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Pick a Patch

USGA

By Bob Vavrek, *Senior Agronomist, United States Golf Association*

Despite a cool spring, we knew that it was only a matter of time before hot, stressful weather would arrive across the upper Midwest. Right on the heels of the heat and high humidity were brown patch, take-all patch, and summer patch. Each disease has been seen with regularity during the past few weeks and each has its own unique personality.

Brown patch tends to be more of an annoyance than a serious threat to golf courses in northern states. Ask around and no one seems to have ever seen it actually kill turf. Besides, it is easy to diagnose and fairly easy to control with most contact or systemic fungicides.

Summer patch is the forgotten disease on many courses. Still a serious threat to turf, but it has been overshadowed by more glamorous and ominous sounding diseases, such as Waitea patch, bentgrass dead spot or rapid blight. After all, you get no sympathy from the neighboring superintendent when you mention you have plain old summer patch on fairways. On the other hand, rapid blight sounds really serious. First of all, it is a blight - a blight beats a patch, just like a full house beats a straight every time. Furthermore, it is rapid and what could possibly be worse than a blight that is rapid. That name alone has to make the green committee increase the fungicide budget by at least $5K to $10K.

Last, but definitely not least, is take-all patch. It never takes it all, but that name scares many into thinking that some year...it just might. Diagnosis is not all that easy. In many cases, you send a half-dead sample to a lab and ask if there is any take-all disease on this turf and the answer is usually yes. No smoke rings, no mushrooms, no black spiny

Take-all patch on a bentgrass fairway.

acervuli and no webby mycelium to count on. Even when you are confident of the diagnosis and have tracked the disease on a few of the same greens for several years, it disappears and appears on other greens this season. The same goes for fairways, the disease was right there like clockwork during the 3rd week of June for the past three seasons and darn if it doesn't show up somewhere else this year.

Maybe take-all scares people because it only affects bentgrass. Bentgrass is good. We would probably care less if it were only affecting *Poa annua*, since we pay good money to kill *Poa* with growth regulators and herbicides.

Take-all has to be the fungicide distributor's dream disease. Treatments require high rates of expensive fungicides applied to turf during late fall and early spring, well before any symptoms are observed. Better yet, it is somewhat hard to tell if the treatments are working since the disease can be here today and gone tomorrow. However, it is easy to sell the preventative program to the golfers; after all, it is called take-all patch, not take-some patch.

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Late Season Nitrogen Fertility on Putting Greens

The Wisconsin Survey

By Dan Lloyd, *Graduate Student, Department of Soil Science, University of Wisconsin - Madison*

Many of you may remember filling out a survey regarding your fall N fertility practices for your putting greens. The survey was distributed both at the symposium last November and also online via Noernet. With fall around the corner, it seems like an appropriate time to relay the trends compiled from the 42 responses from Wisconsin superintendents. For those *Grass Roots* historians among us, you may recall the inspiration for this survey. Robert J. Erdahl conducted a similar survey and published the results in the May/June 1989 edition of *The Grass Roots*, providing an interesting glimpse of the management practices of that time. While Mr. Erdahl's survey covered nearly every aspect of putting green management, this 18-year follow-up focuses on putting green N fertility with emphasis on late season and dormant applications.

Table 1 shows the annual averages and ranges of N fertilizer applied to putting greens in 1989 and 2007. There appears to be a small increase (0.6 lbs N/M) in the total amount of N being applied from 1989 to the present, although both averages are inline with what one would find in the textbook or UW-Extension recommendation (2.5-3 lbs/M). Perhaps more intriguing is the wide range of N application rates exhibited in both surveys. Applications ranged from 1 to 7 lbs/M in 1989 and 1.5 to 6 lbs/M in 2007.

Figure 1 shows the average monthly application rates between September and November. Once again, averages are similar to current recommendations for fall-applied N, but the ranges are drastic. Some superintendents are applying little or no N fertilizer after September 1st and others apply over three lbs N/M. The anticipated date of final fertilizer application ranged from Labor Day into the New Year.

