Pollinator Conservation

Hole Notes

The Official Publication of the MGCSA

Vol. 53, No. 5 June 2018

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TurfVerks

New Feature Column
Insights Into Leadership
By Chris Tritabaugh
Superintendent at Hazeltine National GC

Mark Your Calendars:

July 12, Great North Exposure, Pine Hill Golf Course
Host James Barry

July 18, South East Exposure, Valley View Golf Course
Host James Batys

August 9, UMN Field Day, TROE Center
Host Dr. Brian Horgan, Dr. Eric Watkins and Sam Bauer

August 20, The Championship at The Jewel
Host Doug Mahal

Minnesota Chapter GCSAA
GOLF COURSE SUPERINTENDENTS ASSOCIATION OF AMERICA

Hole Notes Magazine
Vol. 53, No. 5, June, 2018

Feature Articles:

Monthly Columns:

On The Cover:
It is That Time of Year for Pollinator Conservation
photo UMN Beelab

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.

Presidential Perspective

by Brandon Schindele, Superintendent Edina Country Club

Last month I discussed the topic of showing gratitude and saying Thank You to everyone that allows us to complete our respective jobs with success every day, whether it is colleagues in other departments of your operation, colleagues at another golf course, vendors that provide support, products, and knowledge, and probably most importantly the staff members that each of us are charged with leading.

Staffing is a great concern to all of us. Every spring the question of, "How is your staff coming together?" comes right after, "How did your turf come through winter?" Drilling down further I think all of us worry how are we able to continue to find people that will fill the roles of Equipment Manager/Mechanic, Spray/Irrigation Technicians, and even Assistant Superintendents for that matter. Honestly, this problem is not a simple, one answer solution because the reason for lack of people going into the positions is multi-faceted.

The cost of education is going up and the rise in salaries are not going up at the same rate. I do think the salary part will correct itself in the present economy due to low unemployment numbers and salaries are going to have to go up. Universities are becoming increasingly more difficult to gain admittance to, especially at a Big 10 school, such as the University of Minnesota or UW Madison.

Looking inward at our operations, what are some things that we can all do to develop staff and show them that the Turf and Golf Course Industry can be a rewarding and fun place to work?

- Are you giving your staff the opportunity to think for themselves and create an atmosphere where they have ownership in the product? I think this is an area where every employee, no matter the business they are in, does not want to be micro-managed. By letting people learn, make mistakes, and grow from those mistakes only makes stronger employees and therefore a stronger operation and team.

- Are you allowing your staff, including your Assistants and full-time people, to have lives outside of work? Working excessive hours for many years was commonplace in this business and I'm not sure why. Sure if it's aerification time, a big project needs to be completed, or watering needs to be done I get it, but when it turns into the norm and not the exception I think that is a problem. Is it a badge of honor to say, "we work 75 hours a week"? I would rather be able to say that my badge of honor is, "I am able to help coach my kids in hockey, soccer, baseball or whatever activity they are into in THE SUMMER TIME!!!" This is something that I am proud to say I am doing this summer. Looking at this from a golfer's or member's perspective, I have never heard any golf or member of a private club brag about how many hours their Superintendent or Turf and Grounds staff put in.

- How can we develop staff and get them the necessary training to help them succeed in the long term? Spending the time to teach about irrigation, equipment operation, course set-up, and fertilizer and plant protectant application falls directly on us and can be a very good start to getting us the immediate help we might need. What is the next way we can provide direction to staff members in the form of traditional education or even non-traditional education? How many of us have had or do have a staff member that would benefit greatly from some formal turf education, but they might

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not have the means or confidence for that matter to pursue it? The Great Lakes Turf School might be a perfect opportunity for those individuals, and they might just need a little shove in the right direction.

I am happy to report that the MGCSA is going to be able to help with that shove in the right direction. This, due to a generous grant from PBI Gordon given to us as MGCSA members having the second most members attend their program at the GIS. The stipulation with the grant was that it had to be used for a research or educational opportunity. Thank you very much PBI Gordon and Affiliate member, Jeff Schmidt.

The Board has agreed to put the money towards funding four (4) Great Lakes Turf Grass Scholarships. The Wisconsin Chapter has done this in the past and we are modeling the program after theirs. Jack MacKenzie will be putting out the scholarship application via the website and email notifications. Applicants will be selected based on meeting the eligibility requirements and their ability to follow the application process:

Eligibility
1. Applicants must either be a MGCSA member or sponsored by a MGCSA member to apply.
2. Completion of the program and providing Certificate of Completion is necessary for reimbursement.
Criteria for Selection
1. (Four 4) Applicants shall be selected based on employment history, recommendations and personal statement essay.
2. Financial need is not a factor in the selection
3. Any Awards or Membership Committee member with a conflict of interest must remove him/herself from the process, i.e. family member or current employee applying.

The scholarship application

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deadline is December 15th, 2018 and applicants will be notified prior to the deadline to sign up for the Great Lakes Turf School.

The long-term staffing issue, as I stated before, is not going to go away and I think it is up to all of us that have a stake in this industry to choose whether we are going to be reactive or proactive.

The dog days of summer are upon us, so I wish everyone luck in wrapping up any lingering spring projects and remember to take the time to focus on your staff and how you can help them develop.

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What is the Great Lakes School of Turfgrass Science?

By Sam Bauer, UMN Extension Educator

Turfgrasses are a resource in our urban community environments and best management practices are aligned with environmental, economic & societal priorities. The Great Lakes School of Turfgrass Science provides participants with the science based principles needed to effectively manage turf for recreation, sport, aesthetics and environmental protection. The Great Lakes School of Turfgrass Science is a quality training opportunity for:

Practitioners that establish and maintain turfgrass for athletic fields, consumer/commercial lawns, golf courses, recreation/parks, and sod production.

Technical representatives from industry (suppliers of equipment, plant protectants, fertilizer, etc.).

Those new to the industry - wanting to get trained and off to a great start
Those with experience in the industry - to review/update their knowledge and practices.

The registration deadline will be mid-December, 2018. Students will have access to the course and materials at their convenience during the 12-week period via moodle class management system. The fee for the course is $495, which includes supplemental materials and a certificate

after successful completion of the program.

Any investment in quality continuing education opportunities benefits employees and employers alike. The 2019 Great Lakes School of Turfgrass Science Online is designed to help meet the continuing education needs of any individual or organization. This 12-week program will have training sessions accessible live online on Wednesday evenings, beginning in early January, from 6 to 7pm (Central Standard Time) and the option to view the recorded sessions. This certificate program aims to provide participants with thorough and practical continuing education in turfgrass management. The course is directed by educators from the University of Minnesota-Twin Cities and the University of Wisconsin-Madison, with 12 turfgrass scientists and educators from six Land-Grant Universities.

Sessions include:

- **Turfgrass identification, physiology and growth**
- **Soil science and management**
- **Selection and establishment**
- **Nutrition and fertility programming**
- **Mowing and additional cultural practices**
- **Abiotic stresses**
- **Irrigation**
- **Insect biology, identification and management**
- **Disease biology, identification and management**
- **Weed biology, identification and management**
- **Specialty product usage**
- **Mathematics and calibration**

Know someone who might be interested in this opportunity and needs financial help to attend?
Watch for the MGCSA/PBI Gordon GLSTS Scholarship offered in the months ahead.

Insights In Leadership

By Chris Tritabaugh, Superintendent at Hazeltine National Golf Club

Getting them out of bed

If I've heard it once, I've heard it a hundred times- "I'd just like to be able to get my whole crew to show up every day." This, or some variation of this statement seems to come across my Twitter feed at least a couple times a week. "How can we compete with McDonald's!?" is another. How can McDonald's compete with us!?

