

# Sports Turf Manager

FOR BETTER, SAFER SPORTS TURF. SUMMER 2011. VOL. 24. NO. 2.

## Heavy Rains A Clear Argument for Drainage

R.W. Sheard, Professor of Soil Science (retired), University of Guelph

**T**his evening there was a headline in the local paper that read “Wet weather spoils sports in city.” Murray Cameron, Guelph’s General Manager of Parks Maintenance and Development and a former member of the STA Board of Directors, states: “We have sports fields we can’t even cut right now because they are so wet.”

ity of sports fields, but only comes to the public’s attention when the parks manager says, “There will be no play today.” Can this problem be avoided, or at least minimized?

The answer is a resounding YES! The basic problem is poor drainage. Most athletic facilities that were constructed more than a decade ago have no drainage system

**This spring’s heavy rains have highlighted a problem that exists on the majority of sports fields, but only comes to the public’s attention when the parks manager says, “Sorry, no play today.”**

The twice-normal rainfall during the month of May has turned baseball infields into mush and normal grooming cannot take place. Even exercise classes on the fields are frowned on by Cameron as jumping and other actions can harm the turf under such wet conditions.

This spring’s heavy rains have highlighted a problem that exists on the major-

ity of sports fields, but only comes to the public’s attention when the parks manager says, “There will be no play today.” Can this problem be avoided, or at least minimized?

or an inadequately designed system. Not only does the lack of drainage influence the use of the field, it also contributes to the deterioration of the turf through encouraging compaction of the root zone, the encroachment of knotweed and other weed species and reduced infiltration of water.



**DRAINAGE...**  
**Continued inside on pg. 11**

with little space left for air – which the roots vitally need for normal growth and function. In a well-drained soil, excess water flows rapidly out of the large pores due to the pull of gravity to a point where only water held in the micro pores remains.

EPN Soil Injector, S. Sharififar



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# Sports Turf Manager

FOR BETTER, SAFER SPORTS TURF. SUMMER 2011.

The trouble with weather forecasting is that it's right too often for us to ignore it and wrong too often for us to rely on it. ~Patrick Young



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Deadline for Autumn 2011 Sports Turf Manager: Sept. 9th.

### WHAT'S ONLINE

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

#### Postal Strike

In the event of ongoing postal disruptions, check often for STA event information including program & registration forms, sponsor & exhibitor details, maps & directions & where to stay.

#### STA Membership Directory

Is your contact information current? Your email address must be registered to login to the "Members Only" section.

#### Members Only Section

1) STA Constitution & By-Laws  
2) From Our AGM: Executive Manager's Report, Membership Analysis & Financial Statements

#### Shop for Resource Publications

The Athletic Field Construction Manual & Understanding Turf Management.

## Sports Turf Manager

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include the vital information of name,  
telephone number with area code, and  
time of calling. The office may be reached  
at any time by faxing (519) 766-1704  
or via e-mail.

4 Summer 2011 Sports Turf Manager

# President's Desk

BY PAUL GILLEN

The spring of 2011 will long be remembered for the excessive rain and cool temperatures. I know that we are all playing catch up with our mowing and spring fertilizer applications. I hope we can now look forward to a moderate summer with respect to both moisture and heat.

As we get into the summer regimes, we thought it would be prudent to include a reminder about heat stress and sun safety. With all of the pressures to get things done, it's too easy to overlook some of the basics of a safe working environment. In this edition, we are also publishing three additional highlight articles from the Ontario Turfgrass Symposium to keep you abreast of the latest research. Your association is committed to providing you with the most up-to date information available for best management practices. If there is something that you want more information on, contact us and we'll do our best to get it for you.



STA President Paul Gillen and the "kids."

The association has a busy summer schedule planned. By the time you read this, we will have completed the Parks and Open Space Alliance (POSA) 5<sup>th</sup> Annual Summer Operational Forum, hosted this year by the City of St. Catharines. The theme was "The New Face of Parks and Open Spaces."

Our expansion into eastern Canada will be highlighted with the Atlantic Field Day on July

21<sup>st</sup> in Moncton, NB. An excellent speaker program has been arranged and the day includes practical 'on-the-field' training and a tailgate trade show component. STA member Gord Horsman has been instrumental in bringing all of this together and there will be something of interest for everyone. If you are reading this in the Maritimes, we encourage you to come out and participate. Visit [www.sportsturfassociation.com](http://www.sportsturfassociation.com) for information and registration details.

