

Bud White, director of the USGA's Mid-Continent Region, believes the only value a chemical test would have in giving superintendents information on aeration is indicating the salinity of the soil.

"If it shows that you have higher salts than you should, that would tell you that you need to do more aeration and venting so you could flush better," he says.

A physical test, White says, is really the most telling when it comes to aeration. Sending in an undisturbed core to an accredited lab will offer information on the percentage of organic material in different layers and what the dilution rate is, or the percentage of sand versus organic material.

"It's important to keep that dilution up with sand where you're building organic matter in the rootzone so that the rootzone stays porous to air and water movement," says White.

"When that upper portion becomes more organic than sand, it seals off the top of the rootzone and creates a false perched water table, which ruins the air and water movement into the soil."

After the test results are back, it's up to the superintendent to determine a course of action, whether that be doing more aeration and topdressing (which go hand-in-hand for the dilution) or nothing at all – because the results indicate that their current program is doing a good job of keeping air-filled porosity up and capillary porosity down.

White says some superintendents test their soils annually, but believes that most can get by doing it once every two years.

"You sure don't need to do it more than once a year," White says. "If I had salt in my irrigation water, I would be testing my greens twice a year because of the tendency to leach nutrients." **GCI**

Jason Stahl is a Cleveland-based writer and frequent GCI contributor.



For more...

Check out the August 2012 USGA Green Section article "Don't Guess - Check the Numbers!" about how soil testing reports can impact your

aerification practices. Enter bit.ly/16DHVxi into your browser to access this article.



PHOTO: MIKA MICHAYKA, CLEVELAND UNIVERSITY



PHOTO: MIKA MICHAYKA, CLEVELAND UNIVERSITY

Above left: What turf looks like when rolling has been completed. Above right: A side-by-side comparison of turf before and after it has been vented.



PHOTO COURTESY OF REDEEM



John E. Kaminski, Ph.D. is an associate professor, Turfgrass Science, and director of the Golf Course Turfgrass Management Program at Penn State University. You can reach him at kaminski@psu.edu.

WHERE DID THE SUMMER GO?

As we move into fall, take a look back at your year to begin prep for 2014.

It's already September and, as always, the summer seems to fly by quicker and quicker each year. Despite an unusual low amount of pest activity reported on golf courses across the country, this summer was no exception.

As all golf course superintendents are aware (and most golfers and members forget), Mother Nature was again the star of the season and in total control. For those of us in the Mid-Atlantic, the spring started out very slow with moderately cool temperatures delaying the season.

While this was somewhat of a problem for getting the turf going in the spring, it was probably more of a problem for golf rounds across the country. I recall everyone's excitement about rounds being up when we had an early spring in 2012. Speculation about hitting a "turning point" as it relates to the business of golf was being proclaimed by many. After the slow start this year, however, it appears that Mother Nature was likely to blame for the increase in rounds in 2012 and the decrease in 2013.

The relatively cooler temperatures continued into early summer and on top of that, June was marked with record setting rainfalls. Philadelphia received its highest recorded precipitation with over 10.5" of rain for the month. Many golfers remember this as it coincided with a little golf event called the U.S. Open. During the week, I recall thinking that there was more grass on the greens at Merion than I had seen at any other time... and this was during a major event.

So June came and went and again things didn't seem to be changing much with regards to the moderate weather. Most golf courses had healthy stands of grass and probably more rough than they wanted or their members could handle. This was the

case until July when one hot and wet weekend was followed by about three weeks of "hold on for dear life."

During the month of July, disease outbreaks went from reports of moderate dollar spot to overnight outbreaks of Pythium. It was apparent that summer had finally arrived. I spoke with numerous superintendents during this period and saw my share of disease samples. Everyone was in panic mode and felt like things were finally getting back to what I consider a "normal" summer. However, as quickly as summer arrived it decided it would leave in the same manner.

During the month of August (at the time of writing this) the highest daily temperature (according to weather.com) in Philadelphia was 88F and occurred on a single date. Even better were the nighttime temperatures, which occasionally dropped into the 60's. This year was definitely different and far from normal.