Fall fertilization can be sorted into two categories. The first is what we will call late-season fertilization, which Dr. Wayne Kussow defined in a *Grass Roots* soils report (Sept/Oct, 1987) as the time of the year when mean air temperatures linger around 50° F or less; during this time shoot growth tapers off but roots are still active (generally around mid-October in lower Wisconsin). The second category of fall fertilization is categorized as dormant fertilization. In a different *Grass Roots* article (Nov/Dec, 1994), Dr. Kussow differentiates these two categories of fall fertilization based on when the plant will absorb the applied N. Dr. Kussow distinguished fertilization as dormant if plant uptake has ceased and the fertilizer will not be taken

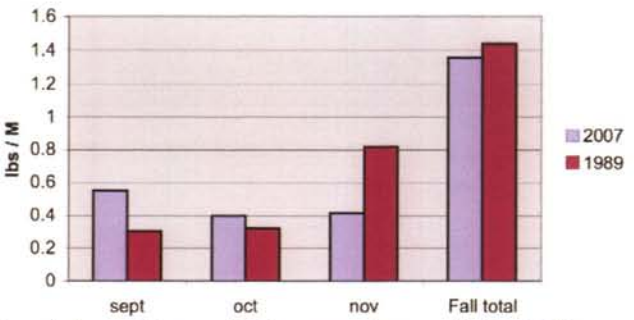

Figure 1. Average N rates and timings compared between 1989 and 2007 surveys. 1989 late season N totals averaged 60% of annual N applied, 2007 late season N applied accounted for 44% of annual N applied.

Table 1. Annual N rates applied to putting greens in 1989 and 2007. Results based on 25 responses in 1989 and 41 responses in 2007.

Annual N (lbs/M)	1989(%)	2007 (%)
1.0 - 2.0	36%	17%
2.5 - 3.0	40%	49%
3.5 - 4.0	8%	14%
4.5 - 5.0	4%	15%
> 5.5	*12%	4%
Average annual N	2.49	3.1

* Data points in 1989 with asterisk indicate < 2yr old putting greens

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up until the following spring. For the purposes of this article however, I will classify any fertilizer applications after November 1 as dormant. Figure 2 indicates that 20% fewer superintendents are making dormant fertilizer applications today compared to 1989.

The fertilizer products used for the late-season treatments are listed in Table 2. There was considerable diversity among fertilizers, although most products are variations of an ammoniacal or urea-based product having an analysis of approximately 18-3-18. Andersons Contec DG was the most frequently used product in the fall of 2007. The dormant fertilizer used most often was overwhelmingly Milorganite, which was usually applied at the rate of 1 lb N/M in mid-November. Only 10% of 2007 respondents indicated that a predominantly quick release fertilizer was used for a dormant application. Figure 2 displays the percentage of superintendents using biosolids vs. other fertilizers for their dormant applications in 1989 and 2007.

The survey also asked about the dominant factors that influence fall fertilization timing. Responses included "weather, aerification, growth, snow cover, irrigation blow out, budget, and seat of my pants". When asked about rationale behind late-season fertility, superintendents cited carbohydrate storage, root growth, recovery from aerification, and recovery from summer stress as primary motivation for their chosen application timings and rates. Specifically in response to dormant fertilization, the main reasons for applications included protecting crowns from ice formation and kick starting growth and green up in the spring.

When I developed this survey, I thought it would be interesting to see how late season nitrogen management has changed over the past 18 years. As it turns out, not much has changed. The largest change is in dormant fertility practices, as a smaller percentage of superintendents are applying N after November 1st, which can be assumed to be from a similar sized reduction in biosolid applications. The other finding in this survey that was also apparent in 1989 is the wide range of annual N rates. These results highlight the variability of N requirements among golf courses. Superintendents are dealing with countless variables such as age of the greens, shade, precipitation, root zone type, species composition, and many other factors that make each microclimate of a golf course unique, not to mention budget, player demands, and rounds per year. The wide range of these surveys brings me to re-evaluate the validity of the one-size fits all N recommendations that have been the standard for so long.