Finally, a reminder to mark Sept. 22<sup>nd</sup> on your calendar for the STA Fall Field Day. This year it is being hosted by the Town of Oakville, always a popular venue, and we have arranged a first-rate program with top-notch speakers. See you there!

## Member Feedback: Grass Clippings

With all of the disproportionate grass growth and weather interference with normal cutting schedules this spring, is anyone out there using drags behind their mowers to scatter the clippings? I see a lot of unsightly clumps laying on sports fields and golf course fairways during my travels. It seems to me that a simple drag of chain link fence would clear these up, or is it not considered a problem? Email your thoughts to [info@sportsturfassociation.com](mailto:info@sportsturfassociation.com) (Subject: Clippings) and we'll publish your replies online.

## Summer is Here: Take The Dangers of Heat Stress Seriously...

**WORKING IN A HOT ENVIRONMENT** puts stress on the body's cooling system. When heat is combined with other stresses – like hard physical work, loss of fluids or fatigue – it may lead to heat-related illness, disability, or even death. Individuals over age 40 need to take extra care when the weather is hot, because our ability to sweat declines as we age. However, heat stress can also affect individuals who are young and fit.

Water is crucial to helping the body adjust to high temperatures. The rate of water intake must equal the increased rate of water loss by perspiration to keep body temperature normal. When it's hot, drink plenty of water! Your body must work even harder to get rid of excess heat when conditions are both hot and humid. Unfortunately, perspiration can't evaporate as readily under muggy conditions. The process is easier if the surrounding air is moving. That's why we welcome a cool breeze, or turn on a fan when the air is "sticky."

Sickness and accident rates increase when heavy work is done at temperatures above 30 degrees. Don't push yourself beyond your limits. It could be harmful to your health, and could put you at increased risk of having an accident. Learn the signs and symptoms of heat stress like cramps, heavy sweating, cool, moist skin, blurry vision, clumsiness and confusion and realize that if allowed to progress, heat stroke can kill a person quickly. Get medical attention immediately.

~ "Dangers of Heat Stress," Farm Safety Association, [www.farmsafety.ca](http://www.farmsafety.ca)

## NEW & RETURNING MEMBERS

Jay Kivell, Jay Kivell and Associates  
Thornbury, ON

Lorna Hill, Dol Turf Restoration Ltd.  
Bond Head, ON

Mike McQuade, Woodbine Entertainment  
Group, Rexdale, ON

Robert Mackie, Waterloo Region District  
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John Engelberts, City of Ottawa, ON

Kim Berge, City of Saskatoon, SK

Rob Allison, Kubota Canada Ltd., Markham, ON

Doug Gough, City of London, ON



### *POSA Summer Operational Forum*

STA Director/Treasurer Rick Lane (left), Director, Recreation & Community Services for the City of St. Catharines, together with Peter Secord, Councillor & Deputy Mayor, welcomed participants at the POSA Summer Operational Forum, June 22nd.

## Odds & Ends...

### **STA MEMBERSHIP PLAQUES**

Display membership plaques are available in executive engraved walnut for \$50 plus S&H and HST. To order, contact Lee at the STA office.

### **TURF TRADES EMPLOYMENT ADS**

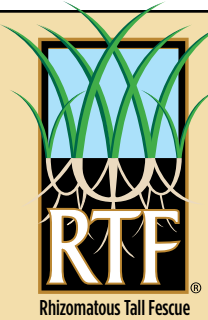
Are you advertising a position or job searching? Visit us online at [www.sportsturfassociation.com](http://www.sportsturfassociation.com) and click on Turf Trades. Cost is \$75 plus HST for STA members for a 2-month listing.

### **STM EDITORIAL CONTENT**

Opinions expressed in articles published in the Sports Turf Manager are those of the author and not necessarily those of the STA.

