



For golf clubs with creeping bentgrass greens in certain parts of the country, one of the biggest fears is a pathogen called “bacterial wilt.”

found on their greens is really a bacterium. Whatever you call it, superintendents who have witnessed bacterial wilt destroy their greens don't care. They just want pathologists and the USGA to work collaboratively to find a cure.

Jim Rooney, director of golf courses and grounds at Saucon Valley Country Club, Bethlehem, Pa., first saw bacterial wilt on his *Poa* greens back in 2005. After regrassing the 60 holes at this historic private club with A1A4 creeping bentgrass, he saw some of the bacteria return to his renovated greens in 2010. He sent plugs to Tredway (who

was at NC State at the time), to the University of Rhode Island, to Rutgers and to the University of Connecticut.

Rooney – a 25-year turf veteran – has never seen a disease this devastating. He's upset by the controversy among the pathologists over this issue.

“To have academics arguing is wasting everyone's time,” Rooney says. “What am I supposed to tell my membership? It's not fair for the superintendent.”

Tredway is still not convinced that what Kent and others are seeing on their bentgrass greens is bacterial wilt. To him, it's just

“In the absence of proof as to what causes it, I continue to call it etiolation.”

—Lane Tredway, Syngenta

etiolation – a technical term to describe yellowing and elongation of the turf, which is a common symptom seen on creeping bentgrass putting greens.

“In most locations, the symptoms come and go with changes in the weather conditions and it is not a significant problem,” Tredway explains. “In the absence of proof as to what causes it, I continue to call it etiolation.”

On the other side of this disease debate is Nathaniel Mitkowski, who has been studying bacterial wilt for several years. Looking through last year's records he saw it most concentrated in Ohio, Illinois, Pennsylvania, south New Jersey, South Carolina, North Carolina and then back in through West Virginia. It's also been identified in Texas and Kentucky.

“If you have excellent growing conditions for bentgrass you most likely won't see it, but when you get a very hot, stressful year, the pathogen becomes very aggressive and that's when you start to see decline,” explains Mitkowski, associate professor of plant pathology at the University of Rhode Island.

This summer, Mitkowski, along with colleagues at the University of South Carolina, are set to do extensive field trials at golf courses throughout his region on what he dubs “a bizarre disease.”

Bacterial wilt first cropped up widespread on putting greens around 2006-07 at Quail Hol-

low and it came back over the following few years, causing severe etiolation of leaf blades on the course's bentgrass greens. Tredway was involved in the initial research into this disease at Quail Hollow.

According to academics, what basically happens with this disease is the plant becomes clogged with bacteria; then, when you mow it, or roll it, you spread it around unknowingly. If the plant becomes too stressed from being dry and hot, you try and cool that plant, and evapotranspiration and photosynthesis and everything else that is taking place in the plant doesn't allow the plant to function. Since it can't transport nutrients upward or downward, it clogs up, withers back, turns yellow and wilts.

Kent decided to send a plug out-of-state to try to figure out what it was. One researcher he sent it to was Joe Vargas at Michigan State; Vargas identified the bacterium as *Acidovorax*, according to Mitkowski and despite no conclusive evidence discovered by Tredway's team, and published a paper of his findings.

“What Joe [Vargas] was able to do was pull the bacteria out of the plants, put it on clean plants, and get disease in a greenhouse environment,” says Mitkowski. “To many, it was pretty clear it was a pathogen.”

The summer of 2010 was the hottest year on record in many

“Most pathologists in our industry have discounted bacteria as being much of a turf problem. I don’t think we quite know whether it is a primary pathogen, but I can tell you this does have the industry concerned with ample justification.”

— Stan Zontek, USGA Green Section’s Mid-Atlantic region

parts of the country. Quail Hollow lost some grass because it was so aggressive and other courses started to feel the wrath of this silent killer. Mitkowski had reports of bacterial wilt from Maine to Georgia, so he considered it a significant problem in the turf market.

Sam Green at Eagle Point Golf Club in North Carolina is another superintendent who believes in this bacterium. “This will be the single limiting factor to growing bentgrass in parts of the southeast,” he says.