As an example of how current recommendations can improve, let's look at corn. Current corn fertility recommendations are outlined in detail in a 70 page UW extension nutrient application guidelines publication (A2809) that takes into account details such as soil texture, organic matter, site history, N source, and pH. Site-specific details are important for maximizing efficiency both economically and environmentally. Obviously corn production is a different situation from turf management, because the goal in

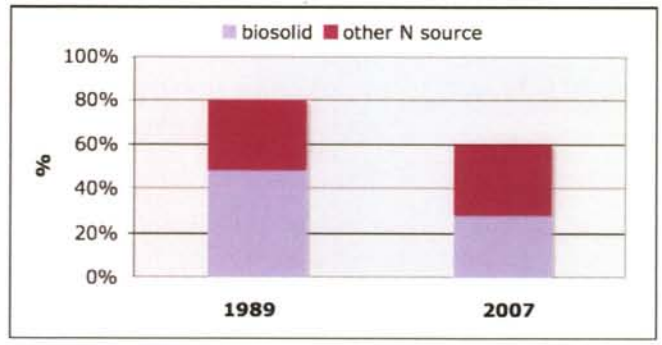

Figure 2. Percentage of surveyed superintendents that made a dormant fertilizer application in 2007 compared to 1989. Dormant application sources are shown separated into biosolid and non-biosolid categories.

Table 2. Fertilizer types applied on putting greens by surveyed Wisconsin superintendents during the fall. Products listed are reproduced directly from survey answers.

Products applied in September and October	Number of Respondents	Products applied in November	Number of Respondents
IBDU (21-3-16)	4	Milorganite (6-2-0)	5
Ammonium sulfate	1	Lesco w/ biosolids (18-2-18)	1
Andersons Contec DG	10	Nature Safe (10-2-8)	1
Signature (19-0-19)	1	Isotek 19-3-19 w/ IBDU	1
Urea	3	Prosource (21-0-21)	1
Methylene urea	2	Andersons 20-0-20	2
Prosource (21-0-21)	1	Urea	2
Sulfur-coated urea	3	Ammonium sulfate	1
LESCO 18-0-18 ELITE	4	IBDU 10-18-22	1
Spring Valley (21-3-12)	5	Spring Valley	1
Potassium Nitrate	1		
Plant Marvel (28-8-18)	1		
Growth fluid fert (15-2-15)	1		
UMAXX	2		
Plant Food (12-3-12)	1		
Country Club NX (21-3-21)	1		
Reinders Pro (EcGrow)	1		
Nature Safe	1		

corn production is to realize maximum profits by identifying the optimal ratio between N fertility rate and yield based on prices of grain, fertilizer and fuel. However, turf managers also seek the optimal balance between turf quality and management costs. Fertilizer prices have skyrocketed recently in response to soaring fuel costs and an increase in demand driven by ethanol production. USDA agricultural statistics show that fertilizer prices have tripled in the last five years, including a 135% increase in the last six months (Dec. 2007 - May 2008). In addition to the significant economic incentive for maximizing fertilizer efficiency, DNR's recently enacted NR151 highlights another trend in the form of fertility management accountability. In response to these economic and environmental motivations, fertility recommendations will continue to evolve.

While we in the turf industry do not have nearly as much research to draw upon when as corn producers, research is currently under way in the UW-Madison Soil Science department evaluating N uptake in cool temperatures for different grasses grown in sand and silt loam root zones. One anticipated outcome of this research is more specific late-season N recommendations for maximizing the efficiency of N use.

Golf course superintendents remain a highly-educated group and have always been receptive to changes. In the 1989 *Grass Roots* edition containing Mr. Erdahl's survey two other articles caught my eye. The first was an article written by Rob Shultz which advocated equal golfing rights for women, the second was a piece written by Dennis Thorp encouraging superintendents to learn to use tools like computers and a new concept called "an electronic bulletin board" which we now know as the Internet. This article titled "Electric Dreams" went on to say that if a company could figure out a way to run irrigation from a computer they would make a lot of money. Today, many take computerized irrigation, the Internet, email, and on-demand weather information for granted and consider them an invaluable tools of the trade. Women are now enjoying equal stature as men on golf courses (excluding Augusta) and in some clubs even outnumber the men in the membership. Fall N fertility programs on the other hand haven't considerably changed over the last two decades. New environmental regulations have been passed while prices and golfer expectations have increased dramatically. And though that phrase is beginning to sound worn out to my ears, it is clear that these trends will continue, and it is increasingly important to make effective decisions to enhance our agronomic impact while minimizing costs and protecting environmental quality. As we always have, our dynamic industry will continue to adapt and evolve, while current and future research will attempt to assist these efforts.

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Welcome Dr. Kerns

By David Brandenburg, *Golf Course Manager, Rolling Meadows Golf Course.*

Wisconsin's golf and turf industry is happy to welcome Dr. Jim Kerns as he takes the position of Turfgrass Pathologist to the Department of Plant Pathology at the University of Wisconsin-Madison. It is hard to believe it has been almost two years since the Wisconsin turfgrass industry has had a turfgrass pathologist on staff. Dr. Kerns joins us from North Carolina State University where he shown his research abilities in work with Pythium Root Dysfunction.

