TALK TURF

Official publication of the Wisconsin Sports Turf Managers Association

VOLUME 21 ISSUE 1| SPRING 2020

PREPARING FOR SPRING

WSTMA WINTER MEETING RECAP

We had a great day and turnout for our WSTMA Winter Educational Conference at Timber Rattlers Stadium in Appleton. To begin with, we'd like to give a huge thanks to our hosts, Field Manager Kyle Slaton and the Clubhouse Staff at Timber Rattlers Stadium. We were well taken care of!

Over 100 attendees were presented with some great information and networking. As the morning sessions were focused on being proactive with your management of your facilities in a responsible way, the later sessions were a look at how turf managers operate on a day-to-day basis. We truly hope the two "round table" talks were informative and there was something you took with you from them.

We started off with the Board of Directors reorganization. Scott Johnson of the LaCrosse School District has fulfilled his term and has stepped down from the Board. Thank you to Scott for his service to the Association. Taking his spot is Ryan Rusch from Plymouth School District. Ryan brings with him a long career in the Turf Industry, spending time in the golf world at Whistling Straits, Blackwolf Run and also at North Shore CC. Please welcome Ryan!

We next moved to a presentation by Josh LePine, Superintendent at Maple Bluff C.C. in Madison and President of the Wisconsin Golf Course Superintendents Association. be explaining their project in developing a "Best Management Practices Handbook" for Golf Courses initiative. This is something the National GCSAA is mandating for all of the local organizations. This will set parameters for turf management for golf courses throughout the nation. As the pressure from local communities' and state legislators gets more intense regarding water usage, pesticide usage, and all the other "questionable" practices used in golf course management, the GCSAA wants golf courses to adhere to solid management practices using IPM and environmentally sound processes.

We want sports turf managers to be the best stewards of the environment we can be and still produce great playing conditions and beautiful fields for our athletes.

Moving on, Dr.Paul Koch, Professor at the University of Wisconsin presented "Developing A Science Based Pesticide Program" and also spoke on the research they have done regarding the Glyphosate issue. Regarding developing plans for pesticide programs, an important piece he focused on was being responsible in developing AND putting programs into action.

He also gave us insight on the true research that has been motivating the glyphosate debate and scare. Dr Koch then let us know what other what options we have for vegetation control, and insight on moving forward. He also touched on pesticide usage and how to manage those challenges.

Next up, we had a Panel discussion moderated by Josh Viet

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Wisconsin SportsTurf Managers Association

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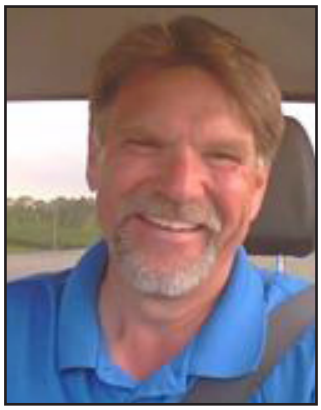
PRESIDENT'S MESSAGE



Greetings All,

I'll start by hoping you and your loved ones are all well. I'm coming to you hopefully as a distraction from these uncertain times. I have no sage advice and won't throw any profound news articles or opinions at you. We all have our own feelings and they are as diverse as each persons' situation. My mantra as of late is that let's just pull together as human beings and get through this.

Let's talk turf….

Last Fall, many turf managers were wondering how their fields would possibly recover from a short, wet season and be ready for the Spring season that starts the minute (or before) the snow is gone. Don't take this the wrong way as I'm not minimizing the current situation, but you could look at the lack of Spring sports as a ray of light in these dark times for our sports fields. I know many fields needed a lot of work and most importantly, TIME, to be in shape for the pounding of spring sports. So those of you who are allowed to work, here is a chance to get some of the work done.

We will be adding another exciting trial to our research this season. As I mentioned in the last "Fertilizer from the Presidents' Desk" Dr. Soldat and the UW Staff will look at Plant Growth Regulator usage on KBG, PRG, and TTTF and the effects of traffic on those treated areas.

Here is a little backstory on the addition to our research...

The golf world has been watching for quite awhile the testing of a product called PoaCure. This is potentially the best Annual Bluegrass control product to come around to date. In my day job in the turf world, I have watched it with amazement as it was tested at various golf sites. As it has recently been registered in Wisconsin, I contacted Dr. Soldat and the PoaCure Research and Development Representative and got a little more input regarding the product and it's potential use in the sports turf world. To shorten the story, it is labeled for KBG, PRG and TTTF but NOT Sports Turf.

So, Dr. Soldat is now going to do a research study for the WSTMA testing the product under traffic conditions and seeding intervals around use of the product. We are really excited about the prospect of bringing this research to our members and potentially beyond. Hopefully this can be a piece of the puzzle to expand labeling to our part of the industry.

