, tall fescue, and some salt tolerant fescues for roadsides. We also were fortunate enough to see their sod harvester in action, which was pretty amazing. We talked with Dick Carlson and Tammy Uraynar, who told us everything that went into their operation and the different practices that they use to get the sod perfect for golf course superintendents, athletic field managers, and home lawns. We were very lucky to be able to see the process that goes into producing the sod that we might one day be ordering for use on our courses.

Turf club members were also involved in an annual aerification project out at the OJ Noer Turfgrass Research and Educational Facility. Turf club volunteers get a taste of what goes into the aerification and topdressing process, as well as lots of core shoveling. It went smoothly until the rain gave us some problems with wet topdressing sand, but we got the job done before the heavy stuff fell. Members are also given the opportunity to go and look at some of the research plots and learn a little bit about what is going on out at the O.J. Noer center.

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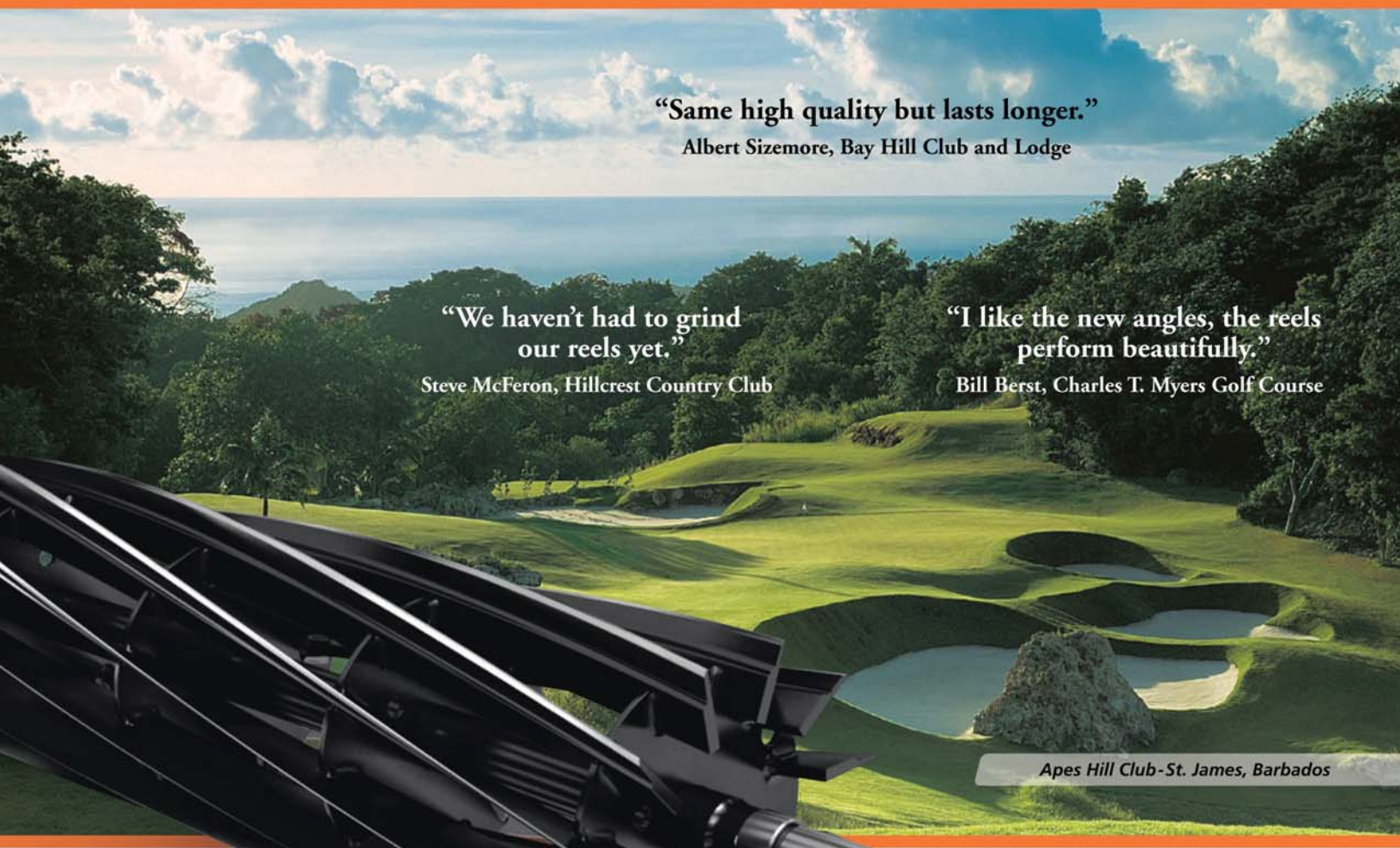