In 11 years as a superintendent, I can say with a great deal of truth that getting our people to show up in the morning has never been a con-

sistent problem. Yes, we've had the occasional person who finds this basic function to be more difficult than others. However, these types generally find themselves on the outside looking in, and typically find other work. As time went by, I begin to think about why this phenomenon (staff members not showing up), seemingly so prevalent in our industry was of little concern for us.

In doing so, I thought about what it was that got me out of bed in the morning. Why was it that during my time working on a golf course, I never had much of a problem getting out of bed? Additionally, if I did have trouble getting out of bed, why was this the case?

We all know the feeling of being so excited for the coming day that we can't even make it to our morning alarm. The excitement being so great that it's all we need to wake up. And even the most positive of people will know the feeling of dread that accompanies a day you know is going to be hellish. Its a feeling that only makes you want to shut off the alarm and go back to sleep. What can we learn from this?

The answer seems simple enough; create something offering such a level of excitement and inspiration that people can't wait to get up and come to work. In the exploration of my own feelings, I came up with four simple things that got me excited about waking up and going to work; Spending time in a place I loved-with people I considered friends-doing work we enjoyed-while being able to stand back at the end of a day and admire our work.

The theme in these four simple things-enjoyment. Could it be this simple? Allow people to enjoy the place they work, the people they work with, the work they do, all while creating a great product.

Center for Urban
Ecology and Sustainability

Pollinator Conservation

Vera Krischik and Emily Tenczar, University of Minnesota, updated June 2018

Bees pollinate native plants so seeds can be produced. Bees pollinate many crops.

Native bees are threatened by habitat loss, lack of nectar and pollen plants, and insecticides.

Honey bees are threatedend by *Varroa* mites, management practices, lack of nectar and pollen plants, and insecticides.

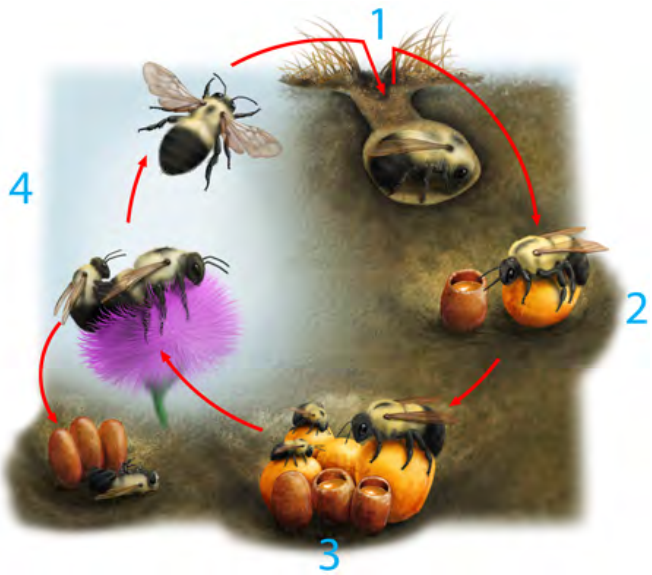
You can help conserve bees by providing habitat for overwintering and summer nest sites. Also, provide heirloom and native plants for pollen and nectar.

Bees are Important Pollinators

Bees and other pollinators provide pollination services for 70 percent of all flowering plants, which result in seeds and fruits. Beyond agriculture, pollinators are keystone species in most terrestrial ecosystems. Fruits and seeds derived from insect pollination are a major part of the diet of birds, and of mammals ranging from red-backed voles to grizzly bears. However, many of our native bee pollinators are at risk, and the status of many more is unknown. Habitat loss, habitat alteration, and fragmentation, insecticide use, and introduced diseases all contribute to the declines of bees.

Bees can be divided into two groups by their lifestyles, either solitary or social. Only a few species of bees are social. Social bees share a nest, and divide the work of building the nest, caring for the offspring, and foraging for pollen and nectar. The principal social bees are the honey bee, which is not native to the U.S. and about forty-five US species of native bumble bees.

The life cycle of a typical bumble bee colony.
Illustration by David Wysotski, Allure Illustration.



THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION

1. A queen emerges from hibernation in spring and finds a nest site, such as a mouse burrow. The queen forages for food until her first eggs hatch. Insecticides in pollen and nectar can cause disruption in behavior and cause reductions in colony health and new queen production.
2. Queens create wax pots to hold nectar and pollen, on which she lays and incubates her eggs.
3. When her daughters emerge as adults, they take over foraging and other duties.
4. In autumn the colony produces new queens who leave to find mates. Newly mated queens hibernate until the next spring.

Types of Bees: Learn How to Identify Common Native Bees in Landscapes

Bumblebees (*Bombus* species, Family Apidae)

Bumble bees are fat, hairy, bees about 10-23 mm in length that nest in the ground. Some species, such as *Bombus impatiens*, are used to pollinate greenhouse crops.
Pictured: *Bombus ternarius*
Rob Routledge, Sault College, Bugwood.org

Honey Bees (*Apis mellifera*, Family Apidae) introduced

The European honey bee is 10-15 mm in length and is used for pollination and honey production. Bees have perennial colonies and survive winter on stored honey.
Pictured: *Apis mellifera*
David Cappaert, Michigan State University, Bugwood.org

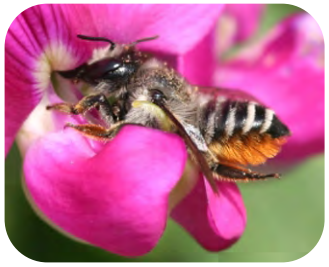
Digger and Long-Horned Bees (Family Apidae)

Digger bees are hairy bees that range from 5- 25 mm in length and carry pollen on the hind legs. Most species are solitary and nest in the ground or in vertical banks, often in sandy soil.
Pictured: *Melissodes bimaculata*
Johnny N. Dell, Bugwood.org

Carpenter Bees (Family Apidae)

Carpenter bees are 13-30 mm in length and chew out galleries in wood to lay their eggs. Most species are solitary, but a few species are semisocial and nest together.
Pictured: *Ceratina* species
Steve Nanz, University of Minnesota Extension Service

Leafcutter Bees (Family Megachilidae)



Leafcutter bees are 10-20 mm in length and nest in cavities. Most are solitary, but nests may be aggregated and use bits of leaves and flowers to wrap brood cells for their young.
Pictured: *Megachile* sp.
Whitney Cranshaw, Colorado State University, Bugwood.org

Mason Bees (Family Megachilidae)

The blue orchard bee (*Osmia lignaria*) is an important fruit pollinator. These solitary bees are 3-20 mm in length and use mud to divide brood cells.
Pictured: *Osmia lignaria*
Scott Bauer, USDA Agricultural Research Service, Bugwood.org

Mining Bees (Family Andrenidae)

Mining bees can be as small as 2 mm or as large as 25 mm in length. All species nest in the ground. Some species are important apple pollinators.
Pictured: Andrenid Bee
David Cappaert, Michigan State University, Bugwood.org

Sweat Bees (Family Halictidae)

These small bees are sometimes brightly colored and may be 3-23 mm depending on species. Most are solitary and nest in the ground or in wood.
Pictured: *Agapostemon* sp.
David Cappaert, Michigan State University, Bugwood.org

Polyester Bees (Family Colletidae)

These 5-15 mm solitary bees nest in the ground or in wood and line brood cells with a substance that resembles cellophane. These bees nest alone but may aggregate.

Pictured: *Hylaeus* sp.
David Cappaert, Michigan State University, Bugwood.org

Social Wasps (Family Vespidae)

Social wasps (yellowjackets, paper wasps, hornets) are sometimes mistaken for bees. These beneficial predators are often seen at picnics in late summer.

Pictured: *Vespula maculifrons*
Gary Alpert, Harvard University, Bugwood.org

The new EPA bee icon and bee advisory box on insecticide labels

EPA has added new language to neonicotinyl insecticide products (imidacloprid, dinotefuran, thiamethoxam, and clothianidin) to protect bees and other insect pollinators. The bee icon above signals that the pesticide has potential to harm bees. The language in the new bee advisory box explains application restrictions to protect bees.