From the couple times I have met Jim it is clear he will get along well with the Wisconsin turfgrass industry. With a clear passion for his work, a great personality and smooth communication skills Jim is easy to talk to and learn from.

Jim was born in Wheaton, IL just outside of Chicago and yes he is a Chicago Cubs fan so I was very happy. We shared a couple Wriggly Field stories and Jim talked of participating in the Cubs kids' camp and having a student summer weekday ticket package that allowed Jim and his brother to attend many games at the friendly confines.

His father is an engineer and mother was a registered nurse leading the family to spend a little time in Texas before moving to North Carolina for high school. Similar to many of us, Jim selected North Carolina State University because of its proximity to home and in state tuition. At North Carolina Jim majored in Agronomy with plans to become a golf course superintendent or athletic field manager.

However, working with Dr. Charles Peacock and Dr. Tom Rufty revealed an interest in research and teaching, and as a result, he decided to pursue a Master of Science degree under Dr. Don Vietor and Dr. Richard White at Texas A&M University. Though his work at Texas A&M was primarily in Soil Science, a couple of classes in Plant Pathology showed Jim where his true interests lie, and Jim returned to NC State upon completion of his M.S. degree to pursue a doctorate under renowned turfgrass pathologist Dr. Lane Tredway.

Under Dr. Tredway, Jim took on the unenviable task of researching the little known Pythium Root Dysfunction. The research has brought to light the etiology, epidemiology, and management of this troublesome disease. Dr. Tredway and Dr. Kerns co-wrote an article in the July/August 2005 USGA Green Section Record titled Defining the Nature of Creeping Bentgrass Roots Diseases that describes some of his research.

Jim and his wife are house hunting in the Madison area if you have any tips for him. Their free time includes many outdoor activities including golf, biking, hiking and visiting state parks. Jim already had his Wisconsin State Park permit for this year. They also like to visit museums, so even when he is not researching turf diseases he is still learning.

Although Dr. Kerns is still getting to know his way around his new surroundings, his goals include advancing the Noer Center Turfgrass Diagnostic Lab and studying dollar spot epidemiology. He hopes to allow us to reduce chemical inputs while achieving effective control of disease problems.

Jim agreed with my statement that the Noer Center and the Turfgrass Diagnostic Lab are tremendous resources for turf managers in the midwest. We also agreed that Paul Koch has done an excellent job as lab manager and the various aspects of his work without having a turf pathologist to assist him during this time.

The same as many of our golf clubs are tightening belts and crunching budgets, the University system is no different. Credit for Jim's hire needs to be given to the Wisconsin Turfgrass Association. Requests from university departments for new or replacement faculty positions are often delayed for years for financial reasons. To speed up this process the WTA offered to fund the first year of salary and benefits for the new position at a cost that totals nearly $100,000! Couple this with the fact that the WTA recently funded Dr. Doug Soldat's first year as a professor in Soil Science and the WTA has certainly turned heads within the university with their relentless support. Be sure to support the WTA and its educational and fundraising events.

Welcome to Wisconsin Dr. Kerns!

A Snow Mold Article...Already?

By Paul Koch, *Turfgrass Diagnostic Lab, University of Wisconsin Madison*

A snow mold article? But didn't summer just start? It may seem like it, what with the harsh winter; cold spring, record floods, and mild summer (as of mid-July) making it feel like we have just entered into June. But believe it or not it will be August by the time most of you are reading this, and that means heat, humidity, weary crew members, and even wearier superintendents...yes the dog days of summer are here. However, it also means that shorter days, cooler nights, and raucous Saturdays at Camp Randall are just weeks from arrival.

For golf course superintendents fall is often a time to regroup from a busy summer. However, it is also a time to plan for the upcoming winter, and as last year showed us, winter in Wisconsin still has plenty of bite. Snowfall totals over 100 inches in many southern Wisconsin communities and snow cover durations exceeding 100 days over most of the state meant higher snow mold pressures for most superintendents. But despite the higher pressures, those superintendents that planned ahead and put down proven products for snow mold control saw little to no snow mold come spring. Those that figured they could get by with lesser protection due to the mild winters of years past unfortunately saw significant damage. And those that did not heed the recommendations of limiting nitrogen fertilization going into winter experienced especially significant damage, even observing snow mold breakthrough on normally effective products.