I want to invite you to go on the website and share your thoughts, ideas, or just vent on the "Member Forum" page. This is a perfect time to connect with your comrades in the Sports turf world. Remember, we are all in this together! I truly believe, from what I see at our Turf Conferences and the Turf Managers I see on a daily basis that there is unity in this bunch, take advantage of it!!

I hope I have distracted for a few minutes and gave you something else to think about in a positive manner.

Be well and may all your roots be healthy!

Michael Krupke

Wisconsin SportsTurf Managers Association

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A Message from New Sports Turf Manager Association President Jimmy Simpson

Webster's Dictionary defines evolution in many ways, but the definition that really resonates with where I believe STMA is today, states "a process of gradual and relatively peaceful social, political and economic advance." Since the creation of STMA, we have been in a constant state of change in order to work toward the mission of advancing professionalism in sports field management and safety through education, awareness programs and industry development. Sometimes large and noticeable changes are required, while other times it is small, yet very effective, changes that move us closer to achieving our mission. But all the while, the STMA is working continuously to educate people both inside and outside of our industry about the valuable work being done by our members. Our association has had many accomplishments of which we can be proud, but the one that stands out to me most is the ability of our peers to adapt and evolve from the singular sports field manager-only focus to full-scale event managers. This evolution hasn't happened overnight, but is a process in which everyone has given input and is continually working to change. Every day, our profession presents us with new challenges that we didn't expect or an event that "has to happen." We have evolved from the days of "stay off my grass" and have become the "can do" group. This positive attitude toward change and challenging situations is what defines us. We can accomplish anything when collaborating with others. Our profession has become what I like to term "memory makers." We are fortunate to play an instrumental role in making memories for others, whether they are World Series champions or Little League champions; people attending concerts, car shows and festivals; or simply those enjoying daily open play at the facilities we maintain. We put smiles on people's faces every day, and the work we do every day creates memories for many people beyond just the players on the field. Most of the people who encounter our work will never actually get to physically interact with the safe surface we create for the players, but they will always remember it. Change is inevitable, but how we react to those changes and work with others will determine the continued evolution of our profession.

SFM Collaborating in change together, Jimmy Simpson, CSFM

NEW HERBICIDES FOR THE NEW YEAR

By Devon Carroll and Jim Brosnan, Ph.D. | Republished from Sports Field Management Online March 2020

A new year often brings new technology to the turfgrass industry, and 2020 is no exception. Five new herbicides will be available to field managers in 2020, including Coastal, Cheetah Pro, Crew, GameOn and Vexis. These products contain active ingredients from six mode-of-action groups with several combined in pre-packaged mixtures. Mode-of-action groups indicate the physiological mechanism a herbicide uses to control weeds, and can be easily identified on product labeling using the Weed Science Society of America (WSSA) group numbering system (e.g., dithiopyr [the active ingredient in Dimension] belongs to WSSA Group 3).

These new herbicides have been researched for several years at land-grant universities throughout the United States to determine how they can be optimally used to control weeds of cool- and warm-season turfgrass while minimizing environmental impact. This article will outline attributes of these new herbicides to aid athletic field managers considering incorporating them into their weed management programs.

Coastal

Coastal is a new herbicide mixture from Sipcam Agro that contains prodiamine (WSSA Group 3), imazaquin (WSSA Group 2), and simazine (WSSA Group 5). This mixture can be applied preemergence to control many grassy and broadleaf weeds including crabgrass (Digitaria spp), annual bluegrass (Poa annua), and goosegrass (Eleusine indica) on bermudagrass (Cynodon spp.) and zoysiagrass (Zoysia spp.) playing surfaces. Additionally, Coastal offers early-postemergence control of several weed species. Depending on geography, Coastal should be applied between September 15 and May 31 at rates of 48 to 64 fl. oz./A. Coastal can hamper spring transition of warm-season turfgrasses. Therefore, use as turfgrass is emerging from dormancy is not recommended.

Cheetah Pro

Cheetah Pro is a new herbicide from NuFarm that offers an alternative to glyphosate on select weeds. Cheetah Pro contains 24.5 percent glufosinate (WSSA Group 10), the same active ingredient in Finale. However, Finale (11.3 percent glufosinate) is less concentrated than Cheetah Pro, so turfgrass managers must carefully read product labeling to identify optimal Cheetah Pro application rates. As a non-selective herbicide, Cheetah Pro can be applied to dormant bermudagrass at rates of 24 to 82 fl. oz./A based on weed size and growth stage. The herbicide is labeled for control of nearly 200 weed species including annual bluegrass and other grasses that may be considered weeds in mixed turfgrass stands. Research at the University of Tennessee has shown that herbicides containing glufosinate can control certain populations of annual bluegrass that have evolved resistance to glyphosate. Sequential applications of Cheetah Pro may be required to control certain weed species and can be applied as early as five days after initial treatment.