Bee and other insect pollinators can be exposed to the product from:

1. Direct contact during foliar application or contact with residues on plant surfaces after foliar application.

2. Ingestion of residues in nectar and pollen when the pesticide is applied as a seed treatment, soil, tree injection, as well as foliar application.

Bees and Insecticides

Honey bees and native bees, such as bumble bees, pollinate 30% of the plants that produce the vegetables, fruits, and nuts that we consume. More than 100 crops in North America require pollinators. Pollination by bees contributes over $18 billion worth of additional crop yields. In addition, bees pollinate native plants that require seed to sustain future populations. Both native bees and managed honey bees are in decline due to habitat loss, loss of high quality pollen (protein), loss of nectar plants, pathogens, and insecticide use.

Honey bee colonies in Europe and North America have faced some difficult problems for a long time. Beekeepers have been battling the devastating effects of a parasite of bees called the *Varroa* mite, which was introduced into Europe in the 1970's and in the US in 1980's and is very difficult to control. Honey bees are also faced with a number of diseases and viruses that compromise their immune systems and health in general. Since WWII, with the increase in monocultures and herbicide use, there has been a serious decrease in flowering plants that bees depend on for food.

Beginning in 2006 a yearly die-off of honey bee colonies occurred throughout the US. The cause of this mortality is still unknown but was coined, Colony Collapse Disorder. Most researchers now agree that honey bee decline is due to multiple, interacting causes, including the effects of bee specific diseases and parasites, lack of floral resources that provide good bee nutrition, and lethal and sub-lethal effects of insecticides. It is known that insecticide use in general can take a toll on honey bees and native bees when the bees are exposed to high enough concentrations.

However, it is unclear how much the neonicotinyl insecticides contribute to honey bee poor health or even mortality. Recent research indicates that bees exposed to relatively low doses of neonicotinyl insecticides (10 ppb) may have suppressed immune systems, which makes them more susceptible to some bee diseases. Research also shows that neonicotinoids can have multiple sublethal effects on bees, including disorientation, effects on learning and a reduction in pollen collection and storage. More research needs to be conducted to determine residue levels that bees are exposed to in agricultural and urban environments.

Neonicotinoid Insecticides Harm Pollinators

- The class of neonicotinoids insecticides (imidacloprid, dinotefuran, clothianidin, and thiamethoxam) are highly toxic to honey bees and other pollinators. They are systemic, meaning that they are taken up by a plant's vascular system and expressed through pollen, nectar and guttation droplets on leaf tips from which bees forage and drink.
- Research has shown that sublethal exposure to neonicotinoid insecticides causes significant problems for bee health, including disruptions in mobility, navigation, feeding, foraging, memory, learning, and overall hive activity.
- Insecticides are also suspected to affect honey bees' immune systems, making them more vulnerable to parasites and other pathogens.
- Seed treated crops usualy demonstrate less than 7.6 ppb in pollen or nectar. Research has not shown dramatic effects on honey bee colonies, but has in 2 species of native bees.
- In landscape and greenhouses higher rates of neonicotinoids are used compared to seed treatments. A canola and corn seed seed is coated with 0.11 mg and 0.625 mg of imidacloprid. A 3 gallon pot in the nursery can have 300 mg applied according to the label.

Futhermore, the new EPA labels states that…When using this product take steps to:

1. Minimize exposure when bees are foraging on pollinator attractive plants around the application site.

2. Minimize drift of this product onto beehives or to off-site pollinator attractive habitat. Drift of this product onto beehives can result in bee kills.

Bee kills should be reported to Minnesota Depart of Agriculture (www.mda.state.mn.us , type bee kill into search), National Pesticide Information Center (www.ipm.orst.edu), and EPA (beekill@epa.gov).

Regulatory Issues

- On April 27 2018 the European Commission banned three neonicotinoids, clothianidin, imidacloprid, and thiamethoxam, to all field crops and landscapes, because of growing evidence that these insecticides harm bees. A scientific review by the European Food Safety Authority, released this February, added momentum to the campaign https://www.efsa.europa.eu/en/press/news/180228 .
- For three years starting in January 2014, the Commissioner of the European Union restricted the use of 3 neonicotinoids (clothianidin, imidacloprid and thiametoxam) for seed treatment, soil application and foliar treatment on plants that are attractive to bees. Also, new practices must be developed to reduce neonicotinyl dust at planting of seed- treated crops.

Recent Research Highlights Risks

- A 2013 Sussex University, UK study concluded that residue in agricultural fields contained sufficient neonicotinyl insecticides to reduce bumblebee colony health.
- A 2012 USDA study and a 2009 University of Padova, Italy study demonstrated that corn and cantaloupe seedlings drip fluids filled with very high amounts of imidacloprid and bees frorage on these fluids.
- A 2012 Purdue University study and a 2012 University of Padova, Italy study revealed that bees were exposed to clothianidin through dust that is expelled from mechanical planters containing coated seeds.
- A 2012 from France showed that when bees were exposed to sublethal doses of thiamethoxam, foraging and feeding behavior were significantly degraded.
- A 2012 University of California at San Diego study found that small doses of imidacloprid depress the ability honey bees to communicate and effectively feed the colony.

Colony Collapse Disorder

What is Colony Collapse Disorder?

Colony Collapse Disorder (CCD) is the name given to the mysterious decline of honey bee populations around the world beginning in 2006. On average, the U.S. Department of Agriculture (USDA) reports that beekeepers have been losing over 30% of their honey bee colonies each year. While CCD appears to have multiple interacting causes, including pathogens and mites. Neonicotinoids are a particularly suspect class of insecticides, especially in combination with the dozens of other insecticides found in honey bee hives.

Key symptoms of CCD include:

1) inexplicable disappearance of the hive's worker bees

2) presence of the queen bee and absence of invaders

3) presence of food stores and capped brood

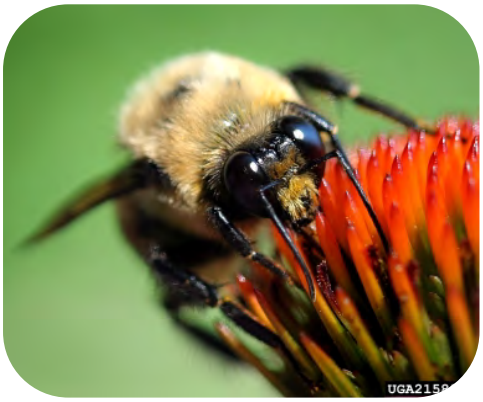
4) suprasedure (new queen)

Honey bee colonies can be moved across country to pollinate seasonal crops
Howard F. Schwartz, Colorado State University, Bugwood.org

How You Can Help: Provide Habitat and Nests for Summer and Winter

There are a number of things you can do to help conserve pollinators in your area:

1. Plant native and heirloom trees, shrubs, and flowers that bloom from April through September to create a consistent food supply so pollinators can complete their life cycles.
2. Minimize the use of broad-spectrum insecticides. These are toxic to bees and include neonicotinoids, pyrethroids, organophosphates, and others. If you must spray, choose a biorational chemical (safer to beneficials) and spray in early evening when most pollinators are less active. Planting insect- and disease-resistant varieties, proper irrigation and nutrition management, and allowing beneficial insects and spiders to visit plants may reduce the need for insecticides.
3. Provide or preserve nesting sites for native bees. Depending on species, bees may nest in the ground, in cavities, or in wood. Tunnel nests can be constructed with bamboo sticks or wooden blocks. For information on building your own nests for native bees, visit the Xerces Society Pollinator Conservation Program (http://www.xerces.org/pollinator-conservation/).