The unusually cooler summer wasn't without its problems though, and turf loss was still evident in some locations. In the Northeast, annual bluegrass weevils again seemed to steal the show. According to reports in the Turfpath App, adult weevils first were observed in the Maryland region in mid-April and continue to wreak havoc now.

Overall disease activity seemed to be low to moderate. Dollar spot developed on a fairly typical schedule in most regions and was relatively severe early in the season. Pythium and algae dominated July as heavy precipitation occurred in conjunction with the three week stretch of high temperatures. On the other hand, reports of diseases like summer patch were lower than normal.

Despite what I would consider an easy year as far as temperatures and stresses were concerned in the

mid-Atlantic region, other areas weren't so lucky. Reports of unusually high temperatures in many locations throughout New England resulted in some considerable stress to annual bluegrass not acclimated to the heat.

While this report focused primarily on what I observed in the mid-Atlantic and Northeastern US, it should be pointed out that other parts of the country had experienced their own unusual summer. Much of the Western US had the warmest July on record, while other areas continued to experience drought conditions. In contrast, Florida's July was among the wettest on record.

“Unusual seasons like this are always a little concerning for me.”

Although the season is far from over, many golf course superintendents took advantage of the weather and widespread reports of "it's the earliest I've been able to aerify ever at our course" were seen throughout Twitter and Facebook. As we head into the fall, those courses that made it through the summer unscathed will likely have the healthiest turf heading into winter. For those courses that didn't escape the damage, the relatively mild temperatures should afford the turf the ability to recover quickly.

Unusual seasons like this are always a little concerning for me. In year's where death and destruction is widespread and the result of an angry Mother Nature, everyone seems to get a free pass. In relatively mild years like 2013 (for some regions), it seems that many clubs use any small decline in

(KAMINSKI continues on page 64)



MARUYAMA®

The POWER in Outdoor Power

The New **BL85 900** cfm

Featuring the new
patented 900 Tornado Tip



The lightest, most comfortable
and "oh, so very, very powerful"

MARUYAMA BACKPACK BLOWER ... PERIOD

Coming to a Golf Course near you.

See your local Dealer and get one now. Don't be the FALL guy.

- new spring-loaded, anti-vibe suspension
- new ergonomic design and great balance
- thicker, padded, support straps

www.maruyama.com





Healthy turf is strong. Strong turf is healthy.



Fight diseases and strengthen your turf with *StressGard*™ Formulation Technology. Plant health is more than being free of diseases. Healthy plants can fight back and grow stronger throughout the season. With Bayer's products containing *StressGard* Formulation Technology, your turf will better resist disease and stress, providing better turf quality and plant health. Get your turf healthy and strong with *StressGard* FT. backedbybayer.com/stressgard
Tartan® | Chipco Triton® Flo | Interface® | Chipco® Signature™

1% of *StressGard*™ product sales will support
Healthy Turf Healthy Tomorrow.
backedbybayer.com/healthy-turf



Bayer CropScience LP, Environmental Science Division, 2 TW Alexander Drive, Research Triangle Park, NC 27709. 1-800-331-2867. www.BackedByBayer.com. Bayer, the Bayer Cross, Chipco, Chipco Triton, Interface, and Tartan are registered trademarks of Bayer. *StressGard* and Signature are trademarks of Bayer. Not all products are registered in all states. Always read and follow label instructions carefully. ©2013 Bayer CropScience LP.

BY MICHAEL L. FLESSNER, J. SCOTT MCELROY, JAMES H. BAIRD, AND BRENT D. BARNES.

Flumioxazin: A pre-emergence herbicide option for warm-season turfgrasses

Annual bluegrass (*Poa annua*) is widely regarded as one of the most troublesome golf course weeds. There are many factors that make annual bluegrass a difficult-to-control weed. Pertinent to herbicidal control, the weed has a long germination period that can outlast the control period of many pre-emergent herbicides. Many times this long germination period requires multiple pre-emergence applications, follow-up post-emergent applications, or

both to achieve complete control. Annual bluegrass can also exist as a short-lived perennial, limiting the usefulness of pre-emergent herbicides. Lastly, the weed has developed resistance to many herbicides use pre- and post-emergence, further complicating herbicidal control.