Crew

Crew is a new herbicide mixture from Corteva Agriscience that contains isoxaben (WSSA Group 21) and dithiopyr (WSSA Group 3) labeled for preemergence control of many broadleaf and grassy weeds including crabgrass, goosegrass and annual bluegrass. Additionally, Crew can be used for postemergence control of newly emerged crabgrass through the one-tiller growth stage. Crew is labeled for use on most turfgrass species used on athletic fields including bermudagrass, zoysiagrass, seashore paspalum (Paspalum vaginatum), Kentucky bluegrass (Poa pratensis), perennial ryegrass (Lolium perenne), and tall fescue (Festuca arundinacea). However, the herbicide should not be applied to fields that have been sodded, sprigged or reseeded until they are fully established. Additionally, sports field managers need to delay seeding or sodding fields treated with Crew until 8 to 12 weeks after application. Crew is labeled for use at 150 to 200 lbs./A.

GameOn

Another new Corteva Agriscience product, GameOn, is a mixture of 2,4-D choline, fluroxypyr, and halauxifen-methyl (Arylex™). All of these active ingredients are synthetic auxin herbicides (WSSA Group 4) with efficacy for postemergence control of broadleaf weeds such as plantain (Plantago spp.), clover (Trifolium spp.), and dandelion (Taraxacum officinale). Similar to Crew, GameOn is labeled for most turfgrass species used on athletic fields including Kentucky bluegrass, perennial ryegrass, and tall fescue (Festuca arundinacea). GameOn can be used on bermudagrass athletic fields;

however, the height of cut must be greater than 0.5 inches and application rate is capped at 3 fl. oz./A (compared to 4 fl. oz./A on other grasses). GameOn is rainfast within two hours of application and, unlike other 2,4-D containing herbicide mixtures, the product is formulated to reduce odor. Athletic field managers should be advised that GameOn should not be applied to bermudagrass when breaking dormancy in the spring. Additionally, seeding fields treated with GameOn should be delayed for a minimum of three weeks after application. Lastly, turfgrass managers should be aware that the product is not labeled for use on residential turf.

Vexis

Vexis is a new granular herbicide from PBI Gordon that contains the acetolactate synthase inhibiting herbicide pyrimisulfan (WSSA Group 2). Vexis is labeled for postemergence control of sedge (Cyperus spp.), kyllinga (Kyllinga spp.), rush (Juncus spp.), and select broadleaf weeds on nearly all cool- and warm-season turfgrasses used for athletic fields. Initially, Vexis will be available to athletic field managers in a 2-pound shaker can designed for spot treating individual weeds (rather than broadcasting across an entire field). One shaker can supplies enough product to treat an area as large as 500 square feet. Athletic field managers must delay seeding or sodding for three weeks after Vexis treatment; when using the product on newly established turfgrass a three-week delay is required as well. Unlike most granular herbicides, Vexis can be applied to wet or dry foliage, but will require irrigation (or rainfall) within 48 hours after application.

Devon Carroll is a Plant, Soil, and Environmental Science Ph.D. student focused in turfgrass weed science in the Department of Plant Sciences at The University of Tennessee, Knoxville.

Jim Brosnan, Ph.D., is a professor in the Plant Sciences Department at the University of Tennessee (UT) and leader of UT's new Weed Diagnostics Center. His research focuses on effective and economical strategies for broadleaf and grassy weed control in various turfgrass systems, including golf courses, athletic fields, and residential landscapes.

Editor's Note: This overview is intended as an informational look at what is new on the market for 2020, and does not imply an endorsement of any particular product(s) by the authors or SportsField Management.

WSTMA Scholarship Winner Announced

Nick Quarberg is a Senior at the University of Wisconsin-Platteville studying Environmental Horticulture and minoring in Business Administration. Upon his graduation in May 2020, he will start his career as the Assistant Grounds Manager for the Wisconsin Timber Rattlers.

Coming to college, I never thought my passion for landscaping and sports would influence me to pursue a major change and would open a door to a future career. From a young age, I have always enjoyed working outside and taking care of my parent's lawn. I began college as a Civil Engineer, and quickly discovered it was not something I could do for the rest of my life. I was not even aware Platteville had a horticulture program, but after making the switch, I knew it was the right fit for me and have not looked back since.

Watching the Rose Bowl on New Year's Day every year was what hooked me on turf management. I can always remember thinking about what it would be like to mow the grass and get the field ready for "The Granddaddy of Them All." Additionally, growing up I can remember always wanting to get to my seats early to watch the Grounds Crew prep the field at Miller Park. I thought it was so cool to watch all the meticulous things they did, and sometimes even thought it was crazy how much attention to detail there was. As I got older and moved closer to starting college, I never thought I would have the opportunity to work on a grounds crew, let alone at the professional level.

