

# Hole Notes

The Official Publication of the MGCSA

## Native Grasses as Food For Pollinators

Vol. 53, No. 2 March 2018



# Thank You 2018 Annual MGCSA Sponsors

*Platinum Podium and Event Sponsor*

**syngenta**

*Gold Tee Prize and Event Sponsors*

**WINFIELD<sup>®</sup>  
UNITED**



**Plaisted  
Companies**  
INCORPORATED



Science For A Better Life



*Silver Tee Sign Event Sponsors*



VERSATILE VEHICLES

*Superior Tech Products*



*For the Strongest Turf*



TWIN CITY SEED COMPANY.



**TurfVerks**



Need tools fast?

Same day shipping on over 80 tools and accessories at [Miltona.com](https://www.miltona.com)



800-456-4351

***On The Cover:  
Native grasses may  
be your next great  
opportunity to  
support pollinators.***

*photo CenUSA*

## ***Amazing Picture Spreads:***

Monarch Joint Venture pages 18 - 19  
North West Outreach, Crookston page 31  
MTI Day On The Hill Event page 35  
2018 Day On The Hill page 36  
Assistant Pro Forum pages 38 - 39

## **Mark Your Calendars**

**March 22, EM Small Engine Program at MTI, Brooklyn Center**

**May 9 Affiliate Appreciation, Highland National, St. Paul, Host Jamie Bezanson**

**May 14 Badgerland Exposure Golf, Cumberland GC, Host Bryan Tahtinen**

**May 14 Understanding Mower Technology, Olympic Hills Golf Club  
Host Jake Schmitz**







#### EDITORIAL COMMITTEE

JAMIE BEZANSON  
JAMIE\_HONDA@YAHOO.COM  
JESSE TRCKA  
JATRCKA@WAYZATACC.COM  
LIZA CHMIELEWSKI  
LIZA@GERTENS.COM  
TERRY NEGEN  
TERRY@MARSHALLGOLFCLUB.COM

# CONTENTS

Vol. 53, No. 2 March 2018

## Feature Articles:

Native Grasses for Pollinators	pages 20 - 25
By Dianne M. Narem and Mary H. Meyer, UMN Extension	
thick-skinned: Jarod Hoyle, Kansas State	pages 26 - 29
By Matt Cavanaugh, Assistant Superintendent Rush Creek GC	
Nutrient Profile: Iron	pages 30 - 37
By Dr. Doug Slodat, UW Madison	
Plant Protectant Check Plots	pages 40 - 41
By USGA Case Study	

## Monthly Columns:

Presidential Perspective	pages 6 - 9
By Brandon Schindele	
In Bounds	pages 10 - 12
By Jack MacKenzie, CGCS	
Within the Leather	pages 42 - 43
By Michael Radermacher	

**Hole Notes** (ISSN 108-27994) is digitally published monthly except bimonthly in November/December and January/February by the Minnesota Golf Course Superintendents' Association, 10050 204th Street North, Forest Lake, MN 55025. Jack MacKenzie CGCS publisher. Please send any address changes, articles for publication, advertising and concerns to [jack@mgcsa.org](mailto:jack@mgcsa.org).

**HARTMAN**  
Golf Course Construction  
& Renovation

*Quality since 1971...*

Specializing in...  
Bunkers • Tees • Laser Leveling • Green Drainage • Irrigation • Design • Pump Station Upgrades

8099 Bavaria Rd.  
Victoria, MN 55386  
952.443.2990

[info@hartmancompanies.com](mailto:info@hartmancompanies.com)  
[www.hartmancompanies.com](http://www.hartmancompanies.com)





# Presidential Perspective

by Brandon Schindele, Superintendent Edina Country Club

Spring is on the doorstep!!! Hopefully by the time this issue of

Hole Notes reaches your computer, tablet, phone, or any device of your choosing, the majority of us will be venturing out onto the golf course to assess our turf conditions and will be making preparations for opening the courses throughout the state. As spring arrives I am sure most of you have the same fired up attitude of a season that can bring about trying new things, accomplishing new goals, starting and completing new projects or perhaps it is something as simple and understated as just making the course better than it was in the previous year. Taking on that issue can be easier said than done as we all provide conditions that get better each and every year and, at times, I believe we can be our own worst enemy in creating expectations for those that frequent our courses.

So how does the Board of Directors continue to provide “better conditions” for the membership of the MGCSA each year and continually improve? This is a question that I have asked myself over the last few months and how can we continually provide better value to your membership. Now all of us understand, working at a golf course, that you will never make everyone happy all the time and I think that goes the same for the MGCSA; everyone will not be happy all of the time, but we sure are going to try. With that being said here are some brief items that the Board of Directors has been working on or has accomplished in the last month or two in the hopes of continual improvement.

- We have adopted the GCSAA branding philosophy for the MGCSA logo. This creates continuity in instances such as National Golf Day and other events



that clearly shows we are a part of GCSAA. We still will have our logo that we are all familiar with and still use it on our website, at events, and just about everywhere you have seen it in the past. Chapters throughout the country are doing the same and it was time for us to follow suit. I was in the camp of never wanting to change our logo but understanding that we would not be losing it, and would still use it pretty much as we always had; helped me come around to adopting the GCSAA branded logo.

- The Board has agreed to send our Grass Roots Ambassadors to Washington DC annually for the National Golf Day which will be April 23rd through the 25th. This is an important cause to make sure we have voices in front of our Senators and Representatives at the Capitol on spreading the good story of golf. This year we will be sending Dave Calder, The Pines at Grandview Lodge, Aaron Johnson, CGCS, Dacotah Ridge Golf Club, Adam Lesmeister, Prestwick Golf Club, and Eric Ritter, CGCS, Wild Marsh Golf Course. We do have 3 other

Ambassadors in the association that are not attending this year, but I would like to recognize them as well for taking the time to volunteer. Justin Ellison, Oak Ridge Country Club, Scottie Hines, CGCS, Windsong Farm Golf Club, and Dave Kazmierczak, CGCS, Prestwick Golf Club. Thank you gentlemen for taking on this task. If you are interesting in being a Grassroots Ambassador information can be found on the GCSAA website or contact Jack Mackenzie or me.

- The Board has agreed to donate money back to the EIFG. This money is created from the interest of our investment accounts. The EIFG has given money to the MGCSA in various forms over the years to fund things such as the creation of our BMP programs and joint dollars towards some research projects that the MGCSA as deemed very important such as the joint Dollar Spot study with the University of Wisconsin. Every year the donation will be a recommendation put forth by the finance committee as a component of the budgeting process, and then final approval given by the



# Minnesota Chapter GCSAA

GOLF COURSE SUPERINTENDENTS ASSOCIATION OF AMERICA

Board of Directors. Giving back to the origins of where some crucial monies have come from is common sense and will pay dividends in the future if we ever need to “drink from that well” again.

- Day on the Hill occurred on March 9th and I want to thank all of the 42 participants that helped spread the good story of golf. Just about every representative and senator that we were able to meet with warmly received us, which amounted to 82 of them. In our circles, we all talk of the importance of water use, pesticide / fertilizer access, and what labor issues are going to be in the future. This is our chance to express the importance of these things to the people that vote and make decisions on this stuff. This is our livelihood, whether you

are a Superintendent, Assistant Superintendent, Equipment Manager, Vendor, Student, or in any way shape or form involved in this industry, the decisions made at the state capitol will directly affect you. We need your voice next year to help the game of golf. Please consider attending in March of 2019. We did endorse a Voluntary Salt Applicator Liability bill that very quickly will let applicators that attend some education and training reduce their liability on their property from accidents. This is common sense and will help reduce the amount of chloride that enters our waterways. Stay tuned to hear if this bill gets signed into law.