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Glen Abbey, Oakville, Ontario

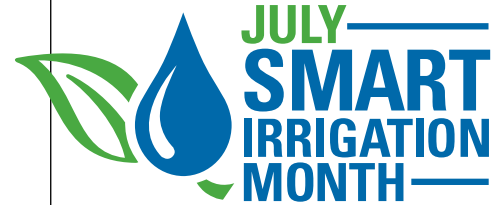
## WATER AWARENESS

### July is Smart Irrigation Month

July is traditionally the month of peak demand for water for lawns, gardens and landscapes in North America. The Irrigation Association named July as Smart Irrigation Month to increase public awareness about simple practices and innovative technologies homeowners, businesses and property managers can use to:

- Save money on utility bills.
- Minimize or defer investments in infrastructure to store and carry water, typically paid for by property taxes or municipal bonds.
- Protect their community's water supply for generations to come.

Turn to page 11 to read about qualifying cultivars for drought tolerance & other characteristics related to water conservation.



Homeowners typically overwater lawns and landscapes by up to 30 percent. By selecting and planting carefully, watering wisely, and maintaining and upgrading automated irrigation systems, consumers can save money, save water and see better results.

To find a certified local professional to design, install, maintain or audit your irrigation system, visit [www.irrigation.org/hirecertified](http://www.irrigation.org/hirecertified). For tips on efficient irrigation, go to [www.smartirrigation-month.org](http://www.smartirrigation-month.org).

Smart Irrigation Month is an initiative of the Irrigation Association, a non-profit industry organization dedicated to promoting efficient irrigation. Visit [www.irrigation.org](http://www.irrigation.org) to learn more.

# Event Calendar

ASSOCIATION EVENTS ARE HIGHLIGHTED IN GREEN

### July 21. Sports Turf Association Sports Turf Field Day (Atlantic)

Note: Pre-registration required by July 8  
Moncton Coliseum (am) / CN Sportplexe (pm), Moncton, NB  
Info: 519-763-9431, [www.sportsturfassociation.com](http://www.sportsturfassociation.com)

August 9. Ontario Turfgrass Research Foundation Annual Fundraising Golf Tournament, Greystone Golf Club, Milton, ON  
Info: [www.otrf.ca](http://www.otrf.ca)

### September 22. Sports Turf Association 24<sup>th</sup> Annual Sports Turf Field Day (Ontario)

Note: Pre-registration required by September 14  
Glen Abbey Community Centre, Oakville, ON  
Info: 519-763-9431, [www.sportsturfassociation.com](http://www.sportsturfassociation.com)

### February 22 & 23, 2012. 21<sup>st</sup> Annual Ontario Turfgrass Symposium

University of Guelph, Guelph, ON  
Info: 519-767-5000, [www.ots.open.uoguelph.ca](http://www.ots.open.uoguelph.ca)

If you have an industry-related event you'd like publicized, contact Lee at 519-763-9431, [info@sportsturfassociation.com](mailto:info@sportsturfassociation.com)

## QUOTABLE QUOTE....

It is best to read the weather forecast before praying for rain. ~ Mark Twain

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# Sports Turf Field Days

WE'RE OUT EAST THIS JULY & BACK IN ONTARIO AS ALWAYS IN SEPTEMBER



## Meet Us In Moncton on July 21!

**ALL DETAILS HAVE BEEN CONFIRMED** and registration is now open for the first Atlantic Sports Turf Field Day on Thursday, July 21, 2011. At the geographic centre of the Maritimes, the City of Moncton is well situated to welcome sports turf managers from across the Atlantic provinces. Educational sessions will be held at the Moncton Coliseum followed by a BBQ lunch, tailgate trade show, and practical "on-the-field" training at the nearby CN Sportplex.

Presented by the Sports Turf Association, the speaker line-up features Dr. Eric Lyons and Dr. Katerina Jordan from the University of Guelph, home of the world class Guelph Turfgrass Institute, together with industry professionals Gord Dol, Dol Turf Restoration Ltd., and George Bannerman, Gordon Bannerman Ltd. The program has been accredited by Plant Health Atlantic for continuing education credits.

Long-time STA member Gorden Horsman encourages his fellow turf managers to attend. "The City of Moncton is pleased to host this event. We hope turf managers from across the region will take advantage of the day's offering of sports turf focussed education – and what a great networking opportunity! Spread the word to your colleagues and suppliers!"

Robert Daniels, Adjunct Professor, Turfgrass Science, Nova Scotia Agricultural College, will preside over the day. "Due to the increased expectations of recreational, amateur and professional athletes, many sports turf facilities have been or are in the process of being either upgraded or constructed in Atlantic Canada. To meet the expectations of these end users, seasonal maintenance practices must be continually improved. The hosting of such an event as this turf field day provides an opportunity for individual managers to increase their knowledge of the latest products and cultural practices available."