I had my first opportunity to run a baseball field for the Wisconsin Rapids Rafters, a Northwoods League Team, in the summer of 2018. This experience gave me a great foundation and showed me first-hand how demanding the turf management industry is. In the summer of 2019, I wanted to be challenged more and sought an internship with a professional team. Naturally, the Brewers were my first choice as I have lived in Wisconsin my whole life and am an avid fan of Wisconsin sports teams. In Milwaukee, I was pushed to learn and had the opportunity to try many new tasks. It was a dream come true and I am grateful for what I accomplished and learned under the great leaders in Milwaukee. Additionally, I am thankful for everyone who has helped me get to where I am today, and the many industry professionals I have met that have been passionate enough to teach me more about what the job entails. I look forward to using my skills this summer with the Timber Rattlers.

WSTMA President Michael Krupke and scholarship winner Nick Quarberg.

Even though Platteville does not have a specific program devoted to turf management, I believe I have been given the same opportunities to learn and develop as other students in the industry through my hands-on learning experiences in labs and through my internships. In addition to my classwork and internships, while attending Platteville I have also had the opportunity to work for the grounds department on campus. This job has given me a different perspective and has taught me the importance of working in a team setting and how vital that is to become successful.

As I wrap up my college career, I am glad I have had so many opportunities to challenge myself to learn more. I look forward to beginning my career as a turf manager and hope to continue to learn for the rest of my career.

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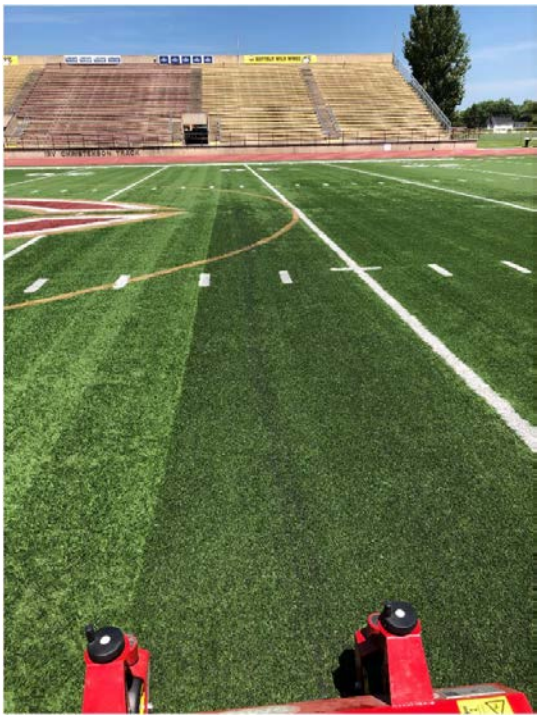

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SYNTHETIC TURF COUNCIL CERTIFIED
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Conference continued from front

addressing the challenges of managing sports turf during the short growing seasons we have been experiencing lately and how managers have adapted. Panel members Zak Peterson of the Milwaukee Brewers, Ryan Rusch of Plymouth School District and Kyle Slaton of the Timber Rattlers gave their input and some the practices they implemented along with input from the attendees.

Next, we had another Panel discussion on field painting hosted by Michael Krupke. We all know the time this process takes up in your weekly schedules, and efficiency is a MUST!!

Panel members Ron Novinska of Oregon Schools, Mike Miller from UW Whitewater and Rex Zemke and Staff of Wausau Schools answered questions, explained their painting processes, shared tips and even showed equipment they used. Finally, our host Kyle Slaton, Head Groundkeeper of the Timber Rattlers gave us a peak at his field management program in "Planning For Success at Neuroscience Group Field. He spoke on everything from field history, managing infields, turf, and high expectations. Nicely done Kyle!

We would also like to congratulate Nick Quarberg, recipient of the Roy Zehren Student Scholarship. We'd like to thank all involved with the day, attendees, presenters, vendors and hosts! If you couldn't make it, we are rotating the Conferences around the State so hopefully, location becomes less of a deterrent to you joining us.

SAY HELLO...

We're highlighting new WSTMA Board Member Randy Rusch, Plymouth Joint School District.

WHAT FIRST GOT YOUR INTEREST IN TURF MANAGEMENT?

My interest in turf management began early when I was a kid and mowed people's lawn for summer job. Also, I had an uncle that was a golf course superintendent and a cousin that worked on golf course grounds who is now a director of golf operations in Arizona.

WHAT IS THE BIGGEST CHALLENGE IN MAINTAINING THE PLYMOUTH JOINT SCHOOL DISTRICT?

Trying to work around all the districts activities (recess, gym classes, and practices) at the five schools and still getting everything done. Yet making everything look the best like it was professional facility with less people and too small mowing equipment.