- The Assistant Superintendents had their professional education forum that included a variety



of speakers including: Jack MacKenzie, CGCS discussed advocacy, Shelia Finney, GCSAA, discussed the new Assistant Superintendent Certificates, Sam Bauer, U of MN, discussed member driven research, Bob Vavrek, USGA, discussed the US Open at Erin Hills, and Judd Duininck, Duininck Construction, discussed Bunker liners. There were almost 50 attendees this year with some bowling afterwards. I addressed the group before the educational line up started and stressed the importance of investing in yourself through education. No one will do this for you and you need to fight for that investment opportunity. I speak to enough Superintendents that express the opinion of, “my assistant(s) do not show any interest in attending these events so I am

not going to sign them up unless they ask me to do it!!” This is a WAKE UP CALL to every assistant that is reading this article, do not get left behind on furthering your education. Competition in the future is not going to get any easier in the job market so do everything you can to further your skillset. Will you get to attend everything you ask to? Maybe, but more than likely not, but how will you know if you don’t ask to attend? Take the initiative to be in charge of your future!! If you have ideas for future education please bring them forward to the Education Committee or me. That is all I have for now as it relates to the activities of the Board and the Association. I wish everyone luck as they assess their turf from a long winter and open the courses for play.







# In Bounds

by Jack MacKenzie, CGCS

If you have driven by White Bear Lake in the last decade, you have

watched the

water level of this metropolitan recreational destination fluctuate as weather impacts, a limited watershed and the potential of variable groundwater use has caused a big swing in the water mark. The jury is still out regarding the true cause of the anomaly. However, a judgment declared in August of 2017 placed the blame directly upon the Minnesota Department of Natural Resources. Although the DNR is pursuing an appeal, they must comply with the judge's ruling until any changes are made in the original declaration.

The indictment against the DNR isn't just a slap on the wrist, as serious accusations were presented during the trial that they, the DNR, were irresponsible in their role as the state's water management agency. The judgment is a significant precedent

that could have an impact across the state, not just in the five-mile radius of impact as delineated by the judge, and potentially cause a ripple effect through many industries.

The following italicized excerpts are from the judgement:

*The Court declares that the DNR's current and planned permitting of high capacity groundwater appropriations and management... violate:*

... B. *The Public Trust Doctrine, by:*

- 1) *Causing a continuing decline in the levels of both the Prairie du Chien Jordan Aquifer and of White Bear Lake that diminishes the size of the lake and its lakebed, and adversely impacts public uses of the lake; and*
- 2) *Failing to take remedial measures within its authority to protect White Bear Lake and the Prairie du Chien Aquifer, when it had knowledge that its actions in issuing and failing to manage high capacity groundwater pumping permits were adversely affecting the lake and aquifer.*



*Partial ruling:*

*... 3. The DNR is prohibited from issuing appropriation permits for new groundwater wells, or increasing appropriation amounts in existing groundwater permits, within a 5 mile radius of White Bear Lake until it has fully complied with the requirements of the above statutes.*

*To that end, it shall:*

*A) Review all existing groundwater appropriation permits within a 5-mile radius of White Bear Lake, analyzing them both individually, and cumulatively, to ensure compliance with the sustainability standard of M.S. §1030.287, subd. 5. The review will be completed within one year of the date of this order. The specific results of the analysis will be published in a public newspaper, in a form understandable to the general public.*  
*...furthermore...*

*....4. For groundwater permits within a 5-mile radius of White Bear Lake, the DNR shall comply with all the applicable provisions of M.S. § 1030.285, including:*

*D) Requiring that all existing*

*permits include an enforceable plan to phase down per capita residential water use to 75 gallons per day and total per capita water use to 90 gallons per day. The enactment of this requirement will be completed no later than 1 year from the date of this order.*

*...*

*F) Requiring that all groundwater permittees report annually to the DNR on collaborative efforts with other northeast metro communities to develop plans as described in (D), above.*

*...7. The DNR shall require that water supply plans include measurable conservation goals and shall evaluate compliance with water conservation requirements on all permits issued within the 5-mile radius of the lake.*

Following the ruling, the MGCSA contacted the DNR to learn about potential impacts on the local courses as well as long-term ramifications. Several emails and two meetings have brought the White Bear Lake Impact courses, Dellwood Country Club, Gem Lake Hills GC, White Bear Yacht Club, Oneka Ridge GC,

Applewood Hills GC, Loggers Trail GC, Stillwater Oaks GC, Goodrich GC and Indian Hills GC, have generated strong and progressive reactions. The time sensitive project is three fold:

1. Amend their current water appropriation permits to reflect a number closer to actual use. If this corrective practice had not been done in recent years, the courses agreed to calculate a ten-year average figure and add 30% as a buffer. This new number would be presented to the DNR as the amended appropriation.

\*\* It is interesting to note that almost every course could reduce their appropriation dramatically. Across the state, golf actually uses an average of 7.8 billion gallons annually, yet appropriations total over 13.8 BGA.

2. The courses would utilize the recently published Best Management Practices (BMPs) Water-Use Efficiency/Conservation Plan For Minnesota Golf Courses manual and associated worksheet to craft destination specific efficiency, conservation and drought management guidelines. \*\*\* It is interesting to note that the DNR presented the Manual to the group as a vetted industry template that they had

reviewed and will endorse.

3. The golf industry, with the help of the University of Minnesota, will define appropriate measurements of the water used as golf courses are not rated “per capita”.

Will this initiative bring White Bear Lake back to a water level acceptable by the lakeshore homeowners? I doubt it, as many will never be satisfied. High water brings wet basements!

However, this is a GIANT opportunity for the golf industry to set the bar for likely statewide mandates. We are the leaders when it comes to developing and implementing environmental stewardship programs, BMP initiatives and resource management concepts. Through your support we have been “at the table” for many years and now our hard work is coming to fruition. The Golf industry has a “back-pocket” plan in place for this situation and can easily comply with the DNR demands as the footwork has been done in advance of the mandate.

Kudos MGCSA for reading into the future and acting proactively.



Reelmaster 3555

**TORO**<sup>®</sup>

Performance you expect,  
in a size you didn't



4830 Azelia Ave. N Suite 100  
Brooklyn Center, MN 55429

Tel. 763-592-5600  
Fax: 763-592-5700  
[www.mtidistributing.com](http://www.mtidistributing.com)



# ***2018 Legacy Scholarships***

## ***Deadline for Application:***

### ***June 1st, 2018***

**The Program:** The Minnesota Golf Course Superintendents' Association offers a scholarship program designed to assist children and grandchildren of Class AA, A, B, C, D, EM, Associate and Affiliate members. The MGCSA provides scholarships to students attending college or vocational programs at any accredited post-secondary institution. The program is independently managed by Scholarship America, a national non-profit student aid service organization. Awards will be granted without regard to race, color, creed, religion, sex, disability, national origin or financial need.



**The Joseph S. Garske Legacy** award, named after the founder of Par Aide Products Company, Joe Garske, is committed to further the education of children and grandchildren of MGC-SA members through financial contributions. This is the 22nd consecutive year for these awards. Par Aide is located in Lino Lakes, Minnesota and owned by Steve Garske, son of Joseph.

The late Mr. Garske, who died at the age of 76 in 1982, started Par Aide in 1954 with plans to make a "good" ball washer. A foundry man and avid golfer, he knew little about



the golf business, tried to sell his ideas for design and tooling to two accessory companies, was turned down by both and so began Par Aide Products Company. Steve Garske started The Legacy Scholarship in his father's honor in 1996.