SureGuard is a new herbicide for the turfgrass market that offers a solution to some of these problems. Flumioxazin, the active ingredient in SureGuard, inhibits the protoporphyrino-

gen oxidase (PPO) enzyme in susceptible plants which eventually leads to the desiccation of the plant. This mode-of-action has both pre- and post-emergence activity. Pre-emergence control results from soil application where the herbicide is predominantly absorbed by the roots. Post-emergence control results primarily from foliar contact, which causes rapid desiccation and necrosis with negligible translocation.

This mode-of-action is similar to oxadiazon (Ronstar).

Summary points

- SureGuard (Flumioxazin) can be utilized for pre- and post-emergent annual bluegrass control
- Use is limited to dormant Bermudagrass unless induced dormancy can be tolerated
- Post-emergent control is limited to annual blue grass plants less than 2 tillers in size.



Above left: The non-treated plot from 2011. Above right: The plot after the November application.



Pictured top to bottom: The plot after the December application. The plot after the January application. The plot after the February application.

Managers familiar with Ronstar Flo will note that it should not be applied to actively growing turfgrass because it can lead to foliar necrosis. The same is true with flumioxazin. However, since both herbicides have limited translocation within the plant, established grasses can recover. Therefore, application of both SureGuard and Ronstar Flo is restricted to dormant periods.

Flumioxazin may be an alternative to other herbicides currently available in Bermudagrass (*Cynodon sp.*) for annual bluegrass control. Having both pre- and post-emergent activity, it may be possible to apply flumioxazin after annual bluegrass germination has begun. That is, the post-emergent activity would control plants already emerged while the pre-emergent activity could control the weeds not yet germinated. Post-emergent applications may control perennial biotypes of annual bluegrass and provide residual control. Additionally, there

RESEARCH CONDUCTED. Research was conducted to evaluate application rate and timing of flumioxazin for annual bluegrass control in hybrid Bermudagrass (*Cynodon dactylon* × *C. transvaalensis*). Application timings evaluated were November, December, January, February, and March. At each application, flumioxazin was applied at 6 and 12 oz product per acre with nonionic surfactant at 0.25% v/v. Research was conducted at Auburn University during the 2010-2011 and 2011-2012 seasons and at the University of California, Riverside in 2011-2012. All locations had a history of annual bluegrass infestations. Data collected included annual bluegrass control, Bermudagrass injury, and overall sward quality.

A greenhouse study was also conducted to determine the maximum annual bluegrass size that flumioxazin can control post-emergently. Annual bluegrass plants were treated at pre-tiller (approximately 3

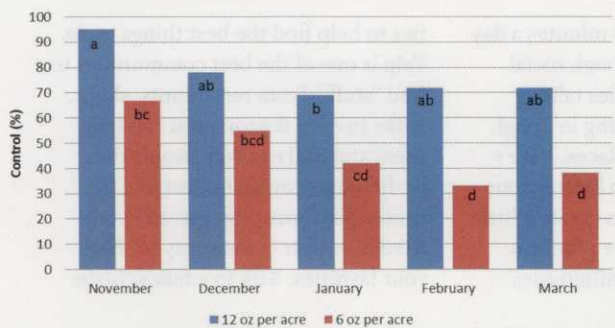
“Optimal flumioxazin application timing is dependent on Bermudagrass dormancy and annual bluegrass maturity, which will vary by specific climate and geographic region.”

are no reports of annual bluegrass resistant to flumioxazin or other PPO-inhibitors, which could benefit managers with herbicide-resistant populations. Despite these beneficial aspects of flumioxazin, applications on Bermudagrass and other warm-season turfgrasses are limited to periods of dormancy which could limit application timings that are safe for use.

leaves), 1 to 2 tiller, and 4 to 6 tiller sizes. Treatments the same as the field study— flumioxazin at 6 and 12 oz product per acre with nonionic surfactant.