WHAT DO YOU LIKE BEST ABOUT YOUR JOB?

Working and preparing for Professional golf tournaments at Whistling Straits.

Being able to show case the athletic fields with hosting bunch sectional finals soccer games and football playoff games.

Also getting 20-30 high school football players to come help do in house project by leveling and re-sodding a big section of football field where it sank from drain settling couple months before season started.

WHAT HAS BEEN THE MOST MEMORABLE MOMENT OF YOUR CAREER?

Working and preparing for professional golf tournaments at Whistling Straits.

Being able to show case the athletic fields with hosting bunch sectional finals soccer games and football playoff games.

Also getting 20-30 high school football players to come help do in house project by leveling and re-sodding a big section of football field where it sank from drain settling couple months before season started**.**

WHO HAS BEEN YOUR BIGGEST INFLUENCES/MENTORS?

My biggest influence on me for my professional career would be my former Golf Course Superintendent David Swift who I learned under at Whistling Straits who has now moved on to Minnehaha Country Club in Sioux Falls, SD. He taught me all there is to know about turf and how to be hands on. He take me aside to show me the ins and outs of daily planning and thought process of how to be a successful turf manager and to be one step ahead of the game. He also taught me how to deal with Mother Nature because you can never win with her. You just need to able to beat the punches she gives you to be successful. Without his knowledge and skills he taught me I wouldn't have been prepared or successful in the turf industry like I'm at today.

WHEN YOU'RE NOT WORKING, WHAT DO YOU LIKE TO DO?

I absolutely love the outdoors and any chance I can get to hunt, fish, and go boating. And going up north to cabin in Forest County. I also like to golf and play softball in the summer time.

IF YOU WERE NOT IN THE TURF INDUSTRY, WHAT WOULD YOU WANT TO DO?

I would probably want to be a PE Teacher at either elementary or high school.

DEVELOPING AND COMMUNICATING A SCIENCE-BASED PEST MANAGEMENT PLAN

Paul Koch, PhD, Assistant Professor | University of Wisconsin – Madison

Pesticides including herbicides, insecticides, and fungicides are important tools for managing pests in sports turf. While there has always been scrutiny over pesticide use in turfgrass and other sites, that scrutiny has significantly increased in recent years in response to litigation surrounding the cancer-causing effects of glyphosate. This increased scrutiny has led many groups and communities across the state, region, and country to impose severe restrictions and some outright bans on synthetic pesticide use on turfgrass sites, including sports turf. This puts sports turf managers in the difficult position of trying to produce high quality, safe playing surfaces with limited financial resources and without some of their most effective tools. Below I have outlined some of what we know about pesticide toxicology and strategies that you can use to build and communicate an effective, science-based pest management plan for your sports turf facility.

Does Roundup cause cancer?

Pesticide toxicology is a highly complex topic that encompasses different health impacts including acute injuries like nausea and vomiting, birth defects, neurological disorders like Alzheimer's disease, and a host of environmental impacts from pollinators to aquatic organisms to birds. However, recent concern has focused on cancer impacts so we'll focus our efforts there. In addition, most attention has been on glyphosate (Roundup) so we'll use that pesticide as our case study.

Before talking about glyphosate specifically, it's important to note that we know A LOT about pesticides before they come on to the market…much more so than many other chemicals like additives into manufacturing products or even many health and beauty products. That's because a pesticide manufacturer spends approximately $300 million and around 10 years to bring a new product from discovery to market, and much of that time and expense goes to undergoing a series of environmental and human health tests mandated by the Environmental Protection Agency (EPA). While these tests don't account for every potential negative impact a pesticide can have, they do provide critical information to the EPA to help regulate how much pesticide can go into the environment before human or environmental harm is observed.

Glyphosate is the most widely used pesticide in the world with over 250 million pounds applied annually in just the U.S., though approximately 90% of that is used on agricultural sites. With such widespread use comes intense scrutiny, and a search of 'glyphosate' on the PubMed.gov research database shows that there are currently (as of March 2020) 3,434 studies related to glyphosate in the database. These studies show a range of potential glyphosate effects, with many studies reporting no effect of glyphosate on cancer development and others a significant effect. Fortunately, governmental groups from the U.S. and abroad sift through this research and use their own testing to provide clarity on the risk that glyphosate poses. The U.S. EPA has repeatedly stated that glyphosate is not likely to be carcinogenic to humans, and reiterated this point again in early 2020. Even the European Food Safety Authority (EFSA), the European counterpart to the EPA and a group normally much more restrictive on pesticide use than the EPA, stated in 2015 that glyphosate is unlikely to be carcinogenic to humans. In fact, of the major global organizations that have investigated the cancer-causing properties of glyphosate, only the International Agency for Research on Cancer (IARC) has classified glyphosate as a probable carcinogen.