**Selection of Recipients:** Scholarship recipients are selected on the basis of academic record, potential to succeed,

leadership and participation in school and community activities, honors, work experience, a statement of education and career goals and an outside appraisal. Selection of recipients is made by Scholarship Management

Services. In no instance does any member of the MGCSA play a part in the selection. Applicants will be notified by the end of July whether they have been awarded or denied a scholarship.



**Eligibility:** Applicants for the MGCSA Legacy Scholarships must be: children/grandchildren of Class AA, A, B, C, D, EM, Associate or Affiliate members who have been members of the MGCSA at least five years; High school seniors or graduates who plan to enroll or students who are already enrolled in a full-time undergraduate course of study at an accredited two- or four-

year college, university or vocational-technical school, and under 23 years of age.

**Awards:** Three awards will be given to children and grandchildren of Class AA, A, B and C members. One award of \$1,500 in the name of

Joseph S. Garske will be given to the highest evaluated applicant. That award will be renewable for one-year contingent upon full-time enrollment and satisfactory academic performance. One other \$1,000

award will be given to other qualified applicants from this group. One \$1,000 award will be available to children and grandchildren of Class D, EM, Associate and Affiliate members. These awards are not renewable. However, students may reapply to the program each year they meet eligibility requirements. Awards are for undergraduate study only.

**Obligations:** Recipients have no obligation to the MGCSA or its members. They are, however, required to supply Scholarship Management Services with current transcripts and to notify Scholarship Management Services of any changes of address, school enrollment or other relevant information. Except as described in this brochure, no obligation is assumed by the MGCSA.

# Apply Today

## You Say When to Pay!

If you choose, only pay when your course is open!

Finance your next fleet of Used Equipment with Turfwerks today, and you decide when to pay. No gimmicks. No tricks.

Monthly: Level monthly payments  
Seasonal: May - October payments only  
Annual: One lump payment per year

With Customized Financing, Turfwerks can help you get the equipment your course needs this upcoming season, at the price you can afford! Call your rep today!

Adam Hoffman Ph: 612-802-3149 • Nick Sherer Ph: 612-308-0102 • Mitch Stewart Ph: 515-240-8874

# Turfwerks

JACOBSEN  
A Tennant Company

RAIN BIRD

neary  
TECHNOLOGIES

STANDARD  
GOLF COMPANY

PAR  
AIDE

VENTRAC

TURFCO

PROGRESSIVE  
TURF EQUIPMENT

Smithco

1710 Alexander Rd • Eagan, MN • 55121 • [www.Turfwerks.com](http://www.Turfwerks.com)





*Photo courtesy of The Minikahda Club*

## Lush, Colorful Gardens Start with the Soil Mix

A colorful splash of flowers around the clubhouse, tee boxes and other strategic sites can make a course more memorable and provide an outlet for your creativity and imagination.

For flourishing gardens, assess the soil conditions before planting. Plaisted Companies offers a full line of horticultural products to keep your gardens blooming longer. Ask our Soil Specialists to help you choose the right mix for your plantings, whether gardens, bushes or trees.

*Premium Garden Mix • Compost • Soil Amendments • Black Dirt*



**Plaisted  
Companies**  
INCORPORATED

Elk River, MN • [plaistedcompanies.com](http://plaistedcompanies.com) • 763.441.1100





# MONARCH JOINT VENTURE

*Partnering across the U.S. to conserve the monarch migration*

[www.monarchjointventure.org](http://www.monarchjointventure.org)

The Monarch Joint Venture is a partnership of federal and state agencies, non-governmental organizations, and academic programs that are working together to protect the monarch migration across the lower 48 United States.

## MISSION

Recognizing that North American monarch (*Danaus plexippus*) conservation is a responsibility of Mexico, Canada and the U.S., as identified in the North American Monarch Conservation Plan, this Joint Venture will coordinate efforts throughout the U.S. to conserve and protect monarch populations and their migratory phenomena by developing and implementing science-based habitat conservation and restoration measures in collaboration with multiple stakeholders.

Our mission will be achieved by coordinating and facilitating partnerships and communications in the U.S. and North America to deliver a combination of habitat conservation, education, and research and monitoring.

## VISION

The vision of this Joint Venture is abundant monarch populations to sustain the monarch migratory phenomena into perpetuity, and more broadly to promote monarchs as a flagship species whose conservation will sustain habitats for pollinators and other plants and animals.

Monarch Joint Venture  
University of Minnesota

Page 18 [www.monarchjointventure.org](http://www.monarchjointventure.org)

*In the face of declines in monarch numbers and habitat, researchers and conservationists are pooling their efforts under the Monarch Joint Venture to protect monarchs and pollinator habitat.*

## Monarch Migration

The monarch migration is one of nature's most spectacular events. Much as birds migrate to take advantage of resources available across a large landscape, North American monarchs travel up to an astonishing 3,000 miles in an annual migration from their summer breeding habitat to overwintering grounds.

During the summer breeding season, eastern monarchs spread across the eastern U.S. and into southern Canada, laying eggs on milkweed plants. Western monarchs make use of milkweeds across the western states, primarily west and south of the Rockies, and into southwestern Canada.

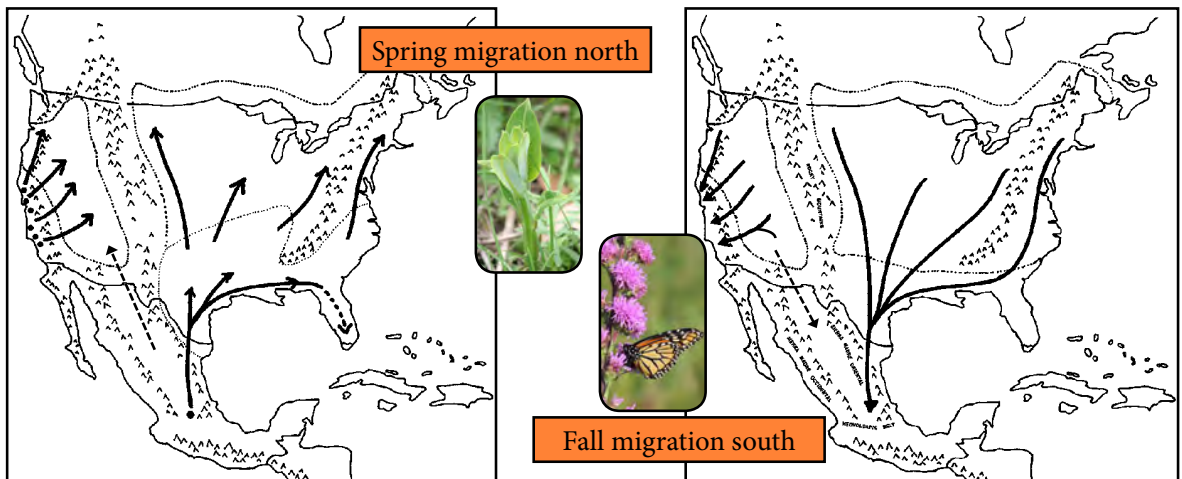
In the fall, monarchs feast on late-blooming nectar plants along the way to their wintering sites. The eastern monarch population winters in oyamel fir forests in the mountains of central Mexico. While the spring migration northward is completed over the course of two or more generations, the final generation of the year flies the entire way back to these forests, new to them, but visited

by their ancestors a few generations ago. In the same way, monarchs from across the western U.S. return to eucalyptus, Monterey cypress, Monterey pine, and other trees in groves along the Pacific coastline, from Mendocino County south to Baja, Mexico. Climatic conditions at these sites allow monarchs to survive the winter before beginning the return trek to their summer breeding grounds.