Meet us in Moncton this July! Visit [www.sportsturfassociation.com](http://www.sportsturfassociation.com) for information and registration details.

## Onsite in Oakville

**WE'LL BE ONSITE IN OAKVILLE** for the Sports Turf Association's 24th Annual Field Day, September 22, 2011. Located in the Greater Toronto Area between Toronto and the Niagara Region, Oakville's two beautiful harbours, creeks and shorelines, numerous parks, scenic nature trails, and sports fields form a great base for outdoor activities. The town boasts recreational amenities that include 12 community centres, four public libraries and 1,000 acres of parks with 141 sports fields.



## OAKVILLE

The Field Day Committee is in the midst of applying the finishing touches to this year's program that will take place at the Glen Abbey Community Centre. Stay tuned!



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# IMPROVING SOIL HEALTH WITH COMPOST

**S**ports turf managers taking care of fields that have been built using very poor soils, or in some cases, sub-soil material, can improve soil health by amending it with organic matter. In an ideal world, organic matter would be incorporated into the top 4-6 inches of soil prior to grading, so that the seed or sod is growing in a healthy soil from the beginning. In some situations though, poor soils are seeded or sodded by contractors as part of a larger job (new school build, etc.) and the sports turf manager inherits a mature stand of grass that will not grow and quickly becomes infested with typical soil compaction indicator weeds like prostrate knotweed, clover and plantain. The soil is typically hard when dry and thus creates a very hard playing surface. When wet, the same soil turns quickly to mud and puddles form because the water infiltration rates are so low.

In these types of situations, an aggressive plan of soil cultivation (core aeration, shatter tine, verti-drain, etc.) coupled with organic matter incorporation/topdressing is vital to improving the quality/health of the soil.

Selecting a compost material for soil improvement requires some investigation and planning because not all composts are the same. Composts are made from a variety of sources such as manures, bio-solids, yard waste and spent mushroom compost. They should be regulated to make sure they contain no harmful bacteria (like *E. coli*) and they should be decomposed enough that the carbon:nitrogen ratio is not excessive (>30:1). They will also vary from one another in nutrient status, moisture content, odour and amount of soluble salts.

Because the purpose of improving poor soil with compost is to create air spaces and improve the drainage capability of the soil, composts used on athletic fields need to contain adequate organic matter (>30%) and have a bulking agent, like wood chips. The bulking agent eventually decomposes,



leaving large air spaces, as well as mixing with the poor soil to improve soil aggregation. The size of the bulking agent is important – pieces that are too large cause playability problems and they stay on the playing surface for a long time. If they are too small (<0.25 inch), they break down too readily and do not create large pore spaces.

Field managers can find compost suppliers via [www.FindaComposter.com](http://www.FindaComposter.com). To make sure that a compost is truly adequate for soil improvement, ask compost suppliers to have the compost material tested at a reputable turf lab and then the test results can be evaluated to make sure the material is going to truly improve the soil and not just cause an odour for a few days!

— Pam Sherratt & Dr. John R. Street,  
“Compost Resources for Ohio,” The Ohio State University, <http://buckeyeturf.osu.edu>

## Editor's Note

Looking for additional information on this or other topics? The complete back files of the Sports Turf Manager and its predecessor the Sports Turf Newsletter are available online via the STA website at [www.sportsturfassociation.com](http://www.sportsturfassociation.com). Click on Publications/Resources/Archive. Sports Turf Association members continue to enjoy complete subscriber access to the Turfgrass Information File, the most comprehensive publicly available collection of turfgrass educational materials in the world, via the Michael J. Bladon Educational Link. Simply login for access to the Members Only section of the website.

## Turfgrass Water Conservation

### SEARCHING FOR DROUGHT TOLERANT CULTIVARS



**WITH FRESH WATER** supplies becoming severely limited around the world, the uses of water are being scrutinized more closely than ever before, especially for landscapes, athletic fields, home lawns and other non-agricultural uses. This means the development of turfgrass cultivars with improved tolerance

to limited or low quality water remains as one of the most important research objectives facing the turfgrass industry.