So Roundup and other pesticides are totally safe?

This is also not true. As mentioned above, we don't (and will never) know every possible negative impact of a particular pesticide so it's best to always treat pesticides with care and prevent exposure to the greatest extent possible. It's also possible for the science surrounding a particular chemical to change as new tests and new data becomes available. For instance, DDT was a highly effective and widely used insecticide in the 1940's and 50's because of it's low toxicity to humans, but later testing found that it had devastating effects on bird populations and bald eagles in particular. More recently, neonicotinoid insecticides have become hugely popular on the turf market for white grub control because of their lower human toxicity compared to older organophosphate products, but their potential negative impact on pollinator populations has put them under the microscope in recent years. The EPA takes great lengths to ensure that pesticides available on the market pose a minimal risk to human and environmental health, but they should still be used with care to limit unnecessary exposure.

What alternatives exist?

Many groups and communities still want to eliminate the use of glyphosate and other synthetic pesticides despite the

conclusions of governmental scientific groups. In many of these cases, as the manager of the facilities, it's your job to present potential alternatives to using glyphosate (or other synthetic pesticides) and the pros and cons of those alternatives. In 2019 my program tested one synthetic and three organic alternatives to glyphosate at the OJ Noer Turfgrass Research Facility in Madison (Table 1). What we observed is that organic certified products like Homeplate, Axxe, and acetic acid provide a rapid burndown of the plant material but don't translocate in the plant, which means the weeds often recover in a matter of weeks and require numerous reapplications (Figure 1 and Figure 2). The organic products are also more expensive relative to glyphosate even before the reapplications are accounted for, making their overall use significantly more expensive than glyphosate in both product and labor costs (Table 1). Bottom line, it's possible to use other non-selective herbicides to help suppress weeds, but they will cost more and be usually be less effective. This kind information is critical to provide to the group or community leaders to consider when making their decision. For the full report on our 'Roundup Alternatives' demonstration please visit the link at the end of the article, as well as links to studies conducted in California and North Carolina that found very similar results.

Recommendations for building and communicating your plan

1. See things from their point of view. As someone who works with pesticides and understands their value, you have a different perspective than someone who just sees the end result of your work. In addition, there is a tremendous amount of material online that can scare even the most reasonable parent who is just concerned about their kid's safety. Knowing that in most cases these groups aren't out to make your life miserable usually makes it easier to set up a productive and informative conversation from the start.

2. Stick to the science. As I just mentioned, there is a tremendous amount of information online about human and environmental health effects of pesticide exposure. It's hard for even a seasoned expert to sift through the material and find information that isn't either biased for or against pesticide usage or to find material that isn't overly technical and hard to understand. Most anti-pesticide groups use emotional messages weakly grounded in science to make their case to eliminate synthetic pesticides. It's critically important to stick to the science when responding, and I believe the easiest way to do that is to provide fact sheets from science-based groups without an agenda. In my opinion the best group to obtain science-based pesticide information from is the National Pesticide Information Center (NPIC). The NPIC is a collaboration between the EPA and Oregon State University, and they have easy-to-understand fact sheets explaining the concerns surrounding glyphosate, 2,4-D, and a host of other commonly used pesticides. The NPIC is my go-to site for providing science-based information on pesticides to public groups and I highly recommend visiting their website (link provided at the end of the article) for more information.

3. Develop and share your integrated pest management plan. If you don't have an integrated pest management (IPM) plan, then making one should be a priority. The central premise of IPM is using a holistic approach to pest management that implements cultural practices to lower pest pressure and then applying pesticides only when needed based on the biology of the pest(s) you're trying to control. For every pesticide application you're planning to make, you should have listed out the pests you're targeting and how you're planning to schedule the application to maximize impact. This should NOT just be because it's a certain day on the calendar, but rather be based on environmental factors like soil temperature, growing degree days, use of a predictive model, or on scouting of the pest. Most of the cultural practices used in your IPM plan are probably already in your normal maintenance schedule, they just need to be talked about in a way that focuses on pest management. For instance, the amount of fertilizer you apply can be talked about as a way to increase plant density and naturally crowd out weed pests. In addition, core aerification can be talked about as a way to increase root health, which allows the plant to naturally fend off white grub and root disease damage. Many IPM manuals exist online, but one of the most detailed and extensive IPM manuals is from the University of Maryland and has been linked to at the end of this article.