Pollinator conservation is essential for agriculture ornamental production, and natural landscapes

Pictured: Bumble bee (*Bombus impatiens*)
David Cappaert, Michigan State University, Bugwood.org

Bamboo insect hotel used by mason bees (*Osmia* spp.)
Magne Flaten [GFDL or CC-BY-SA-3.0-2.5-2.0-1.0], Wikimedia Commons

Nesting blocks in alfalfa field for use by alfalfa leafcutting bee (*Megachile rotundata*)
Whitney Cranshaw, Colorado State University, Bugwood.org

How You Can Help: Provide Habitat and Bee Plants

Pollinators require both nectar and pollen for their life cycles. Planting trees, shrubs, and flowers that bloom from April through September creates a consistent food supply so pollinators can complete their life cycles. Ground covers (such as *Ajuga*, squill, crocus, clover, and creeping Charlie) are also good bee plants. Visit a local plant nursery and select plants that are hardy for your zone. The first two rows below are native species; the last two rows are common garden species.

Early Season	Early-Mid Season	Mid Season	Mid-Late Season	Late Season
 Serviceberry (*Amelanchier* species)[1]	 Wild rose (*Rosa* species)[1]	 Purple prairie clover (*Petalostemum candida*)[1]	 Anise hyssop (*Agastache foeniculum*)[1]	 New England aster (*Symphyotrichum novae-angliae*)[2]
 Pussy willow (*Salix discolor*)[1]	 Basswood, linden (*Tilia americana*)[3]	 Swamp milkweed (*Asclepias incarnata*)[2]	 Wild bergamot (*Monarda fistulosa*)[2]	 Goldenrod (*Solidago* species)[1]
 Carolina lupine (*Thermopsis villosa*)[1]	 Garden sage (*Salvia nemorosa*)[2]	 Billard's spiraea (*Spiraea x billardii*)[4]	 Sunflower (*Helianthus* species)[1]	 Korean angelica (*Angelia gigas*)[5]
 Siberian squill (*Scilla siberica*)[6]	 Catmint (*Nepeta x faassenii*)[2]	 Catnip (*Nepeta cataria*)[7]	 Globethistle (*Echinops* species)[8]	 Stonecrop (*Sedum* species)[2]

[1] Prairie Moon Nursery, www.prairiemoon.com
[2] North Creek Nurseries, www.northcreeknurseries.com
[3] Paul Wray, Iowa State University, Bugwood.org
[4] Alfred Osterloh, [C-BY-NC-SA-3.0], Hortipedia Commons
[5] Hardyplants at English Wikipedia, Wikimedia Commons
[6] Heike Löchel, [CC-BY-SA-2.0-de], Wikimedia Commons
[7] Theodore Webster, USDA Ag Research Service, Bugwood.org
[8] Barbara Tokarska-Guzik, University of Silesia, Bugwood.org

Insecticide Toxicity to Bees: By active ingredient

Chemical class	Examples of common names	Examples of trade names	Toxicity			
			Non	Low	Mod	High
Carbamates	carbaryl, methomyl	Sevin, Lannate				x
Neonicotinoids	Imidacloprid (I) thiamethoxam (T) clothianidin (C) dinotefuran (D) imid+bifenthrin (I,B)	Nursery/landscape Merit, Marathon, Flagship, Meridian, Arena, Aloft, Safari, Allectus, Field crops Gaucho (I), Poncho (C), Cruiser(T) (seed treatments), Admire/Provado (I), Venom (C), Platinum (T)				x
	Acetamiprid (A), thiacloprid (T)	Tristar (A), Assail (A), Calypso (T)		x		
Organophosphates	acephate, chlorpyrifos, dimethoate, malathion, phosmet	Orthene, Dursban/Lorsban, Dimethoate, Malathion, Imidan				x
Pyrethroids	bifenthrin, cyfluthrin, fenpropathrin, lambda-cyhalothrin, permethrin	Attain/Talstar, Tempo, Decathalon, Tame, Scimitar, Astro				x
Botanical	pyrethrum/pyrethrins azadirachtin, neem oil	Pyganic, Azatin, Ornazin, Triact				x
Insect growth regulators	diflubenzuron tebufenozide	Adept, Dimilin, Confirm			x x	
	azadirachtin buprofezin pyriproxyfen	Aza-Direct, Azatin, Ornazin, Talus Distance	 x x		x	
	novaluron	Pedestal			x	
Juvenile hormone	s-kinoprene	Enstar II	x			
Diamides	chlorantraniliprole cyantraniliprole	Acelepryn	x			
Macrocyclic lactones	abamectin/avermectin, emamectin benzoate	Avid, Tree-Age				x x x
Miticides	acequinocyl, extoxazole, fenpyroximate, fenbutatin-oxide	Shuttle, TetraSan, Akari,Vendex	x			
	clofentezine, hexythiazox	Ovation, Hexagon		x		
	bifenazate	Floramite			x	
	pyridaben	Sanmite				x
Spinosyns	spinosad	Conserve/Entrust, less toxic dried		x		
Tetronic acids	spiromesifen	Judo			x	
Tetramic acid derv	spirotetramat	Kontos				x
GABA-gated chloride channel	fipronil	Fipronil, Termidor,				x
Pyridine carboxamide	flonicamid	Aria	x			
Pyridine azomethines	pymetrozine	Endeavor	x			
Other insecticides	*Bacillus thuringiensis, Cydia pomonella* granulovirus	Bt/Dipel, Carpovirusine/Cyd-X	x			
	Kaolin clay, potassium salts of fatty acids	Surround, M-Pede		x		
	horticultural mineral oils	Monterey Oil			x	
	indoxacarb	Provaunt				x

Insecticide Toxicity to Bees: Consumer Products

Modified From: Nixon, P.L. 2011. Names of General Use Insecticides. University of Illinois. URL: http://ipm.illinois.edu/hyg/insects/insecticide_trade_names_for_homeowners.pdf

Krupke, C.H., *et al*. 2012. Beekeeping: Protecting Honey Bees From Insecticides. Purdue Extension E-53-W. URL: http://extension.entm.purdue.edu/publications/E-53.pdf

This table lists the trade names of insecticides available to homeowners and other residents. The common names of the insecticides are followed by the commercial trade names. Not all products are listed in this table. Be sure to read the label. **Toxicity to bees: 1= highly toxic; 2= moderately toxic; 3= nontoxic to bees**