## Monarchs and Milkweed

Monarch caterpillars require milkweed to grow and develop into butterflies, and they feed on many of the over 100 species of milkweed native to North America. These plants, key to monarch survival, are found along roads and highways; in yards, parks, and gardens; in old fields; and in pristine native prairies and other natural habitats.

In addition to the important role that milkweeds play in the lives of monarchs, they are valuable nectar resources for a diverse suite of bees and butterflies. Enhancing monarch habitat will thus benefit many important pollinators.





## Monarchs at Risk?

The monarch migration was listed by the International Union for Conservation of Nature as an endangered phenomenon in 1983. In 2010, the World Wildlife Fund included monarchs on its list of the “Top 10 to Watch in 2010”: species that are thought to be in need of close monitoring and protection.

The conservation status of monarch overwintering sites in Mexico receives much attention. However, monarchs face challenges in the U.S. as well. A decline in the number of western monarchs, most of which spend their entire life cycle in the U.S., has been well documented over the past decade. Both eastern and western monarchs are dependent on habitat quality throughout the U.S., which is being threatened by:

- Habitat conversion and changes in land management practices that are reducing the availability of milkweed;
- Possible changes in milkweed availability, quality, and distributions due to effects of climate change;
- Pesticide use to control other insects, with unintended harmful consequences for monarchs;
- Habitat conversion in California, resulting in reduced availability and quality of overwintering sites; and
- Shifting overwintering habitat quality, as the trees in California’s monarch groves age and deteriorate.



## Monarch Joint Venture Projects

Ensuring the availability of quality habitat is critical for the conservation of any species. The availability and quality of monarch breeding habitat has diminished in recent years, with a reduced abundance of milkweed in the landscape in the eastern and western U.S. Overwintering habitat for the western monarch population is threatened by habitat destruction and degradation due to development. MJV partners are engaged in work to improve habitat availability and quality for both eastern and western monarch populations. We are implementing a variety of science-based habitat conservation and public engagement projects to better protect monarchs while inspiring America’s youth and adults to observe and study nature.



*Photo credits: Chip Taylor, Wendy Caldwell, Steven Munafo, Jim Ellis,  
Maps courtesy of University of Minnesota Monarch Lab*

## A few of our current projects include:

- Increasing the availability of native milkweed seeds and plants for habitat enhancement projects;
- Adding milkweed and nectar plant seeds in key monarch breeding areas annually;
- Expanding butterfly gardening programs (e.g. Monarch Waystations) to increase monarch habitat and citizen engagement in monarch conservation;
- Inventorying, assessing, and creating land management plans for monarch overwintering sites along coastal California;
- Creating wildlife corridors by expanding monarch habitat in corporate landscapes, utility right-of-ways, residential landscapes, and neighborhood common areas;
- Conducting teacher-training workshops to increase student knowledge of monarch biology across the migration flyway;
- Increasing citizen-science monarch and other butterfly monitoring efforts, especially in important areas where little or no data exists; and
- Expanding the online availability of monarch and milkweed educational resources.



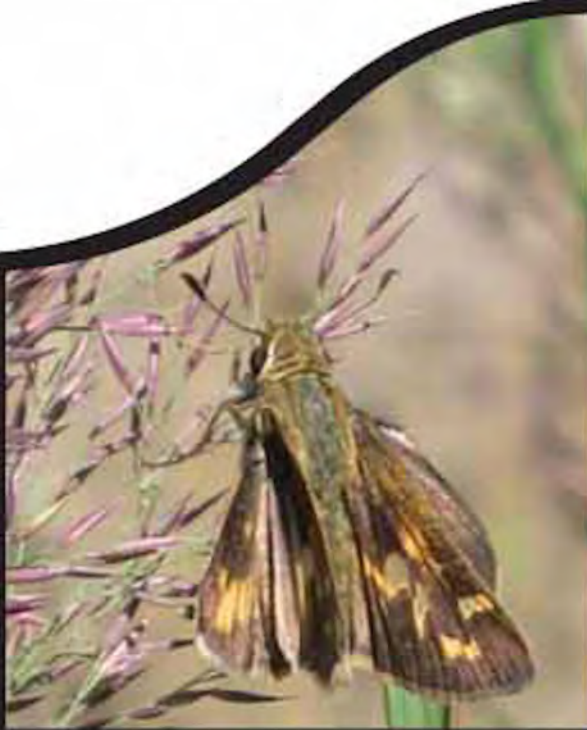
## What is a Conservation Joint Venture?

In 1986, the largest cooperative effort ever initiated to protect wetlands, waterfowl, and other wildlife was initiated with the North American Waterfowl Management Plan. In a new approach to conservation, regional partnerships of agencies, non-profit organizations, corporations, tribes, and individuals—called Joint Ventures—were created to implement conservation plans within specific geographical areas.

Joint Ventures increase the efficiency and effectiveness of conservation by bringing together the science, the people, and the resources needed to develop and implement conservation strategies. Due to their remarkable success, Joint Ventures have been generally accepted as the model for moving bird conservation forward in the 21st century.

The similar migratory nature of birds and monarchs, and their use of multiple habitats across a large landscape, make the Joint Venture model ideal for building monarch conservation efforts.





# Benefits of Native Grasses





# *Native Grasses as Food for Pollinators*

*By Diane M. Narem and Mary H. Meyer,  
University of Minnesota Extension*

## Introduction

Native grasses can soften a garden by adding a natural component or liven up a planting with their interesting shapes and colors that change with the season. Not only are they great for the landscape aesthetic, but they also provide many benefits as landscape plants. Native grasses are low maintenance. They need little to no fertilizer or watering once established, being drought tolerant, and they require no pesticides. Grasses minimize soil erosion and increase organic matter, improving soil conditions. They pro-

vide habitat for wildlife, including food and cover for birds during the winter.

In addition to those benefits; grasses provide food for numerous species of native butterflies and moths during their larval stage. Lepidoptera (the order that includes butterflies and moths) go through a complete transformation during their life cycle, from caterpillars to adults. While most adults feed on nectar, most caterpillars feed on vegetation, and some feed on grasses and sedges. Interest in pollinator-friendly yards and gardens has

grown as the public has become aware of the declines in beneficial insects like bees and butterflies. Native wildflowers have proven a good way to attract and provide nectar to bees and butterflies. However, the benefits of native grasses are not typically known to horticulturalists or the general public.

At the University of Minnesota, we are working on a project to promote native grasses for the benefits they provide to the environment and specifically to pollinators. To address this knowledge gap, we compiled records

of butterfly and moth larvae noted to use native Minnesota prairie grasses from journal articles, guide books, and state and federal publications. Until this information is fully published, we are unable to share all of the specifics, but the following is a general explanation of the relationships we found between native grasses and butterflies and moths.

#### Native Grass Host Plant Relationships with Butterflies and Moths

The relationships between native grasses and the butterflies and moths that feed on them varies from species to species. Some caterpillars are specialists, feeding on only one or two species, and others are generalists, feeding on numerous.