Green has dealt with bacterial wilt on and off for the past couple of years on his 12-year old bentgrass greens. Fortunately, he has not had total turf devastation as the bacterial wilt tends to be isolated to segregated areas. He speculates that the disease is caused by a variety of modern superintendent maintenance practices to get grass to grow to golfer’s high expectations.

“The way we have to treat our greens to achieve expected green speed and firmness and our fungicide rotations all play a role,” says Green. “I believe growth regulators and the way we are using fertilizers also have something to do with it. In a nutshell, we are growing the grass lower than we should, then we are foliar feeding it to get it to recover, and then, so we don’t lose any speed we are putting a growth regulator on top of that to slow it down.

“Then on top of that we are using these newer fungicides for some of these different diseases that have come on in the last number of years,” he continues. “We are throwing four things at

the turf, so I don’t think it is any one product that anyone is using that is causing it ... I believe it is a combination of everything we are doing.”

Last year, Green was part of a trial that used Daconil Action (a Syngenta product) in two of his putting greens that historically had etiolation and in which Dr. Tredway had verified Acidovorax in the plugs.

“We eliminated the yellowing and the problems on those greens last year versus historically having some trouble,” Green says. “We need to have open discussions about this issue. I’ve heard arguments that it’s product-related, some say it’s a primary pathogen, others say it’s a secondary pathogen. At the end of the day, it doesn’t matter what it is, I want to know why it’s happening and how to fix it.”

There is still a lot of research remaining to pinpoint the root causes of bacterial wilt and find the best fix for this perennial problem. Working with the University of South Carolina with USGA funding, Mitkowski sees this summer as a crucial time in the field where he hopes to discover good data that will help find a cure to this serious turf problem that doesn’t appear to follow the rules.

Plant pathologists are trained in universities, not trained on golf courses, he says.

“Training at universities is typically, if you see something in the field, you have to replicate it in the lab, and if you can’t, that’s not the cause ... that is really the foundation of disease diagnosis,” Mitkowski says. “Right now what we’ve got is a pathogen that

doesn’t seem to follow the rules.

“That’s a concern,” he adds. “But, I’m not going to throw the baby out with the bathwater and say, ‘just because we couldn’t get it in the greenhouse, it couldn’t possibly be bacterial wilt. We don’t get etiolation in the greenhouse, but we get the same decline and the same loss of grass that you see in the field.’”

What many do not understand, he says, is just because they take a plug out of their green and they send it off to a lab and see some bacteria streaming from the plant, that doesn’t necessarily mean they have bacterial wilt. So, whether it’s a pathogen or not, what are some of the solutions discovered to date to battle bacterial wilt? Daconil Action that Green tried at his course is one fungicide that doesn’t actually kill the bacteria, but it turns

there are antibiotics that are not labeled yet for turf, but experimentally they work very well,” he adds. “People are now looking at registration of some of these products for turf because those will control the disease.”

Green says changing his general maintenance practices – such as backing off on topdressing and keeping soils at the optimal wetness by using handheld moisture sensors – have also helped keep bacterial wilt from spreading.

Based on what superintendents and pathologists have seen, it will take a true cooperative effort to win the battle against this indiscriminate killer. The summer of 2012 is going to be a busy one for turf pathologists studying this disease.

“I’ll be driving from golf course to golf course where they



Bacteria or not, the culprit tends to be isolated to segregated areas.

on the plant’s defenses.

“We’ve seen very good control of the bacteria with this product when it is applied preventatively on a regular basis,” Mitkowski says. “It’s not going to give you 100 percent complete control, but it will definitely give you enough control that you can probably manage it if you get it early enough and you can go through the summer without too many problems.

“In terms of other solutions,

have the disease, examine the results, try different products, and see what works,” Mitkowski concludes. “This is going to be the first time we go out and try to control this disease in the field and hopefully, by the end of the summer, we will have some good data.” GCI

David McPherson is a Toronto-based freelance writer and a frequent GCI contributor.