RESULTS. Flumioxazin at 12 oz per acre rate resulted in better annual bluegrass control than the 6 oz per acre rate. November and December application timings were the best for annual

Annual Bluegrass Control in April from SureGuard applied at various timings



“Flumioxazin, the active ingredient in SureGuard, inhibits the protoporphyrinogen oxidase (PPO) enzyme in susceptible plants which eventually leads to the desiccation of the plant. This mode-of-action has both pre- and post-emergence activity.”

bluegrass control. Control from flumioxazin at 12 oz per acre applied in November was 95% or better through the following April and was 78% or better from December application. Other application timings resulted in less than 70% control, regardless of rate. These later application timings did not control emerged annual bluegrass plants due to their larger size which allowed them to recover after initial herbicide injury; conversely, earlier applications did control emerged plants.

Greenhouse research indicated that flumioxazin at 12 oz per acre can control annual bluegrass up to the 2 tiller growth stage. However, larger plants (4 to 6 tillers at application) were not controlled. flumioxazin at 12 oz per acre resulted in better control than when applied at 6 oz per acre. These findings agree with field research – that

larger plants are not adequately controlled, and that control is better from 12 oz per acre, rather than 6.

In field research, annual bluegrass was flowering at the January, February, and March application timings. Having weeds present for so long before control is implemented would be unacceptable to golf course managers and users. Therefore the January, February, and March application timings are impractical if this herbicide is used as the sole chemical for annual bluegrass control.

Annual bluegrass generally begins germination in September, where the research was conducted. Therefore, some annual bluegrass plants were emerged for all application timings. Since flumioxazin has pre- and post-emergent activity, emerged annual bluegrass plants were controlled at the

same time and with the same herbicide that the pre-emergence application was made.

Bermudagrass was dormant at all application timings except November. No Bermudagrass injury was observed except from the November application, which resulted in complete necrosis of the foliage. New, green foliage was not produced until spring green-up, due to the onset of the dormancy period. Therefore, flumioxazin induced dormancy of the Bermudagrass. Other research indicates that Bermudagrass will completely recover from flumioxazin injury in approximately 4 weeks. No adverse effects of any kind were observed during spring green-up from any treatment.

The induced Bermudagrass dormancy resulted in superior turfgrass quality through much of the dormant period because these plots were uniformly dormant, as opposed to a mottled, uneven dormancy that occurs when Bermudagrass naturally enters dormancy. Therefore, in one sense, the November application of flumioxazin resulted in unacceptable Bermudagrass injury, but in another sense, the treatment resulted in better turf quality during the dormant period. Understanding this issue prior to its occurrence may

mitigate apprehensions of golf course managers.

Bermudagrass was near complete dormancy at the December application timing, so no injury was observed. Therefore in practice, it is likely that a mid- to late-November application timing is best in the environments that were studied. Optimal flumioxazin application timing is dependent on Bermudagrass dormancy and annual bluegrass maturity, which will vary by specific climate and geographic region.

SureGuard may have other valuable uses beyond what was evaluated in this study. Summer annual weeds, including crabgrass (*Digitaria* spp.) can be controlled with SureGuard. Early pre-emergence applications for crabgrass control (made before Bermudagrass spring green-up) may also have burn-down type control of other winter annual weeds. **GCI**

Michael L. Flessner is a research associate III, and J. Scott McElroy is an associate professor, agronomy and soils department, Auburn University; James H. Baird is an extension turfgrass specialist and Brent D. Barnes is an assistant specialist, department of botany and plant sciences, University of California, Riverside.

The complete scientific publication of this research is: M.L. Flessner, J.S. McElroy, J.H. Baird and B.D. Barnes. 2013. Utilizing Flumioxazin for Annual Bluegrass (*Poa annua*) Control in Bermudagrass Turf. *Weed Technol.* In Press.

All data contained in this document are the property of Auburn University. All rights reserved. No guarantees are made that similar results will be obtained. Auburn University does not endorse or promote products mentioned; criticism of products is for discussion purposes and does not imply endorsement or denouncement. Omission of products not mentioned is neither implied nor intended. Always read and follow product labels, restrictions and precautions.