Different species feed on grasses using different methods. Many moths are concealed feeders, boring inside stems and leaves or rolling up leaves and using them as nests. The grass skippers, a subfamily of native butterflies that contains many of Minnesota's rare butterflies, build shelters in their grass hosts. They do this as soon as they hatch, crawling to their preferred native grass host plant to begin construction. Different species make different kinds of shelters. The larvae of the Ottoe skipper make aerial nests, weaving grass leaves together above the soil surface, using larger bunch grass species like little bluestem and big bluestem. The larvae of the Dakota skipper build shelters at the bases of bunch grasses. One

of the more complex shelter types is made by the larvae of the Arogos skipper, whose leaf tube nests are supported by grass leaves that have been chewed down to their midrib to create "stilts" that make it difficult for predators, like ants, to reach the vulnerable larvae inside. Depending on how their shelter is constructed, skippers will initially feed from inside it, cutting off grass leaves and returning to their shelter to eat. As larvae get older, they will leave their shelter to forage at night. Other grass-feeding species don't make shelters. Some simply hide at the base of bunch grasses during the day and feed at night. Others rest on leaves during the day but go unnoticed by predators because they are camouflaged.





Some native grasses are important for numerous species of Lepidoptera while others provide food for little or no species. Little bluestem, blue grama, and big bluestem, serve as food for over ten butterfly and moth species each, while needle-and-thread and porcupine grass serve as food for only two species each.

Native grasses alone may not attract butterflies and moths to your garden. These grass-feeding Lepidoptera are much more mobile during their adult butterfly stage than their caterpillar stage, and during their adult stage they are looking for nectar. To best benefit Lepidoptera, pair native grasses with na-

tive wildflowers or add them to an existing flower planting.

Many of these butterflies overwinter as larvae at or just below the soil surface near the bases of these native bunchgrasses. This makes them vulnerable to fire management. Prescribed burns can kill overwintering

larvae by direct contact or by dehydration caused by the heat from the fire. If you suspect that you have overwintering larvae in your native grasses or prairie, cut back or mow your grasses instead of burning. Another strategy is to only burn a portion of your grass planting, leaving other areas as refuges safe from fire.

## In Conclusion

Native grasses have grown in popularity due to their natural aesthetic, low maintenance needs, and soil stabilizing properties. Their benefits

to native pollinators is an added bonus that is generally unknown. Although most native grasses and sedges serve as food for some type of butterfly or moth species, little bluestem, big bluestem, blue grama, switch grass, side-oats grama, lake sedge, and prairie dropseed have found to benefit the highest number of native butterflies and moth species. More information will become available on the website [grasses.cfans.umn.edu](http://grasses.cfans.umn.edu) as the year progresses.

*The Minnesota Golf Course Superintendents Association wish to thank Diane M. Narem and Mary H. Meyer for allowing the reprint of this article. This piece first appeared in the June 2017 edition of the MNLA Scoop magazine.*



## Superior Tech Products

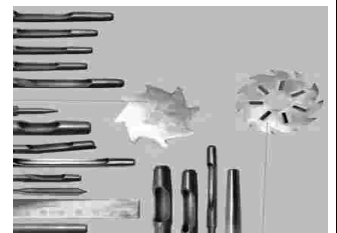
Leading Edge Turfgrass Solutions  
Golf Courses | Sport Fields | Parks

952-546-3678

[www.stproots.com](http://www.stproots.com)  
[stp@stproots.com](mailto:stp@stproots.com)



- \* Liquid & Granular Fertilizers
- \* Organic Fertilizers
- \* Post Patent Pesticides
- \* Aerification Tines & Bedknives
- \* Natural & Artificial Turf grooming equipment.





# Do You Know the Benefits of Native Grasses?

## Native grasses...

- Attract wildlife such as songbirds and turkeys.
- Feed more than 75 butterflies and moths.
- Reduce soil erosion.
- Need no pesticides or fertilizer.



Photo by Hafiz Issadeen/CC-license



Page 25  
Photo by Mike's Birds/CC-license



# thick-skinned: jared hoyle

## kansas state

interview by matt Cavanaugh, assistant superintendent at Rush creek golf club  
*thick-skinned, adjective:*

insensitive to criticism or insults.

“you have to be thick-skinned to work in the turf industry”

synonyms: insensitive, unfeeling, tough, hardened, callous.



What is better than the honesty of a child? Lots of things; mosquito bites, running out of gas, participating in the polar plunge... because a child's words can be brutally honest. Recently I was helping my four-year old get ready for the day. While he was sitting in my lap I asked, “What fun thing do you hope to do at school today?” He turned and said, “Dad, your breath stinks, go brush your teeth.” Of course I laughed, but if it had been my wife that said that I probably would have been miffed. It would have been the same correct message, but it was better received from my four year-old than my high school sweetheart. As adults, we need to be more willing to hear things that maybe we don't want to hear. Much like picturing the crowd naked when dealing with public speaking anxiety, I suggest to picture an innocent child when dealing with constructive criticism. If you can take it from a kid then you can take it from an adult. The fact remains, we don't know what we don't know and you may need to be thick-skinned to hear it.



Jared Hoyle is an Extension Turfgrass Specialist at Kansas State University. Jared can be reached at [jahoyle@ksu.edu](mailto:jahoyle@ksu.edu) or @KSUTurf. If he cannot be reached he will be walking all the red carpets of the turfgrass industry.

### The one simple thick-skinned question:

Jared, you visit with and have many conversations with golf course superintendents and assistants. Based on the current facts, research and knowledge, what is one thing you see that we as turfgrass managers could change to help improve turfgrass decisions?

**Jared:** “Before I answer this I would like to say a quick disclaimer. I know there are a lot of turfgrass managers out there that are doing this but I still see some turfgrass managers not doing this. I want to thank the turfgrass managers that are attacking this head on. It will financially help you in the long run and result in a better quality turf.”



*So, back to the question. One thing I think turfgrass managers could change to help improve turfgrass decisions is pay attention to the mode of action of the herbicide you are spraying. Knowing what mode of action you are spraying and implementing resistant management techniques will help prevent herbicide resistant weeds. More often than not, not only do I see turfgrass managers spray the same mode of action year after year after year, it is the same herbicide year after year after year."*

**thick-skinned:** Currently, with what mode of action and weeds is the turfgrass industry seeing the most resistance? What active ingredients does this include?

**Jared:** *"Knowing the mode of action and the mechanism of action is really important as well as the active ingredient because if an individual active ingredient is rendered ineffective due to herbicide resistance, then every other active ingredient that has the same mechanism of action is also ineffective. Many times people mix up the terms mode of action and mechanism of action. The mode of action is the plant process impacted by the herbicide or the entire sequence of events that results in death of the plant. The mechanism of action is the specific site within the plant the herbicide directly interacts. Sometimes it is also called the site of action. So right now the mechanisms of action that have reported resistance are ALS, ESPS, PS II, mitotic, and ACCase inhibitors. As for weeds there are a number of weeds that are reported to have resistance in turfgrass, including: annual bluegrass, goosegrass, crabgrass, yellow nutsedge, and buckhorn plantain.*

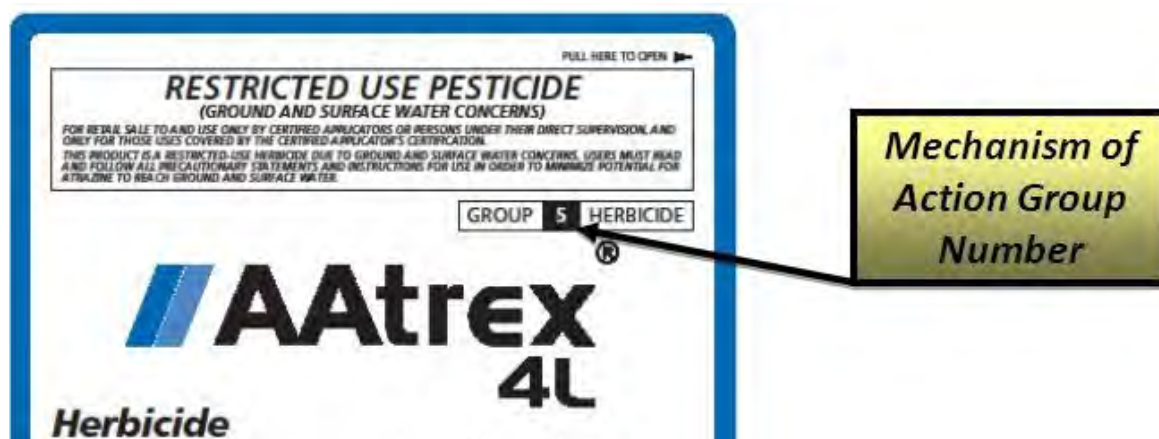


**thick-skinned:** What kind of herbicide rotation recommendations do you have for superintendents and assistants in Minnesota?