*All surfactants are*  
**NOT CREATED EQUAL.**

**Precision surfactants allow you to manage your water, no matter the conditions.**

As a superintendent, you're constantly

pursuing "firm and fast." **Cascade<sup>Plus</sup>** is a



combination of surfactants that hydrate your soil and provide deeper, uniform water

infiltration—ending LDS, correcting hydrophobic conditions and bringing "firm and fast" within

your grasp. > Stressed turf makes for a stressed

superintendent. **Magnus** is a nonionic



surfactant that produces uniform hydration in the root zone – relieving turf stress, providing

optimal growing conditions for new seedlings and putting an end to your headaches.

> Full-scale spray applications aren't always

practical. When recurring hot spots rear their

ugly heads, turn to **EZ Tabs<sup>RESCUE</sup>** featuring



the same active ingredient as Magnus, in a smaller application. > As conditions get wetter,

your revenue dries up. **Duplex<sup>Ultra</sup>** helps



rainfall and irrigation break through thatch

and aggressive turf types and infiltrate the soil,

allowing you to get your crew and players back on the course.



[www.precisionlab.com](http://www.precisionlab.com)



**Henry DeLozier**, a principal in the Global Golf Advisors consultancy. DeLozier joined Global Golf Advisors in 2008 after nine years as the vice president of golf of Pulte Homes. He is a past president of the National Golf Course Owners Association's board of directors and serves on the PGA of America's Employers Advisory Council.

## CRISIS WAITS FOR NO ONE

**W**hat do Herman Cain, Penn State University, Netflix, Bank of America, Carnival Cruise Lines and the Susan G. Komen Foundation have in common?

They've all been in the news recently for reasons they would not have chosen.

What's more, they all probably wish they had been better prepared for the communications crisis that dropped abruptly into their laps. But, if we know anything about crises capable of wrecking a brand, a business or an individual, we know they enter unannounced and seldom follow a script.

You think nothing like that could happen to you, a golf course superintendent, owner or operator? So floods, fires, tornadoes, lightning and hurricanes all stop at your property line? You're immune to chemical and gasoline spills, acts of violence and moral transgressions by employees? And your computer systems are so absolutely fail-safe no one could infiltrate a program and steal members' and guests' personal credit card information?

Maybe you won't attract national media attention, but a golf course is no more unlikely a spot for a crisis than many other places. So as politicians, banks and major universities have discovered, you need a plan.

**PREPLANNING.** And as anyone who has experienced a crisis of any magnitude knows, if you wait for the crisis to arrive, it's too late to plan. There are three key steps in preemptive crisis planning:

**Identify all of the potential crisis situations.** Start with the ones with the greatest potential, including on-site deaths or injuries, fire and property damage. But don't forget arson, terrorism, domestic conflict, environmental disasters and computer-related hacking.

**Determine how you will respond to each circumstance.** Which agencies, officials and professionals should be contacted? In which order? Who will make the contacts? Who will serve as back-up if the primary contact is unavailable or – worse yet – a part of the crisis? Who speaks for the club?

**Develop a communications checklist.** Keep the list of actions and the order in which they should happen immediately available to those designated to act in these situations. Maintain accurate contact information in a consistent place for immediate action.

**ESSENTIAL TOOLS.** Responding to the demands of a 24-hour news cycle, which includes the media, your

members and customers connected via social networks, requires five essential tools:

**Backgrounder file.** Be prepared to distribute background information concerning the club via electronic and hard-copy formats. Among the items that will be required and/or requested by media outlets and others are a map of the club, photographs of the club, descriptions of the mission and vision of the club and a brief description of the club and its history. Do not issue names of members, contact information and secure

Maybe you won't attract **national media attention**, but a golf course is no more unlikely a spot for a crisis than many other places.

information about the club, such as finances and internal issues. Being prepared to respond immediately to requests shows media covering the story that the club is professionally managed and accountable.

**Scripted remarks.** In a crisis situation, precision is critical. Even the most experienced spokespersons can misspeak, so key message points should be crafted long before the crisis hits. Scripting also helps the club spokespersons say what should be said, not what comes to mind in the heat of the moment.