4. Be open about your pesticide applications and emphasize your strategies to minimize exposure. The public thinks you spray pesticides WAY more than you actually do. So it usually benefits you to keep detailed records of your pesticide applications and share them with people when they inquire about them. In your plan, state why each application is being made and what efforts are being made to reduce exposure and mitigate potential negative impacts of using this product. This should ALWAYS include reading and following the pesticide label, wearing proper PPE, and following proper posting laws to keep people off a treated area for several hours until the product dries or for 72 hours post application on public school property. An example pesticide record form developed by the UW-Madison Pesticide Applicator

Training Program is available for download online and has been linked to at the end of this article.

5. Choose the most effective products and those that have the lowest toxicity levels. One of the most wasteful things a turfgrass manager can do is choose an ineffective pesticide. This wastes money and increases pesticide exposure without solving the problem. There are numerous tools for choosing effective products, but one of the easiest to use is the University of Wisconsin Pest Management Mobile website (Figure 3). The website link is provided at the end of the article and the site provides a comprehensive efficacy rating of many turfgrass herbicides and fungicides based on university research from around the country. In addition to limiting potential exposure, choose products that have the lowest toxicity whenever possible. This includes only using products with a signal word of Caution (the lowest toxicity) and only using products that have not been designated as highly toxic to bees. The signal word is always on the front page of the label in big, bold letters and if a product is known to be highly toxic to bees it will contain a statement in the environmental hazards section of the label along with a 'bee icon' (Figure 4). Note that many popular neonicotinoid grub control products are labeled as highly toxic to bees. It's also important to recognize that certified organic products are not necessarily safer then synthetic products. For example, the certified organic non-selective herbicide Homeplate has a much more extensive PPE requirement compared to Roundup, indicating that Homeplate likely has a higher acute dermal toxicity.

6. Be honest about the alternatives. As we discussed above, in the end the decision makers might not be swayed by the science supporting responsible pesticide use and require you to operate without the use of synthetic pesticides. At this point it's important to remember that it's not your turfgrass, and to develop an honest plan about the potential benefits, costs, and limitations of 'going organic' or other pesticide-free plans. This may include higher product costs, higher labor costs, and the potential for reduced turf quality if increased funds aren't provided to match the higher maintenance costs. Request that a system be put in place to log complaints from the public that may come in as a result of any maintenance changes in the event the decision is revisited after one or more years.

The scrutiny surrounding pesticide usage will only increase in future years, and even the greatest 'grass grower' won't be very effective as a sports turf manager if he or she can't communicate their management plan in an effective and science-based manner. With that said, I also realize every situation is unique and the general recommendations provided above may not completely suit your needs. If that's the case, don't hesitate to call me at 680-262-6531 or email me at plkoch@wisc.edu and I would be happy to talk about possible solutions for your particular situation.

Additional Resources:

- University of Wisconsin Turf Pest Management Mobile (https://turfpests.wisc.edu/)
- National Pesticide Information Center (http://www.npic.orst.edu/)
- University of Maryland IPM Manual (https://mda.maryland.gov/plants-pests/Documents/ipmschlawns.pdf)
- University of Wisconsin Pesticide Record Form (https://fyi.extension.wisc.edu/pat/files/2018/01/recordkeeping-form.pdf)
- University of Wisconsin Roundup Alternatives (https://tdl.wisc.edu/wp-content/blogs.dir/42/files/Interactive%20Pages/2019_Summer/Reports/KochRoundupAlternatives_FieldDay2019.pdf)
- University of California Extension Roundup Alternatives (https://issuu.com/capcaadviser/docs/202002_capca_adv_feb2020_web/24)
- North Carolina State University Roundup Alteratives (https://content.ces.ncsu.edu/are-there-alternatives-to-glyphosate-for-weed-control-in-landscapes)

Table 1. Comparison of products tested as Roundup Alternatives at the University of Wisconsin in 2019.

Product	Active Ingredient	Rate/Concentration	OMRI Organic Certified	Cost per gallon (USD)
Roundup Pro Max	Glyphosate	2 fl oz/gal	No	$40.00
Ranger Pro	Glyphosate	3 fl oz/gal	No	$15.00
Cheetah Pro	Glufosinate	3 fl oz/gal	No	$73.00
Homeplate	Caprylic Acid + Capric Acid	8 fl oz/gal	Yes	$89.00
Axxe	Ammoniated pelargonic salts	16 fl oz/gal	Yes	$46.00
WeedPharm	Acetic Acid	20% acetic acid	Yes	$47.00

Figure 1. Plot layout of the Roundup Alternatives Demonstration conducted in Madison, WI in 2019.