**Jared:** *"There are two ways that you can rotate herbicides for resistance management in turfgrass. These are really "scientific".... so stay with me here... 1. Rotate the mechanism of action from year to year, or 2. Rotate the mechanism of action within the season. This works well on both PRE and POST applications. Implementing this strategy of utilizing a different mechanism of action will help clean up any escapes. Is one way better than the other? I don't know. But ideally using both of these methods simultaneously is better when it comes to resistance management. Another strategy is tank mixing multiple mechanisms of action. But... just because you put multiple mechanism of action products in a tank doesn't mean it is going to help with herbicide resistance. For the tank mixing method to help each mechanism of action, if applied alone, it must be able to control the targeted weed. Applying an herbicide that has three active ingredients won't help with resistance management unless each of those individual active ingredients has a different mechanism of action. Additionally, but also very important, to manage for resistance, a turfgrass manager should utilize an integrated approach of cultural, chemical, mechanical and biological practices."* Jared went on to say that there are certainly some active ingredients within the same mechanism of action that work better on specific weeds, but that is also the reason to have multiple active ingredients in the container to increase the spectrum of control.

**thick-skinned:** Can you recommend a resource for superintendents and assistants that provides great information about herbicide?

**Jared:** “Many of the new herbicide labels contains the mechanism of action and classification according to the Weed Science Society of America. Start with that! Another resource that contains a comprehensive list of herbicides that are both used in cool- and warm-season turfgrass is the 2018 Edition of the Turfgrass Weed Control for Professions ([https://mdc.itap.purdue.edu/item.asp?Item\\_Number=TURF-100](https://mdc.itap.purdue.edu/item.asp?Item_Number=TURF-100)). This publication was first developed by Purdue University but recently has expanded with support from 13 other collaborating universities including University of Minnesota”.



**thick-skinned:** I think many of us will be surprised at how many of the combination herbicides we use in turf are actually in the same classification. Along with the Purdue publication, I have found the link below to also be a great resource if the classification of the different active ingredients is not clear on the label, which it can be on older labels.

<http://www.tennesseeturfgrassweeds.org/Lists/Fact%20Sheets/Attachments/33/W352.pdf>

Trade Name(s)	Active Ingredients	WSSA Action Groups
Q-4 Plus	quinclorac + sulfentrazone + 2,4-D + dicamba	(26 or 4) + 14 + 4 + 4
QuickPro	glyphosate + diquat	9 + 22
Solitare	sulfentrazone + quinclorac	14 + (26 or 4)
Specticle Total	indaziflam + glyphosate + diquat	29 + 9 + 22
Speedzone	carfentrazone + 2,4-D + MCPP + dicamba	14 + 4 + 4 + 4
Squareone	carfentrazone + quinclorac	14 + (26 or 4)
Surge, Surezone	sulfentrazone + 2,4-D + MCPP + dicamba	14 + 4 + 4 + 4
Tribute Total	thiencarbazone + foramsulfuron + halosulfuron	2 + 2 + 2
Trimec Classic, Three Way, Others	2,4-D + MCPP + dicamba	4 + 4 + 4

**thick-skinned:** The publication by Purdue should be in everyone’s turfgrass library. I have found that superintendents have a very good understanding of fungicide and insecticide. However, when it comes to herbicide knowledge, many of us have not developed the same knowledge base as with fungicides and insecticides. It’s the “grab the three-way and go approach” (quick, can you name those three active ingredients in a typical three-way herbicide? If not, buy the Purdue publication) and assume that it will work, which for the most part is probably true, but it should not be the case. Increasing your herbicide knowledge will help with this key statement by Jared, “Just because a jug contains three different active ingredients does not mean that you will be helping with herbicide resistance, because all three active ingredients may have the same mechanism of action.”



Jared finished off the conversation with some great advice. *“There are many different theories out there of how resistance occurs and the difference between resistant diseases and weeds. I think that we have a good understanding about mechanism of action and active ingredients and I think we are producing some great research about herbicide resistance and resistance management. There are some awesome weed scientists that are currently working on herbicide resistance and we as turfgrass managers need to look at this research and make sure we are implementing these resistance management strategies before we end up with large resistant populations and no control options”*

On a final note, I want to qualify the difference between herbicide resistance and herbicide tolerance as they are two very different things. *Herbicide Resistance:* When a plant was once controlled by a specific active ingredient and now no longer is. *Herbicide Tolerance:* When a plant has never been controlled by a specific active ingredient. For example, glyphosate has never controlled white clover as this individual learned after accidentally spaying nine acres of Kentucky bluegrass with glyphosate and revealed a large white clover issue.





**JOHN DEERE**



Its Your Time to...

**EXPLORE YOUR FRONTIER!**



John Deere 9009A



John Deere 7500A



John Deere 2030A



Wiedenmann Super 500

Cannon Falls, MN (507) 263-4238	Hastings, MN (651) 437-7747	Osceola, WI (715) 294-2191
Rosemount, MN (651) 423-2274	New Richmond, WI (715) 246-6565	Turtle Lake, WI (715) 986-4403













**EXPLORE YOUR FRONTIER**

# Nutrient Profile: Iron

Doug Soldat

Dept. of Soil Science, UW-Madison

Iron is one of the four most common elements found in soils along with oxygen, silicon, and aluminum. It is highly insoluble, which is part of the reason why we find iron in soils – because it can remain insoluble after millennia of rainfall. More soluble compounds (like calcium carbonate, and even quartz) can be eventually washed away. We only find soils with calcium carbonate in young soils or in areas that receive very little rainfall. Soils in Wisconsin are relatively young (about 10,000 years old) and we have a moderate amount of rainfall so we can find calcium carbonate in some of our soils. However, if you travel to North Carolina, for example, where the rainfall is greater and the soils are much older (because the glaciers didn't reach there) you will find red clay soils that are high in iron oxides and clay. We call those soils Ultisols and they are found all over the Southeastern US. Add another million years of rainfall and the remaining clay will be transformed to iron and aluminum oxides and then you'll have the classic soils of the tropical rainforest – Oxisols.

This characteristic insolubility of iron is what makes it difficult for plants to extract it. Only tiny amounts are required for optimum plant growth, typically 100 times less the amount of nitrogen. That means if you remove three pounds of nitrogen per thousand square feet per year by removing clippings, you are removing only about 0.03 pounds of iron (half an ounce).

But evolution is a powerful force, and plants have evolved the ability to extract iron from which ever soils they evolved in. The problem arises when humans showed up and started taking plants from one environment to another. If the plant evolved in an iron rich environment and was transplanted to an iron poor soil, it would show signs of iron deficiency unless fertilized. A classic example is the River Birch.