Bill Brown, CGCS, is CEO of Turf Republic and founder of iTurf Apps. Bill has spent 20 years on golf courses, including the last 5 years at Hartefeld National Golf Club. He's served as an officer and board of director for the Philadelphia Association of Golf Course Superintendents, as well as served on national committees. Contact him at billbrown@turfpublic.com.

IN A 24/7 WORLD, WHY DON'T I HAVE IT NOW?

With technology controlling our lives, sometimes it's nice to disengage.

The world has become a grind, but that doesn't mean we can't find ways to shut it down even for a short period of time. Social media has become a great turf tool, so let's look at taking that a step further and help us refuel and recharge with our new community.

I often say, ten to twelve years ago it was "I need that tomorrow!" Five years ago, "I need it now!" Now its, "Why don't I have it yet!" We have become a 24/7 world. In the golf world, it means we are expected to be 100 percent all the time. We must be ahead of the game. Creating and innovating isn't expected to stop. The days of "We are in maintenance mode are gone."

So what has done this to us? Well, you're probably reading on one of them or holding one in your hand to tweet something out. Technology has made this world 24/7. Processes happen faster and information spreads quicker so we are forced to keep pace.

The turf industry has embraced the use of social media. It is one of the best tools a superintendent has to stay ahead of the 24/7 world. We have been able to communicate faster and more effective to stay ahead. But in this 24/7 world we must find time to disengage from the world that is turf.

Social media has allowed us to grow our network. We can talk to fellow colleagues and friends all over the world with just a few clicks. Since most of us remain engaged in social media as a community even when we aren't talking turf, let's take a look at some platforms to take advantage of this new community we have built.

Social media in fitness has become big, so big at times you might not even realize you are using it. Many of us turn to fitness for release, so why not share this with your friends?

Running is a quick and relatively

easy way to get your 30 minutes a day of physical fitness. Through social media, I see lots of turfies talking about running, competing in Tough Mudders and Spartan Races. Nike+ is a great community to help encourage each other and even create a little competition. The Nike+ platform allows you to create communities

ties to help find the best things to do. Yelp is one of the best communities to find "stuff." From restaurants, shops, parks to even doctors, you can find them and find out why people did or did not enjoy them. Just like the fitness platforms, you can add your friends to your community to share your favorites. Talk to a fellow turfie

“ We have become a 24/7 world. In the golf world, it means we are expected to be **100 percent all the time**. We must be ahead of the game.

of friends to share your runs which includes times, distances, energy burned and even the areas you enjoy running. Turn to the Nike+ map and see where everyone in your area enjoys running. Add other turf friends to your friends list to share some camaraderie. Maybe even find local turfies to create a Tough Mudder or Spartan team.

I am sure you have all seen tweets like "My fitbit #Fitstats for..." Many of us carry or wear pedometers on us now. The most popular are the Jawbone UP, Fitbit Ultra or Flex and the Nike Fuelband. These are more fitness trackers as they track activity, calories burned and provide you an overall look at how active you have been. These too connect to a community of users. I personally have many friends in the turf industry in my Fitbit community. This creates a little competition for all of us, challenges us to stay fit and even provides for some lighthearted discussion when one of us falls behind.

Enjoying time with your family on a day trip? You can use social media communi-

ties to help find the best things to do. Yelp is one of the best communities to find "stuff." From restaurants, shops, parks to even doctors, you can find them and find out why people did or did not enjoy them. Just like the fitness platforms, you can add your friends to your community to share your favorites. Talk to a fellow turfie

ties to help find the best things to do. Yelp is one of the best communities to find "stuff." From restaurants, shops, parks to even doctors, you can find them and find out why people did or did not enjoy them. Just like the fitness platforms, you can add your friends to your community to share your favorites. Talk to a fellow turfie



It's all teed up and ready to go.



NOW
DOUBLE
reward points

For orders placed from
August 19th – November 30th, 2013.

Conditions apply. See civitasturf.com/tee2green for program details.

All the benefits of CIVITAS in an easy-to-use, pre-mixed formulation.*

Now it's even easier to empower turf to reach its full potential. CIVITAS ONE provides **effective disease control** and insect suppression, while helping to **maximize turf quality**, wear resistance and appearance. Plus, it **enhances plant efficiencies** meaning less inputs are required to achieve picture-perfect turf. CIVITAS ONE is the **Total Turf Health Solution**.