With so many fungicides available for snow mold protection, it

Table 1.

Snow Mold Ratings Recorded on April 30th, 2008 at The Legend at Giants Ridge

	Treatment	Rate	Timing[a]	% Snow mold	Color[c]
1	Untreated Control			76.3 a	7 a
2	Spectro	4 OZ/M	Early	0 f	7 a
	26/36	4 FL OZ/M	Late		
	CLEX-9	1.2 OZ/M	Late		
3	Spectro	4 OZ/M	Early	5 ef	7 a
	26/36	8 FL OZ/M	Late		
	Endorse	4 OZ/M	Late		
4	Spectro	5.75 OZ/M	Late	0 f	7 a
	CLEX-9	1.2 OZ/M	Late		
5	Spectro	4 OZ/M	Early	9.8 ef	7 a
	26/36	4 FL OZ/M	Late		
	Endorse	4 OZ/M	Late		
	Alude	5.5 FL OZ/M	Late		
6	Insignia	0.7 OZ/M	Late	0.8 f	7 a
	Trinity	1 FL OZ/M	Late		
	Daconil WeatherStik	3.7 FL OZ/M	Late		
7	Insignia	0.7 OZ/M	Late	0 f	7 a
	Trinity	1 FL OZ/M	Late		
	Turficide 400	6 FL OZ/M	Late		
8	Insignia	0.7 OZ/M	Late	14.3 def	7 a
	Chipco 26GT	4 FL OZ/M	Late		
	Daconil WeatherStik	3.7 FL OZ/M	Late		
9	Insignia	0.7 OZ/M	Late	9 ef	7 a
	Chipco 26GT	4 FL OZ/M	Late		
	Turficide 400	6 FL OZ/M	Late		
10	Instrata	9.3 FL OZ/M	Late	4.3 ef	7 a
11	Instrata	11 FL OZ/M	Late	1.8 f	7 a
12	Instrata	7 FL OZ/M	Late	4.5 ef	7 a
13	Instrata	5.4 FL OZ/M	Late	23.8 cd	7 a
14	QP Iprodione	4 FL OZ/M	Late	32.5 bc	7 a
	TM/C	6 OZ/M	Late		
15	QP Iprodione	4 FL OZ/M	Late	12.5 def	7 a
	QP Propiconazole	2 FL OZ/M	Late		
	TM/C	6 OZ/M	Late		
16	Banner MAXX	3.2 FL OZ/M	Late	7.8 ef	7 a
	Daconil WeatherStik	4.5 FL OZ/M	Late		
	Medallion	0.27 OZ/M	Late		
17	Banner MAXX	3.2 FL OZ/M	Late	1 f	7 a
	Daconil WeatherStik	4.5 FL OZ/M	Late		
18	Banner MAXX	3.2 FL OZ/M	Late	6.8 ef	7 a
	Medallion	0.27 OZ/M	Late		
19	Daconil WeatherStik	4.5 FL OZ/M	Late	18.8 def	7 a
	Medallion	0.27 OZ/M	Late		
20	Chipco 26GT	4 FL OZ/M	Late	37.5 b	7 a
	Daconil WeatherStik	3.7 FL OZ/M	Late		
21	Tartan	2 FL OZ/M	Late	1.8 f	7 a
	Daconil WeatherStik	5.5 FL OZ/M	Late		
22	Tartan	2 FL OZ/M	Late	0 f	7 a
	Turficide 400	6 FL OZ/M	Late		
23	Reserve	3.8 FL OZ/M	Late	0 f	7 a
	Compass	0.25 OZ/M	Late		
24	Tourney	0.44 OZ/M	Late	2.5 f	7 a
	Daconil Ultrex	3.2 OZ/M	Late		7 a
25	Turficide 400	10 FL OZ/M	Late	32.5 bc	6.3 b
26	Turficide 400	6 FL OZ/M	Late	2.8 f	7 a
	Banner MAXX	2 FL OZ/M	Late		

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

[a] Early and late fungicide treatments were applied on Oct. 22, 2007 and Nov. 16, 2007, respectively

[b] Mean percent diseased area

[c] Color was rated on a scale of 1-9 where 1 = straw colored, 7 = acceptable, 9 = dark green