But before we can get to that story, we need to talk about the two forms of iron. Iron has two primary oxidation states in soil:  $\text{Fe}^{2+}$  and  $\text{Fe}^{3+}$ , the only difference is that  $\text{Fe}^{2+}$  has one more electron than  $\text{Fe}^{3+}$ . Electrons are a premium in soils low in oxygen. If you put  $\text{Fe}^{3+}$  into a low oxygen soil, an electron will be quickly “stolen” from it and the iron will become  $\text{Fe}^{2+}$ . If that soil becomes well oxygenated at some future point, the  $\text{Fe}^{2+}$  is likely to morph back into  $\text{Fe}^{3+}$ . This is called a redox reaction.  $\text{Fe}^{2+}$  happens to be slightly more soluble than  $\text{Fe}^{3+}$ . Another issue that affects iron solubility is pH. Iron solubility (and solubility is related to plant availability) decreases by 100 to 1000 times for every increase in pH unit. That means iron may be 1000x less available at pH 7 than pH 8. Increasing pH also facilitates the conversion from  $\text{Fe}^{2+}$  to  $\text{Fe}^{3+}$ . Iron will be least plant available in well oxygenated, high pH soils.

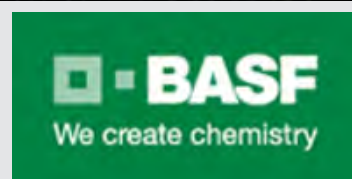
Back to the River Birch. It is native to wet soils. Wet soils are dominated by  $\text{Fe}^{2+}$  over  $\text{Fe}^{3+}$ . That means that River Birch never had to work very hard to obtain its iron during its evolution. Because the River Birch is a beautiful tree, it is often used in landscaping. Sometimes those landscapes are on well drained soils where  $\text{Fe}^{3+}$  is the dominant form of iron. When this happens, the River Birch will often show classic iron deficiency symptoms which are easily corrected with iron fertilization.

Obviously we plant turfgrass in a wider range of soils than they evolved on. Fortunately, however, many grasses evolved in nutrient poor soils and as a result are fairly good at scavenging



# *2018 North-West Outreach at Crookston UMN*

*Thank you  
host Dr. Kristie Walker  
and Affiliate Sponsors*



**WINFIELD<sup>®</sup>  
UNITED**



nutrients with their incredibly fine roots that have massive surface area. In addition, grasses have evolved a pretty good physiological mechanism for solubilizing iron from the root zone.

You are probably familiar with the term chelate or chelating agent. A chelate is a claw-like molecule that “grabs” metal ions (like calcium or iron) and keeps them soluble in soil solution at higher concentrations than would be possible without the chelate. The chelate can be taken up by plants, or the plant can take up the iron after the chelate “drops” the ion as a result of several mechanisms. The most common chelate is EDTA, but there are even better chelates for iron like HEDTA, EDDHA which hold iron better at higher pHs than EDTA, thus making iron more available in the conditions where it is most needed (high pH soils).

Grasses make their own chelating agent. They excrete it through the roots and then absorb the chelate which has hopefully “grabbed” some iron. However, it remains possible that iron deficiencies show up in grasses – particularly when the roots are stressed. Iron is important for electron transport in the cell, which is the way the plant generates energy from the sun. Chloroplasts are the organelles that harvest energy from sunlight. They contain chlorophyll, the pigment that captures light. In iron deficient plants, the chloroplasts are tiny. Tiny chloroplasts mean less chlorophyll and, therefore, a less green plant. Iron deficiency at the leaf level and the field level is shown in Figure 1.



Figure 1. Iron deficiency symptoms at the leaf level (left, healthy leaf on top) and field level (right).

Dr. Nick Christians and graduate student David DeVetter at Iowa State documented a condition called summer-induced iron chlorosis which appears on Kentucky bluegrass on high pH soils in mid-summer (DeVetter, 2007). In mid-summer, Kentucky bluegrass roots are not fully functional because of the heat. Reduced rooting means less soil can be explored, and the turf’s ability to excrete natural chelating agents may be impaired. This condition is rare, and I’ve only encountered it once in Wisconsin. Let’s face it, the vast majority of iron applications are not correcting or preventing iron deficiencies, but the applications have some other important effects.

Larry Lennert earned his M.S. in Soil Science under Dr. Wayne Kussow in 1990. At that time in golf course management, nitrogen rates were quite low compared to what they are today, and superintendents were turning to iron to mask the nitrogen deficiency. Larry’s work demonstrated that the masking effect was purely cosmetic, and the green color imparted by iron application had no effect on plant physiology. At the time, it was thought that the greener color was also increasing photosynthesis. However, Larry’s work showed bentgrass leaves treated with iron were actually covered in tiny black deposits (Figure 2). The black deposits make the grass look more green from a distance.





Figure 2. Creeping bentgrass leaves turn black in response to iron application. This image was taken by Larry Lennert from his MS work on iron.

My former M.S. student Glen Obear demonstrated this again using a device that measures green wavelengths of light. Glen applied different rates of iron to a bentgrass green. The plots looked strikingly different to the naked eye, but when we measured the green light reflected off the grass using the chlorophyll meter the green light was identical regardless of iron application rate (Obear et al., 2017). Iron will only increase photosynthesis when it is deficient in the plant. Adding more to a plant with enough iron will not improve photosynthesis.

### *Using Iron*

The effect you get from an iron application is dependent on the form of iron (chelate vs sulfate) and spray volume. Larry Lennert's Master's work showed us that the color enhancement from a 1.5 ounce per thousand square feet application was greater if the spray volume was lower. You can play with application rates and spray volumes to get the desired effect. Or, if you change your spray volume, you will need to modify your spray rate of iron accordingly to keep the color effect the same.

Iron rates range greatly depending on the goal. For nutritional purposes only, you can get away with never applying iron or at most you may need a fraction of an ounce per thousand square feet per year (split into smaller doses). For color enhancement, you will likely want to be in the 1-3 ounces per thousand square feet range. For disease suppression, rates are much higher. For example, we were able to show suppression of dollar spot at rates of 20 oz. per 1000 square feet applied every other week on Penncross at the O.J. Noer Facility. Researchers at Virginia Tech showed dollar spot suppression at 16 oz. per thousand square feet (McCall et al., 2017). Oregon State University researchers have suppressed pink snow mold with 32 ounces of iron sulfate per thousand square feet (Mattox et al., 2015). In my opinion, these rates are not practical or sustainable. I believe that dollar spot suppression is possible at much lower application rates, but the data have yet to be generated. Paul Koch and I have begun a trial to examine how rate influences dollar spot pressure on a bent/poa fairway at the O.J. Noer Turfgrass Research Facility.

For these high application rates, iron can be quite difficult to solubilize. The two main sources of iron sulfate are iron sulfate heptahydrate and iron sulfate monohydrate. The heptahydrate is easier to solubilize of the two. Hot water and agitation help quite a bit. I also recommend testing different sources of iron from various suppliers if solubilizing is an issue, or going with an iron sulfate product that comes in a liquid form.

Keep in mind that iron is a toxin at high rates. In fact, Iron HEDTA is the main herbicide used to kill broadleaf weeds in lawns in the several Canadian provinces that have banned conventional herbicides. It is applied at approximately 25 oz/1000. Grasses are more tolerant of iron, and hence the selectivity of the herbicide. In our trial where we applied 20 oz/1000 square feet every other week, the Penncross bentgrass was noticeably thinner and less healthy by the end of the season. Keep in mind that this was iron sulfate, if we used chelated iron at this rate we would have done even more damage. The Virginia Tech researchers did not find reductions in quality following 16 oz. per thousand square feet of iron sulfate, but they did observe turf quality decline in plots that received 4 oz. per thousand square feet of chelated iron. The chelate made the iron more plant available, which caused toxicity. I encourage you to be very cautious when experimenting with high rates of iron (particularly chelated iron).