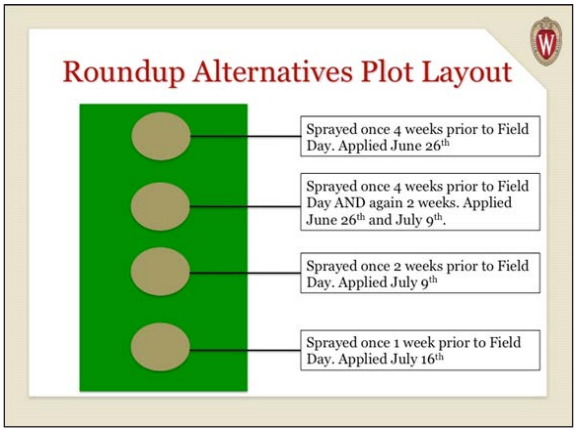


Figure 2. Results of two synthetic (Prosecutor and Cheetah) and two certified organic (Homeplate and Axxe) products for non-selective weed control at the OJ Noer Turfgrass Research Facility on July 23rd, 2019. See Figure 1 for plot layout.

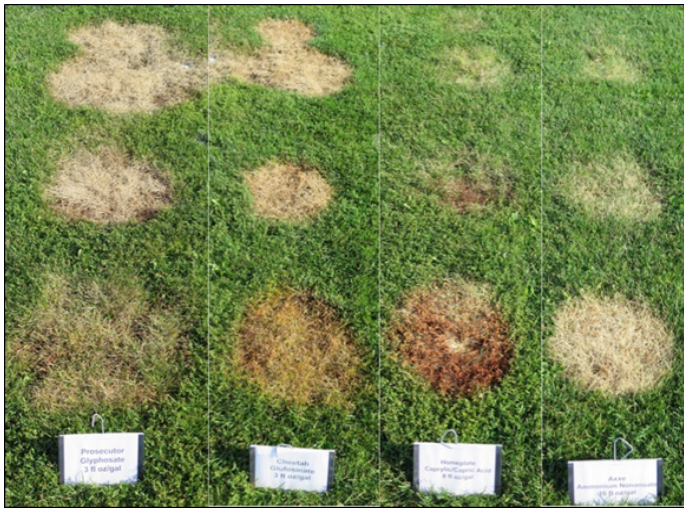


Figure 3. Homepage of the University of Wisconsin's Turf Pest Management Mobile website, which includes a tremendous amount of information on product efficacy against Wisconsin turfgrass pests in an easy-to-use searchable format.

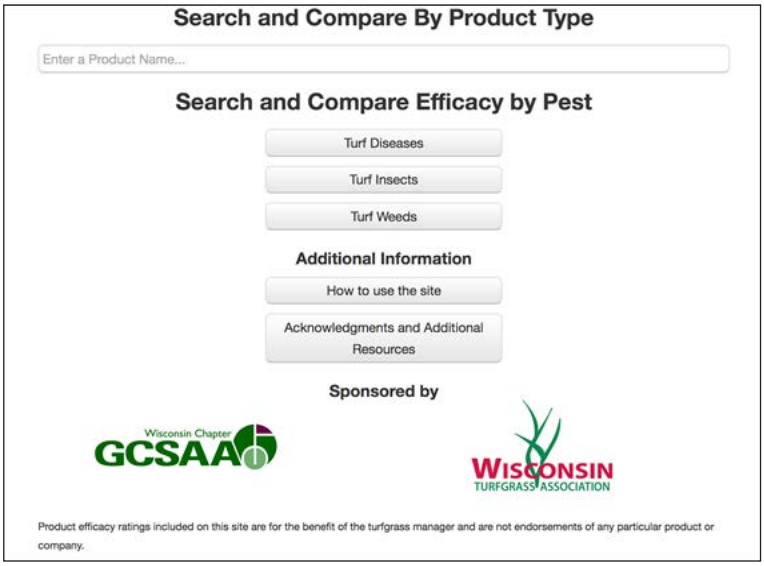
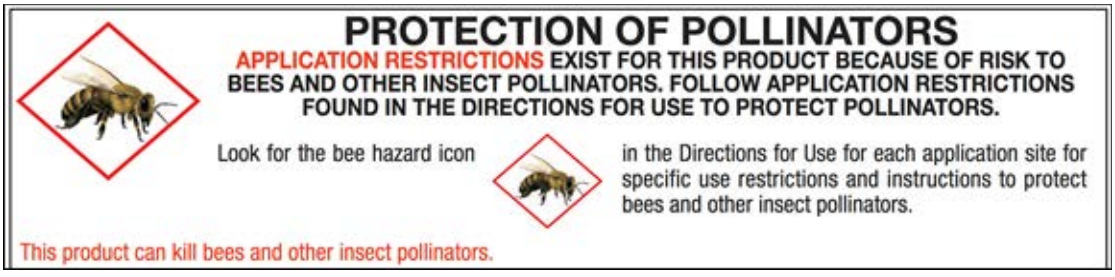


Figure 4. Pesticides that have been identified as highly toxic to bees should be used with extreme caution or avoided entirely. The bee icon pictured here will be present in the environmental hazards section of a pesticide label if that product is highly toxic to bees.



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