**Locations for interviews and broadcast communications.** Most clubs are private property and are, therefore, protected from trespass. But a crisis is not the time to bar the media from your property; doing so only heightens the sense that something is being hidden. Plan ahead and consider backdrops that neutralize the story. For example, if the club is being accused of a chemical spill that polluted a local stream, don't hold the news conference in the maintenance facility in front of pesticide containers. If circumstances have damaged or destroyed the primary locations, have back-up locations selected nearby that align with the club's brand standards.

While in times of crisis a plan is essential, the process that a facility goes through to arrive at the plan – carefully considering every possibility and every response – is equally valuable.

As General Dwight D. Eisenhower once said, "In preparing for battle, I have always found that plans are useless, but planning is indispensable." **GCI**



Emerald Isle Solutions™

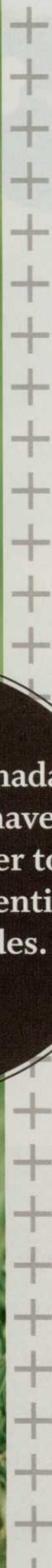
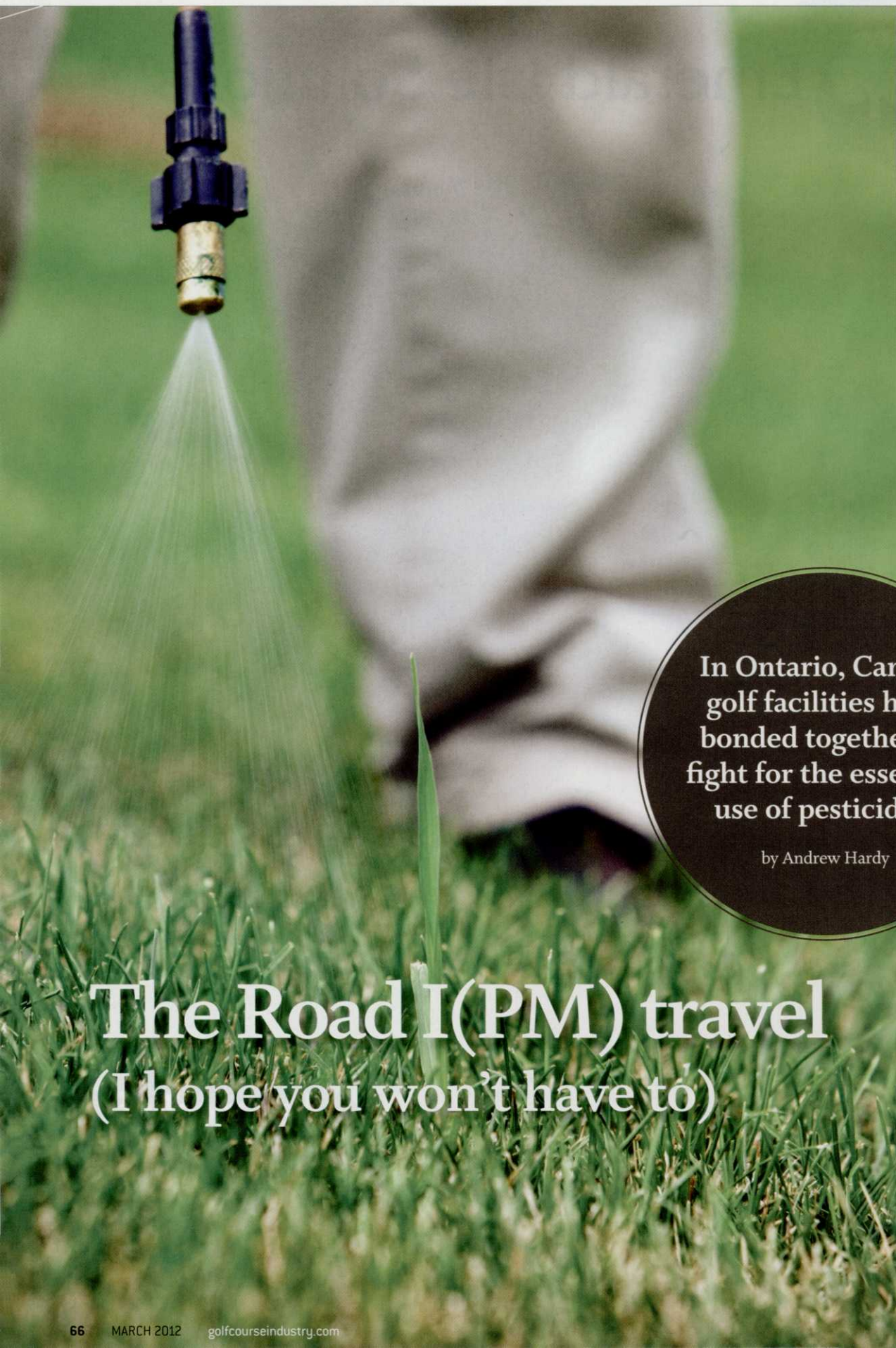