Common name	**Trade names**	
1 acephate	Acephate Bonide Systemic Insect Control	Orthene
2 acetamiprid	Ortho Flower, Fruit & Vegetable Insect Killer	Ortho Rose & Flower Insect Killer
3 *Bacillus thuringiensis* var. *kurstaki* (bacterial toxin)	Dipel Green Step Caterpillar Control Safer Caterpillar Killer	Safer Garden Dust Thuricide
1 beta-cyfluthrin	Bayer Advanced Dual Action Rose & Flower Insect Killer (+imidacloprid) Bayer Advanced Home Pest Control Indoor/Outdoor	Bayer Advanced PowerForce Multi-Insect Killer Granules
1 bifenthrin	Bonide Eight Insect Control Flower & Vegetable Green Thumb Premium Insect Control Hi-Yield Bug Blaster II	Ortho Bug-B-Gon MAX Insect Killer for Lawns Ortho Bug-B-Gon MAX Lawn & Garden Insect Killer Scott's Super Turf Builder with Summerguard
canola oil **1 contact** **3 residual**	Bayer Advanced Natria Multi-Insect Control Earth-tone Horticultural Oil Earth-tone Insect Control (+pyrethrins)	Gardens Alive House Guardian Insect Spray (+pyrethrins) Ortho Elementals Garden Insect Killer (+pyrethrins) Gardens Alive Pyola (+pyrethrins)
1 carbaryl	Bayer Advanced Complete Insect Killer for Gardens Bonide Dragon Dust (+copper) Bonide Fruit Spray (+malathion, captan)	Bonide Rose Rx Rose & Flower Dust (+malathion, captan) Sevin
3 chlorantraniliprole	Acelepryn	Grub-ex
clove oil **1 contact, 3 residual**	Bonide Mite-X (+cottonseed oil, garlic extract)	EcoSmart Home Pest Control (+rosemary oil, peppermint oil, thyme oil)
cottonseed oil **1 contact, 3 residual**	Bonide Mite-X (+clove oil, garlic extract)	Gardens Alive Oil-Away Supreme Insecticidal Spray
1 cyfluthrin	Bayer Advanced Vegetable & Garden Insect Spray	Bayer Advanced PowerForce Multi-Insect Killer Liquid
1 deltamethrin	Hi-Yield Kill-A-Bug II Dust Hi-Yield Kill-A-Bug II Indoor/Outdoor Spray	Hi-Yield Turf Ranger Insect Control Granules Hi-Yield Veg. & Ornamental Insect Control Granules
1 diatomaceous earth	Garden Safe Crawling Insect Killer	Natural Guard Crawling Insect Control
1 gamma-cyhalothrin	Spectracide Triazicide Once & Done Insect Killer	
3 garlic	Bonide Mite-X (+clove oil, cottonseed oil)	
3 halofenozide	Dow Mach II	
3 *Heterorhabditis bacteriophora*	**(insect-attacking nematode)** Gardens Alive Grub-Away Beneficial Nematodes	
1 imidacloprid **Systemic** **Related neonicotinyls:** **• thiamethoxam (Flagship, Meridian)** **• clothianidin (Arena, Aloft)** **• dinotefuran (Safari)** **• imid+bifenthrin (Allectus)**	Bayer Advanced All-in-One Rose & Flwr (+tebuconazole) Bayer Advanced Dual Action Rose & Flwr (+beta-cyfluthrin) Bayer Advanced Fruit, Citrus, & Veg. Insect Control Bayer Advanced Season-Long Grub Control Bayer Advanced 3-in-1 Insect, Disease, & Mite Control (+tau-fluvalinate, tebuconazole) Bayer Advanced 2-in-1 Systemic Rose & Flower Care Bayer Advanced 12 Mo. Tree & Shrub Insect Control Bayer Advanced 12 Mo. Tree & Shrub Protect & Feed Bayer Advanced 2-in-1 Insect Control +Fertilizer Spikes Bonide Annual Grub Beater	Bonide Annual Tree & Shrub Insect Control Bonide Borer-Miner Killer with Systemaxx Bonide Guard-N-Grow Bonide Rose Rx Systemic Drench (+tebuconazole) Bonide Systemic Insect Control with Systemaxx Ferti-lome Rose & Flower Food w/Systemic Insecticide Ferti-lome Tree & Shrub Systemic Hi-Yield Systemic Insect Granules Merit Ortho Max Tree & Shrub Insect Control Ortho Tree & Shrub Insect Control

Common name	Trade names	
insecticidal soap (potassium salts of fatty acids) 1 contact, 3 residual	Bayer Advanced Natria Insecticidal Soap Bonide Insecticidal Soap Concern Insect Killing Soap Concern Tomato & Vegetable Insect Killer (+pyrethrins) Earth Options by Raid Insecticidal Soap Earth-tone Insecticidal Soap Garden Safe Insecticidal Soap Ortho Elementals Insecticidal Soap	Safer End-ALL Insect Killer (+neem, pyrethrins) Safer Fruit & Vegetable Insect Killer Safer Insect Killing Soap Safer Rose & Flower Insect Killer Safer 3-in-1 Garden Spray (+sulfur) Safer Tomato & Vegetable Insect Killer (+pyrethrins) Safer Yard & Garden Insect Killer (+pyrethrins)
3 iron phosphate	Bayer Advanced Dual Action Snail & Slug Killer Bait Bayer Advanced Snail & Slug Killer Bait Bonide Bug & Slug Killer (+spinosad) Bonide Slug Magic	Ferramol Slug & Snail Bait Ortho Elementals Slug & Snail Killer Sluggo Gardens Alive Escar-Go
3 kaolin	Surround at Home Crop Protectant	
1 lambda-cyhalothrin	Bonide Beetle Killer Bonide Caterpillar Killer	Bonide Colorado Potato Beetle Beater Spectracide Triazicide Once & Done Insect Killer
2 malathion	Malathion Bonide Malathion Bonide Fruit Spray (+carbaryl, captan)	Bonide Rose Rx Rose & Flower Dust (+carbaryl, captan) Ortho Max Malathion Insect Spray
3 metaldehyde	Deadline Enforcer Everlast Snail & Slug Bait Hi-Yield Improved Slug & Snail Bait	Ortho Bug-Geta Plus Snail, Slug & Insect Killer (+carbaryl) Ortho Bug-Geta Snail & Slug Killer
2 neem oil	Bonide Bon-Neem II (+pyrethrins) Bonide Neem Oil Bonide Rose Rx 3-in-1 Concern Garden Defense Multi-purpose Spray Ferti-lome Fruit Tree Spray (+pyrethrins)	Ferti-lome Triple Action Plus Garden Safe Neem Oil Extract Green Light Fruit Tree Spray (+pyrethrins) Safer BioNEEM Insecticide & Repellent Safer End-ALL Insect Killer (+insect. soap, pyrethrins)
3 parasitic nematodes	Many trade names	
3 *Paenibacillus popilliae*	**(Milky spore disease)** Many trade names	Product is not very effective
1 permethrin	Bayer Advanced Complete Insect Dust for Gardens Borer-Miner Killer Bonide Eight Garden & Home Insect Control Bonide Eight Insect Control Garden Dust Bonide Eight Insect Control Vegetable, Fruit, & Flower Bonide Eight Insect Control Yard & Garden Bonide Total Pest Control Outdoor Enforcer Outdoor Insect Killer	Ferti-lome Indoor – Outdoor Multipurpose Insect Spray Green Thumb Flying Insect Killer (+d-trans allethrin) Hi-Yield Indoor Outdoor Broad Use Insecticide Hi-Yield Kill-A-Bug II Lawn Granules Hi-Yield Lawn, Garden, Pet, and Livestock Insect Control Hi-Yield Turf, Termite, and Ornamental Insect Control Ortho Bug-B-Gon MAX Garden Insect Killer Dust
petroleum oil 1 contact, 3 residual	Bonide All Seasons Horticultural Spray Oil Bonide All Seasons Spray Oil	Horticultural Spray Oil Ortho Volck Oil Spray
1-3 pyrethrins principally from plant species *Chrysanthemum cinariaefolium*	Bayer Advanced Natria Insect, Disease, & Mite Control (+sulfur) Bonide Bug Beater Yard & Garden Bonide Citrus, Fruit, & Nut Orchard Spray (+sulfur) Bonide Garden Dust (+sulfur, copper) Bonide Japanese Beetle Killer Bonide Pyrethrins Garden Insect Spray Bonide Tomato & Vegetable 3-in-1 (+sulfur) Concern Tomato & Veg. Insect Killer (+insecticidal soap) Earth-tone Insect Control (+canola oil) Ferti-lome Quick Kill Home, Garden, and Pet Spray	Ferti-lome Triple Action Plus II Safer End-ALL Insect Killer (+neem, insecticidal soap) Safer Tomato & Vegetable Insect Killer (+insecticidal soap) Garden Safe Fruit & Vegetable Insect Killer Garden Safe Houseplant & Garden Insect Killer Garden Safe Multi-Purpose Garden Insect Killer Garden Safe Rose & Flower Insect Killer Gardens Alive Rose & Ornamental Plant Spray (+sulfur) Ortho Elementals 3-in-1 Rose & Flower Care (+sulfur) Gardens Alive Pyola (+canola oil) Safer Yard & Garden Insect Killer (+insecticidal soap)
3 sodium ferric EDTA	Safer Dr. T Slug & Snail Killer	
3 spinosad, when residue is dry	Bonide Bug & Slug Killer (+iron phosphate) Bonide Captain Jack's Deadbug Brew Gardens Alive Bulls-Eye Bioinsecticide	Conserve Ferti-lome Borer, Bagworm, Leafminer & Tent Caterpillar Spray
3 trichlorfon	Dylox	Bayer Advanced 24-Hour Grub Killer Plus