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On November 11th Badger Turf and Grounds Club was lucky enough to be invited to tag along on a field trip to Miller Park with Dr. Stier's Introduction to Turfgrass Management class. Everyone that went had a firsthand look behind the scenes of Miller Park and everything that goes into preparing a major league ballpark for a televised game. Gary Vandenberg, the field superintendent was kind enough to take us out onto the field and gave us a great comparison between what it is like preparing for a game and taking care of the field vs. what it is like preparing a golf course for play.

Turf club members recently attended the WGCSA Wisconsin Golf Turf Symposium on November 17th and 18th at The American Club, in Kohler WI. The main topic of the symposium was "Fewer Dollars Requires More Sense." We saw many speakers and leaders in the industry speak to WGSCA members about different ideas and ways to save money on the golf course which is very important especially when budgets are being reduced. Speaker's topics included the reducing pesticide use on the golf course, renovations to save money, developing maintenance standards, sustainable golf course management, low maintenance grasses, and economic fungicide options. The symposium is also a great opportunity for the turf club to build relationships with some of the superintendents in Wisconsin.

Turf club members are also looking forward to elections, where we will vote for a new president, vice president, secretary, and treasurer. This gives newer members the opportunity to run for an office and to develop their leadership and communication skills. Most members are also looking forward to attending the 2010 Golf industry Show in San Diego in February. The Golf Industry Show is a great way for turf students to network with superintendents and other leaders in the turf industry. Many turf club members will use the trip as an opportunity to meet superintendents from various courses to set up an internship or meet with superintendents for an assistant position for next summer. We are also setting up study sessions to ensure that we do well in the turf bowl. Last year we took tenth place, which will prove to be a solid goal for this coming year's turf bowl.

We have had two great guest speakers this semester. Steve Sanborn from Syngenta gave a great presentation on TenacityTM growth regulator. Monroe Miller who gave a great presentation on what it takes to be a successful superintendent as well as some life lessons that prove useful on and off the golf course. We are certainly blessed as a club to have such a wealth of knowledge to pull from. Professors, superintendents, and turfgrass managers all take time out of their day to come and speak and serve as mentors for the Badger Turf and Grounds Club. We are truly indebted to all of you, and extend a sincere thank you for being there for us and for giving something back to the industry. We really appreciate it and enjoy having you.

ELIMINATE GUESSWORK WHEN SPRING FEEDING

Spring fertilization varies greatly on a number of factors. Cultural practices performed, soil amendments made, irrigation and drainage upgrades, fertilizers applied, and what happened last fall plays a significant role with this season's success. However, having a sound fertility program will provide you with your best chance of success for the upcoming season.

Typically, spring applications are applied after the early flush of shoot growth has occurred, but predicting spring weather can be a challenge when it comes to soil and air temperature, and precipitation. That's why choosing a fertilizer that performs in cool climates is so vital.

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Coated products are a great example of fertilizers that don't offer immediate plant nutrition and are subject to leaching once the protective coating breaks down.

Still other products rely on a process called mineralization, depending on soil microbes to break down nitrogen. Whereas soil microbes aren't fully active until the soil temperature reaches 55 degrees – which might not happen until late spring depending on the region – UMAXX begins working immediately and is not dependent on soil temperature for nitrogen release.