So your turf's ability to survive stress doesn't  
have to rely on the luck of the Irish

Emerald Isle Solutions™ products maximize your turf's stress tolerance and improve physiological fitness even under the harshest conditions. Don't count on luck, rely on Emerald Isle Solutions™ to keep your turf green.



*Best of All Worlds™*  
[www.LebanonTurf.com](http://www.LebanonTurf.com)  
1-800-233-0628



In Ontario, Canada  
golf facilities have  
bonded together to  
fight for the essential  
use of pesticides.

by Andrew Hardy

# The Road I(PM) travel (I hope you won't have to)

Over the years in the turf industry, there has been many a political war waged at all levels. Private club superintendents have fought to have a much-needed renovation done, semi-private clubs have battled one another for the almighty golfer's dollar and public golf courses can be forced to fight for survival from season to season. In the province of Ontario, Canada, all levels and calibers of golf facility have bonded together to fight for the essential use of pesticides. The reason for the formation of the Ontario Allied Golf Association (OAGA) was the impending scrutiny that all provinces in Canada are going to face going forward.

I focus on Ontario due to the fact my club, Pheasant Run Golf Club is located there. The conflict being waged is more of an annoyance than a true battle. But the fact is that the Ontario government implemented the Earth Day Act on April 22, 2009. Essentially this law was a ban on the cosmetic use of pesticides. Ontario Premier Dalton McGuinty felt "pesticides to control weeds and insects was purely a cosmetic use and that we were putting our families at undue risk."

## "The program is taking many superintendents off the golf course and putting them behind a desk."

So how was golf going to cope with maintaining a high-maintenance turf stand without pesticides? Fortunately, the Ontario Golf Superintendents Association (OGSA), National Golf Course Owners Association (NGCOA), Golf Association of Ontario (GAO), Ontario Professional Golfers Association (OPGA) and Croplife Canada formed the OAGA. The mission of OAGA was to have the golf industry be exempt from the pesticide ban. The formation of OAGA was a big deal because of the fact that these groups had always worked so hard to gain an independent profile.

With all of the points made thus far, where does Integrated Pest Management (IPM) as it exists in Ontario become so high profile? The IPM program had been a fully voluntary program since 2004. All the stakeholders (golf, landscape, forestry, public works) that were using pesticides were able to come up with their own version of an IPM program. The IPM program for golf was a very user-friendly setup which included the writing and passing (75 percent score) of an IPM exam, the registration of your golf facility with the IPM

council, submitting annual desk audit review, successfully passing of and on-site audit performed by an independent third-party auditor and maintaining eight continuing education credits (eight CEC's) per year.

The program as it existed until the end of 2009 was user-friendly, easy to understand and because it was voluntary not really a panic document to finish. Cue the Earth Day Act of 2009. The pesticide ban was less friendly to the landscape industry than it was to the golf industry. Home owners were completely shut down for pesticide use while golf was granted an exemption based on the IPM program. But the catch was that the IPM program the 53 fully accredited golf clubs had gotten used to was to be revamped and drastically changed. So my thought when electing to enter the voluntary program was that Pheasant Run would have a leg up on the other clubs that hadn't entered the program. Becoming a fully accredited Level-2 golf course in 2008 did not offer any advantage. The fact is the clubs that were "ahead of the curve" were lumped in with everyone else. Though the process to becoming a Level 2 facility remained the same as before, the program as I learned it

was going to change.