Center for Urban
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cues.cfans.umn.edu/

University of Minnesota Extension Service

Research and outreach **supported** by 2010 LCCMR "Mitigating Pollinator Decline"

Photo © Prairie Moon Nursery, www.prairiemoon.com/

Additional Resources

University of Minnesota Bee Lab
www.beelab.umn.edu/

The Xerces Society for Invertebrate Conservation
www.xerces.org/

North American Pollinator Protection Campaign
pollinator.org/nappc/index.html

Pollinator Partnership
www.pollinator.org/index.html

EFSA, European Food Safety Authority
www.efsa.europa.eu/en/topics/topic/beehealth.htm

Befriending Bumble Bees: A practical guide to raising local bumble bees www.beelab.umn.edu/Bumblebee/index.htm

Wild Bees and Building Wild Bee Houses
www.beelab.umn.edu/Bumblebee/index.htm

Managing Alternative Pollinators: A Handbook for Beekeepers, Growers, and Conservationists
www.beelab.umn.edu/Bumblebee/index.htm

Pollinators of Native Plants by Heather Holm
www.pollinatorsnativeplants.com/

Lists of best plants for pollinators, butterflies, and beneficial insects

CUES: CFANS IPM Pollinator conservation
cues.cfans.umn.edu/
CUES: Poster, Save the bees plant flowers and trees
http://cues.cfans.umn.edu/old/pollinators/plantsposter.pdf
CUES: Poster, native plants
http://cues.cfans.umn.edu/old/gervais/poster.pdf
CUES: Bulletin, Plants for butterfly gardening
www.extension.umn.edu/garden/yard-garden/landscaping/butterfly-gardening/
CUES: List, Plants that provide pollen and nectar
http://cues.cfans.umn.edu/old/gervais/keytable.htm

The MGCSA wishes to thank Dr. Vera Krischik, UMN Extension, for her hard work developing, and providing premission to re-print, this fine information. Your support is appreciated.

How To Engage And Motivate Your Seasonal Workers

Kevin Kruse, Founder and CEO of LEADx.org

How can you motivate and engage your seasonal workers, when their job may only last for a number of months?

Whether it's department stores hiring extra cashiers for the holiday season, or amusement parks hiring for the summer crowds, the employee engagement of high performing seasonal workers is one of talent management's greatest challenges. And even when team members start out as engaged, it's not uncommon for long, hot summer days and demanding customers to begin to take a toll on engagement mid-season.

Yet, the engagement of seasonal workers is critical. Engaged workers—those who are emotionally committed to their employers—are more productive, provide better customer service, have few accidents and will be

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more likely to return the following year.

I recently had the pleasure to interview Matt Heller, a consultant who learned real-world lessons when he led seasonal workers in the amusement park industry. He is the author of the book, The Myth of Employee Burnout: What It Is. Why It Happens. What To Do About It.

Gallup has reported that over 70 percent of the variance in engagement is tied to the manager, and Heller's own experience confirms this. He writes that theme park managers routinely blame "burnout" on the heat, long hours and demanding guests. Yet the root cause of employees feeling stressed and overworked has to do with their manager, and the influence the manager has on the environment.

My own research and experience as a Best Place to Work winner suggests that Growth is one of the top drivers of engagement. I asked Heller how we can activate the Growth driver given the limited time we have with a seasonal employee.

One of the things that stunts the growth in many seasonal workers is the practice of front-loading all of their training. There are a number of pitfalls with this technique. First, it gives employees very little to look forward to. Second, rarely do employees truly learn and absorb all of the material covered in a few days or hours of orientation. A better system is to provide training in small nuggets. This way the material sticks better, and they have a chance to actually put it into practice.

A number of years ago, an amusement park in Santa Claus, Indiana, called Holiday World, decided to separate their task training and hospitality training. Instead of inundating new employees with everything all at once, they first spend time making sure they have the competence and confidence to perform their assigned tasks. Then, once proficiency has been demonstrated, they bring them back to go over specific hospitality expectations and strategies. With this approach, Holiday World earned the Golden Ticket award for the Friendliest Employees in the industry 13

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out of the 17 years the award has been given.

Heller is in agreement with my views that signs of appreciation are huge when it comes to engaging seasonal workers. He said, “I often hear leaders saying thank you to their entire team at a meeting or at the end of long day, thinking that this counts as recognition. It’s a step, but for that thank you to really mean something to the individual, the comment needs to be sincere, timely, and specific to the person and the situation. That way, they know specifically what they are being thanked for and know that the behavior is desired again. The blanket ‘thank you’ could actually send a message to a non-performer that what they did that day was okay and worth repeating. And unfortunately, poor performance is what they will repeat!”

It’s also important to realize how recognition, in its most basic form, can have an impact. Specifically, in calling someone by name or remembering something about them. Recognizing them as a person and as a human being with thoughts, feelings, aspirations and fears allows you to make a

connection with that person that builds trust and respect.

When it comes to bringing employees back for the next season, Heller has some contrarian advice. “Don’t bring everyone back,” he said. “If you bring everyone back, regardless of performance the previous year, you are telling your star performers that their over-and-above effort was wasted. They would have been asked back as long as they just showed up for work, regardless of their performance.”

Heller mentions that many summer seasonal jobs are filled with young people—either high school or college students looking to make money and get job experience in between school years. A big reason these workers return each summer is because their friends are coming back, too.

Heller suggests: Maintaining a strong alumni network will help keep people excited and engaged and want to continue to be a part of your organization. This can be done through events, social media, or an online forum on your website. Whatever method you choose, if you keep large groups of friends engaged with your company, they will

be back.

To succeed with the recruiting, retention and engagement of seasonal workers, leaders need to appropriately value this segment of their team and realize how critical they are to the success of the entire business. When valued appropriately, the resources and attention can be applied to make seasonal workers a competitive advantage.

Kevin Kruse is the Founder + CEO of LEADx.org, an online learning platform that provides free leadership training to anyone, anywhere, at anytime. I'm also a NY Times bestselling author and keynote speaker. My books include Employee Engagement 2.0 and 15 Secrets Successful People Know About Time Management. As a serial entrepreneur my companies have won both Inc 500 awards for growth, and Best Place to Work awards for company culture.

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Diseases To Spray For and Diseases To Let Go

Paul Koch, PhD
University of Wisconsin – Madison

There are over 50 potential turfgrass diseases that could be devouring your turf at this very moment, according to a quick count of the diseases listed in the Compendium of Turfgrass Diseases, 3rd edition. When coupled with all the other headaches on your plate that number of possible diseases sounds overwhelming. But as you know, the number of diseases you actually have to worry about is much lower, probably somewhere around a dozen or so.

So which ones do you really have to worry about and which ones are more of a nuisance? For most courses in the state, it doesn't make financial sense to control every single disease that could occur throughout the year. Some diseases are relatively rare or isolated but are difficult to get rid of once they develop and should be targeted for preventative applications. Others are extremely common but don't do any lasting damage and can either be ignored or sprayed curatively. As always, expectations and budgets differ at every course, but below are some diseases I feel are best to spray preventatively, others to keep an eye out for, and still others to let go in most situations.

Spray away!