Although fine-tuning a spring fertilization program varies on many factors, its importance will be felt all summer long and even into the fall. The benefit of using an all-weather, long-lasting performer such as UMAXX provides immediate benefits, as well as a positive long-term impact. UMAXX gives the freedom to apply as a nitrogen component in a blend or part of a soluble fertilizer program. UMAXX offers consistent performance regardless of temperature or application type.

For more information on UMAXX contact me at 952-334-6845 or jmeyer@agrotain.com

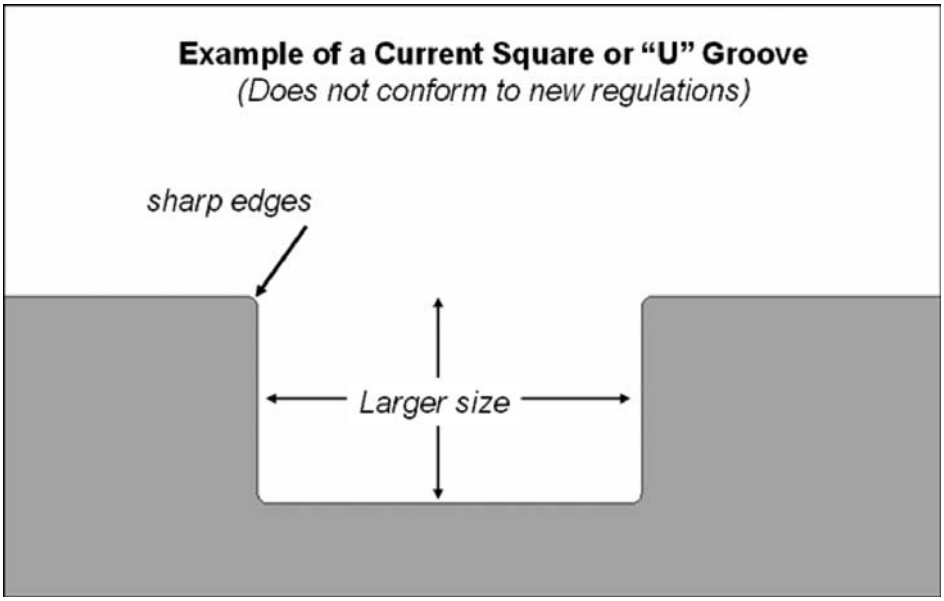
Groovy Information

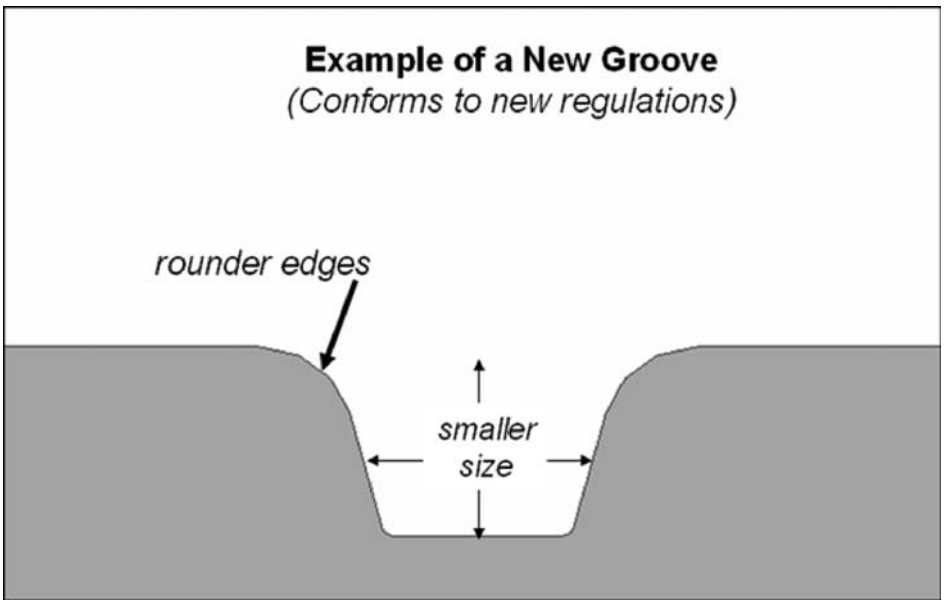
By Jeremiah Hoffmann, *PGA Golf Professional, Rolling Meadows Golf Course*