In addition to being potentially toxic to your grass, iron may reduce the efficacy of the other chemicals in your spray solution. Agricultural research has shown that iron sulfate tank mixed with glyphosate can decrease the efficacy of glyphosate. We don't have much data on turf chemicals, but I would not be surprised if iron sulfate is antagonistic to some or many. A superintendent recently commented that he was convinced that his growth regulator performance was negatively affected by iron sulfate addition to the mix.

Glen Obear did some excellent work at UW-Madison on iron oxide layers at the sand/gravel interface of USGA putting greens. He is continuing that work for his Ph.D. at the University of Nebraska-Lincoln. At UW, Glen attributed the formation to the wet sand sitting on top of a dry gravel layer. The wet sand contained  $\text{Fe}^{2+}$  which could have originated from the soil itself, iron fertilizer, and/or iron in the irrigation water. That  $\text{Fe}^{2+}$  was converted to  $\text{Fe}^{3+}$  when it reached the dry, oxygen rich. At Nebraska, Glen has gone on to discover that the iron layer is exacerbated by low pH sand sitting over high pH gravel. While there is still a lot of work to do in this area, it seems that low pH sand and gravel would be good choices for new putting greens. For existing sites, check for any indication of a reddish layer at the



*2018 MTI Sponsorship at  
the Day On The Hill  
Thank you  
host John McPhee  
and*





# *2018 Day On The Hill Making a Difference*





sand/gravel interface. If you see color, it would be in your best interest to stop applying iron fertilizer. If iron deficiencies are present, correct those deficiencies with very light applications of chelated iron.

This article turned out to be longer than I anticipated. In summary, Iron is found in high quantities in soils, but it's not very soluble. Plants need 100x less iron to survive than nitrogen. Your turf is pretty good at extracting enough from the soil without your help because it makes its own chelating agent. That said, it may need help in high pH soils (pH 8+) or when rooting is compromised. The main reason you should consider using iron is to enhance color and suppress disease (especially dollar spot). We are still working on identifying the optimum application rates for these benefits. The annoyances of iron are many include mixing, tank incompatibilities, and likely reduced efficacy of tank mixed chemicals. The dangers of iron include potential toxicity to turf and accelerated formation of iron layering at sand/gravel interfaces on putting greens.

## References

DeVetter, D.M. 2007. Summer-induced iron chlorosis on Kentucky bluegrass turf. MS Thesis. Iowa State University. Ames, IA.

Lennert, L.L. 1990. The role of iron in turfgrass management in Wisconsin. MS Thesis. University of Wisconsin-Madison. Madison, WI.

Mattox, C., A. Kowalewski, and B. McDonald. 2016. Fungicide alternative management practices for *Microdochium* patch. Oregon State Research Update. Online.

McCall, D.S., E.H. Ervin, C.D. Shelton, N. Reams, and S.D. Askew. 2017. Influence of Ferrous Sulfate and Its Elemental Components on Dollar Spot Suppression. *Crop Science*. 57:1-6.

Obear, G.R., W.C. Kreuser, K. Hubbard, B. DeBels, and D.J. Soldat. 2017. Plant colorants interfere with reflectance-based vegetation indices. *Crop Science*. 57:595-601

The MGCSA wishes to thank Dr. Soldat, UW-Madison Soils Department, for this excellent information about iron. This article first appeared in the WGCSA May/June issue of The Grass Roots.

# MGCSA Assistant Professional Forum Pinstripes, Edina







# Thank You Event Sponsors





## Plant Protectant Check Plots

**Edgewood Country Club**  
**Stanley Heidinger, superintendent**

**Pittsburgh, Pa. 15235**

### Issue

Determining the efficacy of fertilizers, surfactants and plant protectants on a golf course can be difficult. Academic research relies on numerous small test plots to compare rates, timings, formulations and other variables. This method produces excellent results, but it also requires specialized equipment and lots of time and patience. At most golf courses, such an elaborate testing process simply isn't practical.

Despite the importance of determining product effectiveness, it is often a low priority on a superintendent's checklist. Product efficacy is often measured simply by success or failure, with little tolerance for intermediate results. This makes it difficult to fully understand the effects of various products.

At Edgewood Country Club, fairway plant protectant applications account for



*Using fairway check plots at Edgewood Country Club has improved turf health by helping to determine product efficacy.*



51 percent of the chemical budget. It is important to determine the effectiveness and value of each application so that these resources are used optimally. It is also important to know whether rate adjustments or a product change could yield better results.

### **Action**

While numerous small test plots might not be a practical product testing method at most golf courses, untreated check plots are a great way to assess product efficacy. Before every fairway spray application, Superintendent Stanley Heidinger uses a sturdy tarp to cover an area of fairway turf. This creates a small, untreated check plot. The tarp is stored in the sprayer and secured to the fairway turf using several sod staples. Once the area surrounding the tarp has been sprayed, the tarp is removed and the corners of the check plot are painted red so that they are easily seen. Heidinger and his staff will then observe the area over the coming days, noting how the application has performed.

### **Results**

Using an untreated check plot allows Heidinger to easily measure the effectiveness and longevity of fertilizers and pesticides by comparing treated and untreated areas. This information has helped him make valuable adjustments to his spray program. He has a better understanding of each product and he can identify opportunities to stretch spray intervals. Achieving the same results with fewer applications saves time and money. The check plots also help show golfers how important plant protectants are for maintaining a healthy and fun golf course.

***This article is reprinted from the March 3rd, 2017 BMP Case Study of the USGA Green Section Record. Copyright United States Golf Association. All rights reserved. The MGCSA expresses appreciation for permission to reprint this article.***

# Within the Leather

by Michael Radermacher

Assistant Superintendent at Mendakota Cuntry Club

[www.michaelradermacherturf.wordpress.com](http://www.michaelradermacherturf.wordpress.com)

## Compensating the Assistant Superintendent

I've seen some recent talk on Twitter about the assistant superintendent position's compensation; or lack thereof. I've had some thoughts about it and thought I could give some perspective from a current assistant's point of view.



Somebody once told me, "You'll work your entire life and never have enough money." I think that is partly true, that no matter how much money you're making, you can always use a little bit more. Even multi-millionaire professional athletes are always negotiating to

get a little bit more. It's our culture and human nature to want more, more, more. My point being, in the long run the money is not going to matter as much as the knowledge,

mentoring, and experiences that you gain from your professional career. I think young assistants like myself should be putting more value

in experiences and professional development, rather than worrying about making a few more thousand dollars. (Sometimes the highest paying jobs aren't the most rewarding.)

With that being said, I do understand that young assistants



have bills to pay as well and many are even trying to support families on an assistant's salary, which can be an uphill climb. I do believe that the compensation for most assistant superintendents needs to continue to increase and I think that it will. There is a decent market for assistants right now in the Twin Cities area, but that pool of qualified candidates has dwindled in the recent years because of guys leaving the industry and not as many kids pursuing a career in Turfgrass Management.



This trend may not be great for the turf industry, but it may be a positive for current assistants that have stuck with it. Less supply means more demand and more demand could begin to benefit current assistants as we now have the leverage in the job

market, and less competition for superintendent jobs as they begin to come available.

I've had many classmates and others I know that have gave up on the golf course industry for some of these reasons

I listed above. It's unfortunate to see, but I can also see why. I would encourage more assistants to stick with it, especially if they truly have a passion for golf course management like I do.

If you stick with it, work hard, and continue to

advance, the money will take care of itself. "You'll work your entire life never to have enough money," and you can't take it with you anyways.