Changes to the documentation and the amount of paperwork with the new IPM desk audit were significant. My 2008 desk audit was about 20 pages in length, while my 2009 desk audit was more than 300 pages. Yet the two documents did basically tell the same story. The biggest difference was the Annual Report, which was a part of the new IPM desk audit. The report was a cumulative account of the actual active ingredient in kilograms for each product used within the given golf season. And this report is to be uploaded on the IPM Council of Canada website and placed in a high-traffic area in the clubhouse of your course. To the average golfer or member these numbers really don't mean much. In fact to a fellow superintendent they probably don't mean much other than a possible comparison. Also to be added to the IPM website is the map that is created that shows where on our properties we have



Hardy

"And as the chips fall for two provinces, it isn't going to be long before others will have an IPM program to work with."

applied pesticides. This is a little easier for the average person to decipher based on the colors and outlines used. Though easier to read, it may also paint a negative picture of what is being done on a specific property. We at Pheasant Run really don't spray very much at all. But looking at our map you'd get the impression we do. In the court of public opinion I believe the maps do more negative than the annual report.

The last element to meet the conditions of the golf exemption is the holding of a public meeting. The public meeting is to be advertised in a newspaper and all inhabitants living within 100 meters of the golf course are to be personally invited to the public meeting. For a facility like mine this meeting does not really strike fear as we have six neighbors. There are a number of golf courses in Metropolitan Toronto (population about 4 million) that have as many as 350-500 dwellings within the prescribed 100 meter zone not to mention the potential for "environmental activists." With fire codes of clubhouses and potential member participation some of these clubs may have to rent outside of the club to accommodate the numbers. And there are at least two clubs I know of that will do up to two or three separate meetings in one night to meet the guideline. The OGSA in conjunction with Croplife Canada have produced an informational video that highlights the positive benefits of golf to be presented the night of your public meeting. The OGSA has also developed a guideline for running a successful meeting with the hopes that member clubs will follow these for symmetry within our industry. Essentially, the meeting is the reading of the annual report and fielding potential questions.

**SO WHAT DOES ALL OF THIS MEAN FOR GOLF IN ONTARIO?** For the time being the exemption is in place until 2013. At that point Ontario's Ministry of the Environment (MOE) will review the program and move forward from there. There is somewhere in the neighborhood of 1,300 golf facilities in Ontario. It seems a little farfetched at this point to think



Powered by Google + MAPS

**IPM ANNUAL REPORT - PEST CONTROL PRODUCT USAGE for the year 2011**

Golf Course: Pheasant Run Golf Club IPM Agent: Andrew T. Hardy  
 IPM Coordinator: P. 2000 Tel: 2000-910-3917 E-mail: jhardy@pheasantrun.com

Area treated	Product Name	Amount for use	Total quantity in container	Reason for difference from Historical Evidence (if any)
Killex (9111) 2.40	History of pest activity in treated area	2,400	2,400	Little less product used this year
Mentopar	Evidence of pest activity in treated area	1,800	1,800	
Decarb		324,000		
Mentopar (40g WSP) (2500)	Major grub damage in the spring. Turf has damaged in areas through the course	8,776		

Mapping and public notices are part of Ontario's IPM program.

that all are going to fall in line with the legislation (less than 40 percent participation, so far). And there is one small club that I am aware of that, based on the costs of being in the IPM program (\$905/season plus the \$85 agent fee), have decided to stop using pesticides. They made their membership aware of what was coming and they essentially live with the issues that arise.

The golf industry in Ontario has lived through the first phases of the exemption. For some of my colleagues in other Canadian provinces – such as British Columbia, which has always been a very political province – I fear the government is going to throw the book at golf. The presence of the NAGA in British Columbia will hopefully allow cooler heads to prevail. And as the chips fall for two provinces, it isn't going to be long before others will have an IPM program to work with.