For all of this and more visit civitasturf.com

Note: CIVITAS brand captures both CIVITAS mineral oil – Isoparaffin & Harmonizer 2 pack system – and CIVITAS ONE products.

TM Trademark of Suncor Energy Inc. Used under license.

* Shake well before using.



Monroe Miller retired after 36 years as superintendent at Blackhawk CC in Madison, Wis. He is a recipient of the 2004 USGA Green Section Award, the 2009 GCSAA Col. John Morley DSA Award, and is the only superintendent in the Wisconsin Golf Hall of Fame. Reach him at groots@charter.net.

50 YEARS OF MOWING

Celebrating what John Deere has brought to the industry.

For the past 20 years or so, when late July arrives and I can sense the tough days of summer on the golf course were rapidly diminishing, I started to think about Badger and Packer football, apples and pumpkin harvest, and an actual weekend off.

I also started dreaming about which steam and antique power shows I would attend, always hoping to make it to half a dozen.

These shows are a step back in time in American agriculture, often a reminder of the way we farmed in my youth. Binders and threshing machines, straw piles and stationary balers, and lots of old tractors are among the most popular exhibits at these antique power shows. And of the old tractors, the two-cylinder Johnny Poppers are about the favorite, a tough confession for a Ford and Oliver man like me.

At any show the thumping of these engines can be heard all over the park grounds.

John Deere created the start of quite an industrial empire more than 175 years ago when he put his blacksmithing skills to work and fashioned

Illinois, in the 1830s. He needed the Mississippi River to transport steel and coal in, and finished product out to markets.

University of Illinois archeologists unearthed much of the Grand Detour site in 1962, and it is an extremely interesting historical preservation. I have seen his big house in Moline and stood at the foot of his grave there as well.

A number of years ago I was invited to attend a two-day event at Deere headquarters planned for grass guys, including a large number of superintendents. It included a tour of the headquarters building and the museum.

Years later I managed a tour of the John Deere Horicon Works. That's the Wisconsin factory that for the past 50 years has been building consumer products and grass machinery.

The plant is located on the edge of the Horicon Marsh, the largest freshwater cattail marsh in the U.S. It is well known to both bird watchers and hunters – 350 species of birds have been seen there, and huge flocks of Canada geese come and go each year.

The factory was built in the 1860s



It was a very successful mower, and many of the first year machines still run today. It featured a 7-horsepower Kohler engine (yes, that Kohler!) and a three-speed tranny with variable speed drive that made for fast mowing and slow tilling.

So, this year collectors and staff at the Horicon Works decided to celebrate John Deere's 50th anniversary in the grass mowing business.

The three-day event was held at the Dodge County fairgrounds, a few miles from Horicon. Many of the early engineers, designers and production staff from 1963 returned. The event included factory tours (Gators and LGTs are made there now), Deere LGT collectors from all over the country, a tractor cavalcade each noon hour, and demonstrations. There was a swap meet, a flea market, and toy tractor and toy implement peddlers. The chatter all day long was about serial numbers, wiring harnesses, carburetors, and memories of days gone by.

I thought about how the Model 110 had influenced the career of a former employee at our golf course – Emily Buelow. Her father was an engineer at

“ And of the old tractors, the **two-cylinder Johnny Poppers** are about the favorite, a tough confession for a Ford and Oliver man like me.

a self-scouring plow out of a broken saw blade. It was just what pioneer Midwest farmers needed to turn over the sticky prairie soils.

My interest in John and his life have taken me to Middlebury, Vermont where he had a blacksmith shop, and to Grand Detour, Illinois, on the shore of a big bend on the Rock River. He lived and worked there for a number of years before moving to Moline,

to build the Van Brunt grain drills. It was a successful line of Ag seeding machinery, and Deere & Co. bought it in 1911 and put their name on the seeders. It has operated continuously since then under Deere's name.

In 1962 Deere execs saw the potential in the lawn mower/garden tractor market and designed one of their own. They called it the Model 110 and started production in 1963.