Dollar spot: This one is pretty obvious, and in my opinion there should be some level of dollar spot protection in any spray that goes out between June 1st and October 15th (longer in some years!). Curative control of dollar spot is not usually that difficult to achieve, but you'll typically need higher fungicide rates and tighter reapplication intervals to get the disease under wraps. The ideal compromise is to implement 'just-in-time' preventative applications with the aid of a predictive model…but you guys are probably sick of hearing about our work on that by now.

Snow mold: Another obvious disease for preventative control unless you're reading this from Florida. We've got one chance to get snow mold protection

right, and hoping for a mild winter isn't an effective strategy (Figure 1). With that said, I do feel that many courses in southern Wisconsin can get adequate protection for their fairways with just a single DMI in the tank.

Anthracnose: We don't get the severe anthracnose that our colleagues out east do, but I have still seen some nasty anthracnose cases in Wisconsin over the years. Most of the nastiest cases were on annual bluegrass greens with VERY low nitrogen programs, below 1 lb of N per 1000 ft2. Once you have anthracnose it is often difficult to get rid of it, so build preventative fungicide ap-

Figure 1, above: Don't mess around with snow mold in Minnesota.

plications into your cultural program that includes frequent topdressing, rolling, and annual nitrogen rates of 2 lbs or higher.

Patch diseases: Root diseases like take-all patch and summer patch aren't normally that severe over a widespread area, but once the symptoms appear they are a chore to get rid of. If you have seen either take-all or summer patch on the course before, especially on the greens, it's best to implement a preventative program with two applications in the spring once soil temperatures hit 55 to 60°F for a period of 5 straight days. If you haven't observed them in the past, or haven't seen them in several years, there may not be a need to spray.

Fairy ring: Fairy ring is similar to the patch diseases in that it rarely causes widespread problems, but once it does it's very difficult to get rid of. In fact, the same applications in the spring targeting take-all patch and/or summer patch can be used to target fairy ring.

Have product on hand ad be ready to go, but…

Brown patch: I see brown patch almost every year in Wisconsin, but rarely is it very widespread, long lasting, or damaging. Avoid urea applications (or other fast-release nitrogen) during periods of extended heat and humidity, and if a prolonged heat wave is predicted put down a QoI (ie Heritage or Insignia). But in most years, brown patch is a minor disease for us.

Pythium blight: Similar to brown patch, Pythium blight is rarely a significant issue in Wisconsin if you're not dealing with a new seeding (Figure 2). However, Pythium blight can kill plants very rapidly, so consider applying a preventative fungicide if nighttime lows are forecasted to be above 72°F for 3 days or more. QoI fungicides provide some Pythium protection, and in most years enough protection for our needs, but if a St. Louis heat wave comes our way then have some Subdue Maxx, Stellar, or Banol on hand.

Pythium root rot: Pythium root rot is similar to Pythium blight, it just occurs on the roots during warm and very wet periods. I rarely see a need to apply preventative applications targeting Pythium root rot, but during very warm and wet periods an application of a Pythium-specific product may be warranted…but be sure to water the product in!

Figure 2 above: Pythium blight can be a severe disease on new seedings. This picture was taken in July within a year of establishment…but for most of us Pythium is a relatively minor disease.

In most cases, just let it mellow…
Brown ring patch: Also known as Waitea patch, this disease can be significant in some years on annual bluegrass surfaces. But rarely do we reach the severity that they see on the west coast or in the mid-Atlantic. If you have had significant brown ring patch in the past I would recommend a fungicide application, but for most of us the disease doesn't stick around for longer then a week or two and any damage is usually short-lived and superficial.

Leaf spots: Leaf spots are an umbrella term that includes a host of different individual diseases, with Bipolaris and Drechslera being the two main ones on turf. In certain cases preventative fungicide applications are absolutely required, the most obvious cases being those who still manage some of the older vegetative bentgrasses, which are VERY susceptible to Bipolaris. For most superintendents in Wisconsin, though, leaf spots can cause some irregular discoloration for a period in the spring or maybe a couple of patches during wet periods in the summer. Damage is typically minor and once conditions dry out the turf

Figure 3 above: Microdochium patch in the spring is relatively common, but typically doesn't result in widespread or long-lasting damage.

typically recovers pretty rapidly.

Microdochium patch in the spring: Microdochium patch is that rare snow mold disease that doesn't require snow cover to cause disease, and we often have cool and wet periods in the spring that can favor Microdochium patch development. When snow cover isn't present in the spring Microdochium patch normally develops as small, reddish-colored spots (Figure 3). We rarely have the extended periods of cool, wet weather that other areas of the country have (i.e. Pacific Northwest) that can lead to widespread disease outbreaks. In most cases around Wisconsin, by the time you get your sprayer loaded up and out on the course the conditions have changed enough to naturally suppress disease. However, Microdochium patch outbreaks in the fall SHOULD be controlled prior to snow cover since they will likely lead to increased levels of snow mold over the winter.

Yellow patch: Also known as cool-season brown patch, this circular patch

of faint off-yellow or light brown can sometimes be confused with early development of take-all patch symptoms. However, there is usually a more defined yellow or brown edge to the patch and if incubated overnight in a moist chamber there will be some foliar mycelium that develops (though not nearly as much as develops when brown ring patch is incubated overnight). Again, symptoms are normally isolated and any damage is short-lived and superficial.

The MGCSA wishes to thank Dr. Paul Koch, from the University of Wisconsin, Madison for his contributions to the Hole Notes magazine and industry in general. Special thanks also go to the Wisconsin Golf course Superintendents Association for their permission to reprint this article. which first appeared in the January 2018 issue of Grassroots.

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2018 MTGF FIELD DAY

AUGUST 9 REGISTRATION FORM

The TURF & GROUNDS FIELD DAY is back on the St. Paul campus this year as the University of Minnesota once again partners with the Minnesota Turf and Grounds Foundation to produce this popular event at TROE Center and UFore Nursery.

MAKE PLANS TO JOIN US ON THURS., AUG. 9 for outdoor education presented by University of Minnesota faculty and staff working in turfgrass science, horticulture and forestry. The Field Day will run from 7 a.m. to 1 p.m., with presentation topics ranging from turfgrass species for natural areas to disease management in turf and trees.

Our research and extension programs at the University of Minnesota are constantly evolving. This spring we had several graduate students defend their thesis projects and new students have entered the program. We have also had several new staff hires, and we are looking forward to showcasing their work.

FIELD DAY AGENDA - AUG. 9, 2018

8:00 - 9:00 am / Registration and Networking

9:00 am - 12:00 pm / Turf Track

12:00 - 1:00 pm / Lunch, Vendor Networking & Putting Contest

1:00 - 3:00 pm / Tree and Grounds Track

EDUCATION POINTS

CEU's for Certified Arborist, Municipal Specialist, BCMA - Science, .GCSAA-approved Education Points will be available and announced.