I have always based my maintenance on an IPM program with the environment and strong stewardship at the fore. So falling in line with this new IPM program has been easy

and difficult all in the same breath. The easy part is the spraying aspect, as we don't spray a lot and do use other means of fighting disease as well. The more difficult aspects are the reports and work to complete annual reports and paperwork now take me in excess of 70 hours to complete. The in-season scouting reports can take up to two hours to complete with all the follow-up and cross-referencing with spray applications. The program is taking many superintendents off the golf course and putting them behind a desk. But the Ontario government, no matter who is in power, is never going to eliminate this pesticide ban. So we grin and bear it and trudge through the paperwork and meet the stringent guidelines set upon us because it could have been worse. In fact, it could have been much worse. **GCI**

*Andrew Hardy, CGIA and Diploma Turfgrass Management, is superintendent at Pheasant Run Golf Club, Sharon, Ont., Canada.*

ANDREW HARDY

**weedalert.com**

**The Turf Professional's Free On-line Source for Weed ID and IPM Control Recommendations**

- Weed ID Photos
- Regional Alerts
- Control Options
- Turf School Links

**TEST YOUR WEED IQ! WEEKLY CONTEST-**

**Correct ID Can Win This Magic Mug With Disappearing Ink**

**An Industry Service From**  
**G pbi / GORDON CORPORATION**  
 An Employee-Owned Company

**Were You Featured In This Issue?**

Reprints enable you to reuse your article and simply place it into the hands of your target audience. Having been featured in a well-respected publication adds the credibility of a third-party endorsement to your message.

Give yourself a competitive advantage with reprints. Contact us for more information regarding reprints and additional applications designed to meet your challenging market needs.

**Use Reprints As:**

- Sales Aids
- Educational Programs
- Recruitment Tools
- Employee Training
- Managed ePrints
- Sales Presentations
- Trade Show Handouts
- Conference Materials
- Media Kit Supplements
- Direct Mail Campaigns

**Call Traci Mueller @ 800-456-0707**

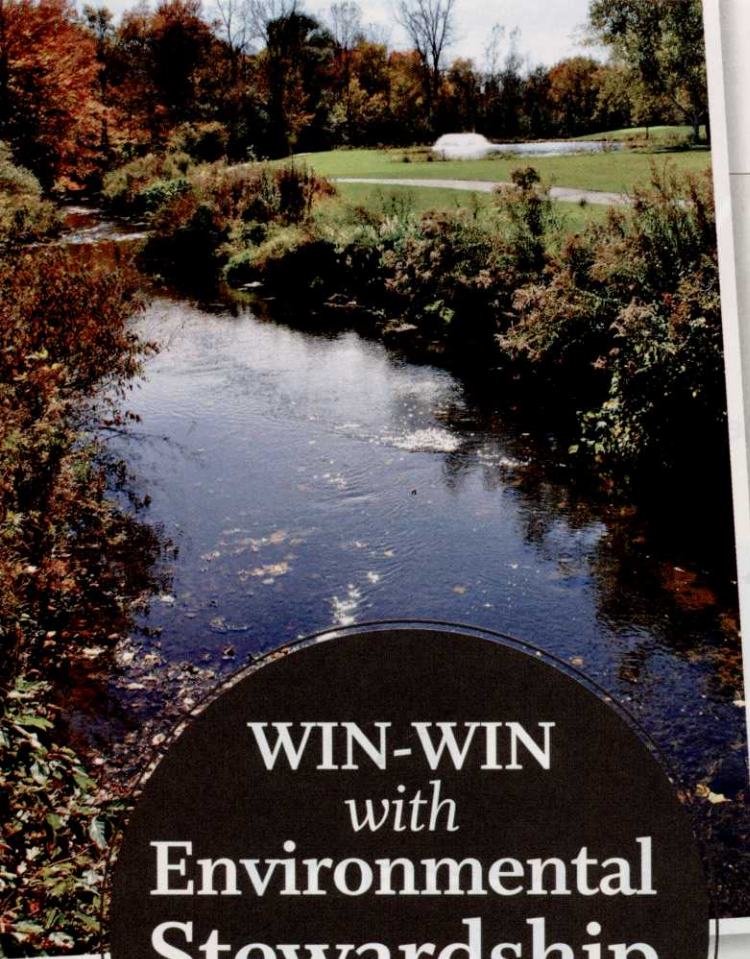


# ANYTIME. ANYWHERE.

Unlimited access to the industry's leading news. Download any of GIE Media's horticulture apps for FREE.