There has been a lot of talk over the past year about the new "groove" rules. As technology continues to improve, it gives those of us in the golf business a chance to learn a lot about physics and geometry. Cubic Centimeters, Coefficient of Resolution and Volume of Grooves have become part of our vocabulary as the USGA adjusts their rules to keep up. Somewhere my geometry and physics teachers are smiling, knowing they are vindicated, because yes I am actually using this stuff! (I know because my dad was my geometry teacher!) The rule change raises many questions like what actually is changing, how will that change my game and when do I have to get new wedges by?

The first thing to realize is that this rule change does not apply simply to wedges, it is any club with more than 25 degrees of loft. By traditional standards, that means anything shorter than your 4 or 5 iron. In the past manufacturers only had to worry about depth, width and spacing of grooves. Now they have to include total volume of the groves as well. The major difference players will see is a result of the radius on the edges of the grooves. No longer will wedges have sharp edges that tear up the cover of your new Pro V1! The sharp edges are a major contributor to the amount of spin put on the golf ball.

The answer to how will this affect my game is, " it depends." Better players that play a soft covered ball will see less spin. Players that don't spin the ball much or play a harder Surlyn covered golf ball will see less change. More than likely those chip shots from heavy rough won't have the same "juice" on them. So, what can you do? Make sure you hit more greens and get better at bump and run shots! (Your golf pro would be happy to help you with both.) In addition, many companies are introducing golf balls that are softer and spin more.

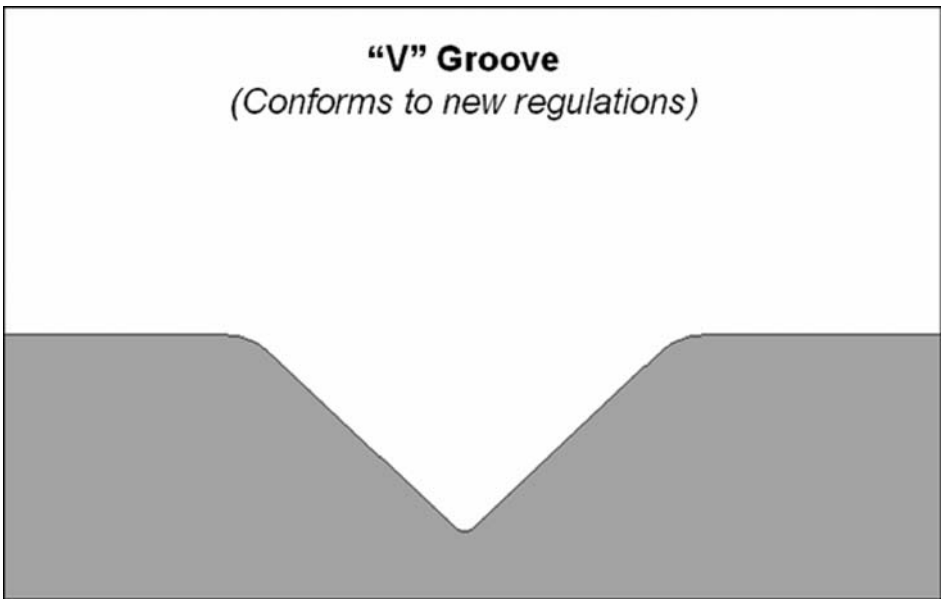




As of January 1, 2010, manufacturers can no longer produce clubs with the old grooves. However, only certain USGA and PGA events will require the use of the new grooves. Top amateur and Section PGA events are exempt until 2014 and all other golfers have until 2024 to

make the change. Golf companies realize that you like to be able to spin the ball from the deep rough, so they are marketing 2010 as a year to "stock up" on wedges. Taylor Made took it a step further, creating a club that you can change out the face of the club. What that allows you to do is buy each of your favorite wedges and a bunch of replacement "faces" to keep you stocked until 2024. The faces are relatively inexpensive and are interchangeable between lofts. Either way, if you like being able to spin, this is the year to get those new wedges.