COMPLETE AGENDA ON BACK

FIELD DAY IS LOCATED ON THE NORTHEAST CORNER OF LARPENTEUR & CLEVELAND IN FALCON HEIGHTS

GCSAA APPROVED EDUCATION POINTS

Please register _____ people at $25 ea. for the Turf Track and Lunch for a total of $ _____

Please register _____ people at $25 ea. for Lunch and the Tree and Grounds Track for a total of $ _____

Please register _____ people at $35 ea. for ALL DAY and Lunch for a total of $ _____

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TURF TRACK
TROE CENTER

New Wetting Agent Research
Ryan Schwab, Graduate Research Assistant

Nutrient and Pesticide Runoff From Home Lawns and Golf Courses
Dr. Brian Horgan, Professor

Social and Economic Value of Urban Greenspaces
Ben Janke, Postdoctoral Associate

Fine Fescue Putting Green Research
Dominic Petrella, Postdoctoral Research Associate

Consumer Mixture Drought Trials
Florence Sessoms, Research Scientist

Using Technology to Enhance Irrigation Efficiency
Chase Straw, Post-Doctoral Research Associate
& Dan Sandor, Post-Doctoral Research Associate

Breeding Sustainable Grasses
Dr. Eric Watkins, Professor

Protecting and Promoting Pollinators in Lawns
James Wolfin, Graduate Research Assistant

Reducing Pesticide Use through Natural Weed Suppression
Jon Trappe, Post-Doctoral Research Associate

TREE & GROUNDS TRACK
UFORE NURSERY

What Trees Will We Be Maintaining in 2050?
Dr. Gary Johnson, Professor/Extension Professor

Emerald Ash Borer Pathology Research
Alissa Cotton, Undergraduate Research Assistant

Top Five Tree Diseases in 2018
Ben Held, Research Scientist

Conservation Arboriculture & Retrenchment Pruning Research
Chad Giblin, Research Fellow
& Brian Luedtke, Arborist Technician

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In Bounds

by Jack MacKenzie, CGCS

Although it seems like yesterday, I haven't been a golf course superintendent for over six years. It truly was a wonderful chapter of my life and I will always treasure the memories of surreal sunrises, springtime snow melt, the thrill of a perfect course just moments before a tournament, a joyous and productive crew, the completion of flower planting and even the comforting knowledge that if my course or I needed a hand, help was just a phone call away.

It was, and likely still is, common to reach out to a neighboring course for an extra fertilizer spreader to "get 'er done" in an expedited fashion, a chainsaw or pump following a storm, a green's aerifier exchange or even available "bodies" if a small project requires extra hands. Both high-end private clubs and low budget nine hole tracks were in my target zone if the need arose. The appreciation of a friend close by was reassuring.

Each of you can understand the uniqueness of our side of the golf industry. Technically your organizations are all competing for the same "golf-dollar", yet in a pinch, any one of you would bend over backwards to help a fellow turf manager in need. This willingness to help transcends city limits, county lines and as I learned recently, even state boundaries and a change in vocation.

My not-so-new lifestyle as your association manager, has afforded me the chance to pursue a hobby of adventure canoeing. Destinations over the past few years have included the Arctic Circle, Quetico Canoe Wilderness, BWCA, the lower Rio Grande and just a couple of months ago, 230 miles of the lightly

explored Little Missouri River in North Dakota. At one time I was a paying participant in some of these adventures but now I find myself quite involved as the leader of the expeditions.

The preparation list can be daunting, especially considering the long mileage treks I tend to commit to:

- Equipment procurement; condition review and repair, serviceability, volume, weight, packing, un-packing and repacking
- Food considerations; special diets, dehydrated or fresh, weight, volume, calorie content, shelf life and flavor.
- Potable water availability; local sources, filtration system, ultra-violet purification, quantity, quality and taste.
- Non-potable water? Gallons to transport per person per day, containers, re-supply, food preparation requirements, canoe size, weight and volume.
- Personal gear; waterproof, bug proof, breathable, comfortable, washable, right-sized and versatile.
- Emergency contingencies; satellite communications, medical gear, extraction insurance, weapons, redundant equipment and repair kits.

However, the greatest challenge of an epic expedition is the planning of logistics, specifically shuttle transport to a river's headwaters or insertion, and extraction at specific place and time at the end of a trip. Some waterways are traveled enough that local entrepreneurs have carved out boutique businesses of driving canoes, gear and adventurers. Other canoeing destinations are so lightly traversed the canoeists have to be very creative and diligent in their pre and post water travel plans. The Little Mizz is one such adventure.

Last November, upon determining the river for a spring 'run-off' trip, as the party leader, I began mapping the course, considering miles and day lengths as well as the many items on the punch list. Because the Little Missouri is silt laden with visibility of about an

inch, and home to thousands of bank beavers, they often carry the giardia parasite, our crew would have to haul fresh water (one gallon per person per day) and resupply our water along the route due to the non-potable water in the river. Weight, volume and placement in the canoe were of paramount interest.

It would be a limited challenge trip of modest length to include thirteen days on the river, two parks, the largest grassland preserve in our country, big animals, badlands, sheer rock cliffs, vast prairies, fast water, migratory waterfowl, petrified trees, oil derricks, ranches, sunrises, sunsets, good food and great company, as I would be traveling with a solid individual prepared for the elements.

Gear allocation was easy as between two experienced individuals, we had ample equipment. The logistical challenge began when I researched potential shuttle services. The Little Missouri is a fantastic river to canoe, unfortunately the window of

An indespensable logistical support team from Medicine Hole Golf Club, left, Assistant Superintendent Brian Klatt and right, Superintendent Terry Simon, at the insertion point on the Little Missouri River in Marmarth ND. Without industry help, this expedition would not have taken place. Thank you both.

opportunity to paddle the section we chose is only about three weeks long due to the rapid loss of spring melt runoff. With such a short exploration interval, and thus very limited opportunities, there are literally no services available to insert or extract adventurers on the long distance route.

In vain I reached out to city administrators and chambers of commerce in the very few towns found in western North Dakota, as well as the county sheriff departments, the National Forest Service and the rangers in the Theodore Roosevelt Parks. Nobody, and I mean nobody, shared real interest in the trip, other than surprise, nor had any clues as to who could help in our shuttle opportunity.

Then it occurred to me that I had a very special resource at my fingertips, the golf industry. Upon the revelation I reached out to the closest courses on the route and received almost instantaneous and similar replies, "Pretty crazy idea. And, absolutely I want to be a part of your adventure. What can I do to help out?"

Terry Simon, Superintendent at Medicine Hole Golf Course in Killdeer North Dakota and his assistant Brian Klatt, were very accommodating shuttling our vehicle, gear, one little dog, potable water and two canoeists to the insertion point in Marmarth, just north of the South Dakota border and seven miles east of the Montana state line.

Terry and Brian were most helpful and wore the proper rubber footgear and parkas for delivery to the rapidly flowing river's edge. Without prompting they pitched in and helped 'sherpa' our gear to the river bank and waved with promises of a pick up almost two weeks away just north of the northern Theodore Roosevelt National Park. Their support was critical in the success of the adventure.

Another key logistical person in the expedition was Kyle Fick,

Superintendent at The Bully Pulpit Golf Course, located roughly mid-way along on our trek. Not only did Kyle present us with our mail-ahead dehydrated food, a fresh supply of water, perishables purchased in Dickenson, a pound and a half ring of indescribable frozen spicy Italian venison sausage and a dozen laid-that-day range fed chicken eggs, he also opened the door to his shop showers for a well earned cleanse. Holy cats!!! Camping or GLAMPING? Not only did we paddle away clean, but we actually put on weight during the overnight stay!

What began as a potential expedition "bust" due to the lack of connections, ended up being a simple expansion of industry relationships. Just a pair of phone calls and my paddle partner and I had amazing support to last the whole trip. Terry and Kyle were even in our satellite text messaging cues in case we needed immediate assistance. Ready, willing and more than able to help a friend in the industry.

In your neighborhood is there an opportunity for peer support? Are you able to share equipment, experiences or even a shoulder during times of frustration? Woa, here is an off-the-wall idea, how about a shout of congratulations for a job well done? You might be surprised, then again probably not, at the payback potential there is in our amazing industry of professionals.

Beyond growing turf and providing exceptional playing conditions, a part of the joy in our industry is the relationships we share with fellow professionals, we know or have yet to meet. Just another magical experience when you stop and think about it.

Next time, reach out; I know I sure will. Maybe not on an Arctic expedition north of 66.5 degrees, but there is plenty of water to be explored in the lower continental states. I just need to find the ones with golf courses in close proximity.

Bully Pulpit Golf Course Superintendent Kyle Fick's backyard view. Wow, a breath-taking display that changed colors with the moving sun throughout the day. On this big adventure I relied upon my peers in the golf turf industry across state lines. Just imagine what relationships you can build with the golf course next door.