↓ Lawn & Landscape and Golf Course Industry available in iTunes and Android Market  
↓ Greenhouse Management, Nursery Management, and Garden Center available in iTunes



# WIN-WIN with Environmental Stewardship

By  
Dan Mausolf  
and Paul L. Scott

**E**nvironmental stewardship is a win-win practice for the golf industry and the environment. It helps the bottom line, reflects positively on the golf industry, and offers the public the chance to experience nature. At the University of Michigan's Radrick Farms Golf Course, environmental stewardship has been rewarding on so many levels. At its most basic definition, environmental stewardship is the responsible management of our natural resources. For us, it is much more. It represents an ethical value that defines our operational culture. Environmental stewardship helps us accomplish our mission of offering an exceptional golf experience at an exceptional value.

From the inception of Radrick

Farms, environmental considerations have been a priority. Frederick Matthaei, Sr., an alumnus and former regent, donated the property to the university in the 1960's. However, Matthaei was already implementing environmental stewardship practices in the 1930's when he purchased the property and converted it from a gravel mine into a farm. He practiced the innovative science of arboriculture while growing at least one of every tree indigenous to the state. University of Michigan President Harlan Hatcher suggested building a faculty golf course with then little-known golf course architect Pete Dye. Agreeing with the plan, Matthaei stipulated that the construction left as many trees undisturbed as possible. Radrick

Farms is now an 18-hole championship layout set on 275 acres of beautiful, rolling terrain.

The staff of Radrick Farms continues to embrace Mr. Matthaei's pioneering environmental stewardship vision. As part of our comprehensive approach to environmental stewardship, we have partnered with the Audubon Cooperative Sanctuary Program, the Michigan Turfgrass Environmental Stewardship Program, Groundwater Guardian Green Site program, and the Washtenaw County Community Partners for Clean Streams program. Through participation in these programs, Radrick Farms has garnered recognition from professionals within the golf industry, policy makers and citizens. These efforts help prove that a golf course can have a positive impact on the environment as well as participate in the university's goal of "going green, staying blue"

Some of these programs require the reporting of environmental data. Through careful planning and fiscal responsibility, we have been able to invest in technology that improves course conditions while gathering that data. Moisture meters, infrared thermometers, compaction meters, weather station data, and soil, water and tissue sampling give us the information necessary to make intelligent decisions. The accuracy of this data allows us to use best practices for chemical applications, water use and cultural regimens. Given the fluctuation of the economy and governmental regulations, superintendents need to be efficient with all of the resources they have at their disposal. Environmental stewardship programs can be a catalyst for identifying wasteful practices, making proper adjustments, and tracking the efforts that often result in better play-

ing conditions while saving time and money. These programs are a win-win for golf and the environment.

These programs also involve educational efforts that have resulted in unexpected benefits. To accurately and effectively promote environmental stewardship, the superintendent and the clubhouse manager have collaborated in many ways. The two parts of the operation must work together to promote and to educate the public about our program partners and their certification requirements. These efforts promote team work and appreciation between the two parts of the operation.

For example, our environmental stewardship guide was created to achieve full Audubon Cooperative Sanctuary certification. To create this guide, extensive collaboration was necessary. Photos were contributed from both ends of the operation. Computer and turf science knowledge was shared. The drafting and proofing process resulted in mutual respect and pride.

The golf industry is at the forefront of implementing and promoting environmental sustainability and stewardship in the burgeoning "green industry." Much research and unwavering dedication are required to reach the best solutions for any particular property. What may seem to be a daunting task is a rewarding experience that results in better course conditioning, sound financial decisions, satisfied customers, and ultimately a better place to live and work. Definitely a win-win. **GCI**

*Dan Mausolf, superintendent and Paul L. Scott, clubhouse manager, are from Radrick Farms Golf Course, University of Michigan, Ann Arbor, Mich.*