Hopefully this clarifies some the questions you may have had about the changes. If you have more questions or want more information talk to your golf professional or check out the USGA's website at www.usga.org.



New groove rules start this year for USGA Opens and PGA Tour Events, 2014 for USGA Amateur Events and 2024 for Other Competitions. (Diagrams courtesy of USGA)

By the time you read this, your height-of-cut could have been adjusted.

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What's All the Hubub about CivitasTM?

By Dr. Jim Kerns, *Department of Pathology, University of Wisconsin - Madison*

There has been a lot of talk about a new product on the market called CivitasTM, since its introduction at GIS last year. The product is owned by Suncor Energy Inc. and is labeled for control of dollar spot, brown patch, anthracnose, gray and pink snow mold. This is an interesting product because it is not a typical fungicide. The product is composed of 98% mineral oil, which is considered the active ingredient. Mineral oil is classified as a horticultural oil, which has been used to control insects and diseases in agricultural settings for many years. The thought was the oil coats the insect and essentially suffocates them. In the case of fungi, the thought was oil coats the leaves, which in turn repels water vital for fungal growth. Typically horticultural oils were only effective against scale insects, powdery mildew and maybe black spot. However, CivitasTM has shown promise against diseases such as dollar spot, anthracnose, brown patch and the snow molds. So what is going on?

Lets talk a little more about the active ingredient, mineral oil. Mineral oil is a petroleum-derived oil that is highly refined with a narrow range of distillation. I really have no idea what that means, but that is the definition. It is a by-product in the distillation of gasoline and other petroleum based products from crude oil. It is a transparent, colorless oil composed of mainly of hydrocarbons. It is widely used in medicine, manufacturing, food preservation and cosmetics because of its low-toxicity and excellent lubrication properties. The key word in that statement is low-toxicity, which makes this product desirable for organic agriculture and the golf course community.

So how does the product work? The actual product of CivitasTM has to be mixed with HarmonizerTM, which is also from Suncor Energy Inc. The instructions are clearly marked on the CivitasTM label, so if you are planning on using this product in the future familiarize yourself with the label. HarmonizerTM is a proprietary pigment designed to minimize the appearance of stress. At least this is what the label says. CivitasTM along with HarmonizerTM usually do not provide adequate disease control without the addition of a fungicide. However when these two products are mixed with a half rate of propiconazole, the mixture seems to provide control similar to industry standards.

For example a fairway study conducted in Guelph, Ontario by Dr. Tom Hsiang demonstrated that the mixture of CivitasTM and a half rate of propiconazole worked just as well as a tank mixture of chlorothalonil and iprodione against Microdochium patch or pink snow mold. Dr. Frank Rossi showed that CivitasTM applied in conjunction with propiconazole provided acceptable levels of dollar spot control in Ithaca, New York. Dr. Rossi also demonstrated that turfgrass quality was improved in every instance, except one, that CivitasTM was applied. The company does claim that the product is an activator of Induced Systemic Resistance (ISR), but that data is currently not published. ISR is a phenomenon in plants where a microorganism or chemical can induce plant defense responses. I think Dr. Hsiang and Dr. Rossi are currently or planning to investigate this observation. Dr. Lane Tredway also found that CivitasTM and HarmonizerTM applied alone every 14 days suppressed dollar spot and brown patch. However, Dr. Tredway did mention that acceptable levels of control were not always achieved, but he did indicate that it is a promising product. If you want to see Lane's actual comments go to our turf diseases blog at http://turfdiseases.blogspot.com/search/label/Southeast. The other data I actually gleaned from the CivitasTM homepage, which is www. civitasturf.com.

I know that other turfgrass pathologists and researchers have tested this product before and note its promise. Unfortunately, we have not tested this product in our trials. However, we plan to seek Suncor Energy Inc. out this year so we can gain experience with the product. CivitasTM is a very interesting product and I think may have a future in the golf course management industry, but it is still young. If you are interested in this product then I urge you to test it yourself before putting it into your full fungicide program. Also talk to superintendents throughout the country that have used the product. I am happy to see products like CivitasTM that are more environmentally friendly and show promise.

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