The Turfgrass Water Conservation Alliance (TWCA), a non-profit organization, has established a science-based method for qualifying cultivars for drought tolerance and other characteristics related to water conservation of grass seeds at low cost. The approach is to establish turfgrass under optimum conditions, allowing the full expression of above ground and below ground growth and then impose a long-term water deficit stress. Seed during the development of drought stress turf grass plots are monitored for their ability to maintain green cover under protracted drought stress, a process that identifies those cultivars with either low water use or extensive root systems. Those cultivars or selections that maintain green cover for longer periods would delay the need for supplemental irrigation, with the hope that natural rainfall can supply those needs before irrigation is required.

This approach to identifying turfgrass cultivars with superior drought tolerance with as much as 21 day delays in the onset of drought stress symptoms is marketed under the "Aqua Wise" brand, the "Water Star" brand, or the "Water Miser" brand. The criteria are very strict for acceptance into TWCA, and a variety must finish in the top statistical group to even be considered. For more information, including a list of approved turfgrass varieties, visit [www.tgwca.org](http://www.tgwca.org).

## COVER STORY CONTINUED...

### HEAVY RAINS PROMPT DRAINAGE DISCUSSION

**IT IS THIS WATER** that sustains the growth of the grass. Installing a drainage system will not remove any of the water held in the micro pores. The removal of excess water from the root zone will normally occur within two or three days.

A properly designed and installed drainage system will greatly assist in reducing the time required for excess water to be removed, often by fifty percent or more, depending on pore space size and distribution in the soil. Additions to the design of the basic drainage system can also increase the removal of surface water during high intensity rains, thus resulting in less water moving through the pore space. Athletic fields that do not have a drainage system can have a basic system installed for approximately \$20,000.

**Remember that an irrigation system should never be installed without a drainage system.**

Variation in costs will be influenced primarily by the availability of a drain outlet and the desire to have surface water removal. With modern installation procedures, the drain lines within the field can be pulled in the same as irrigation pipe and installed with minimum surface disturbance. The system can have a life expectancy of 50-plus years.

In closing, I have no doubt that before this season is over, there will be equal concern about the lack of water and need for irrigation. Remember that an irrigation system should never be installed without a drainage system. Maybe now is the time to take the first step in planning a total water control system – drainage plus irrigation. Note that the drainage system will only remove the excess water applied as irrigation, or irrigation followed by a heavy rain.

~ Murray Cameron quoted from "Wet weather spoils sports in city," Doug Hallett, Guelph Tribune, May 31, 2011.

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## Beating the Ban (and Turfgrass Pests) With Research Into Environmentally-Friendly Products

Michael Brownbridge, Vineland Research & Innovation Centre and  
Pam Charbonneau, Ontario Ministry of Agriculture, Food & Rural Affairs

April 22, 2009. Overnight, Ontario's Cosmetic Pesticides Ban removed over 250 products that had previously been used to control insects, weeds and diseases in the urban environment, leaving the general public and landscaping community with few proven pest management tools for lawns and home gardens.

**OTS HIGHLIGHT**  
**Presented February in**  
**Guelph, Ontario.**

**F**or lawn care companies, practices have had to change radically. With the ban, all the old quick fixes are gone, and more than ever the emphasis has to be on production of a healthy lawn as the first line of defence, and to shift from curative to preventative approaches. In the past, relatively inexpensive broad-spectrum,

persistent insect and weed control products were often applied prophylactically, whether they were needed or not. In order to achieve good insect control today, effective new products are needed, combined with appropriate knowledge on how to use them.

The ban created a real urgency to develop alternative pest management

tools, particularly biopesticides (based on naturally-occurring microorganisms, nematodes and plant-derived products) for the major pests that threaten Ontario lawns. Most biopesticides have a low risk profile and while the present focus is on the use of these materials by landscapers and lawn care specialists, it is likely that some may



Encouraging results were obtained in summer/fall 2010 field trials where nematodes, fungi and two natural products have been tested against European chafer and chinch bug.

late summer/early fall or early spring. The hairy chinch bug feeds at the base of the grass stem rather than the roots. Damage primarily occurs when grasses are water-stressed and temperatures at their highest in late July/August, coinciding with adult feeding activity. Secondary pests such as leatherjackets and sod webworms appear to be increasingly common. These insects were likely kept in check by materials (now banned) previously used to control grubs.

### Natural Solutions For Insect Control

Both grubs and chinch bugs are often naturally-infected with fungi and nematodes. How can we use these beneficial organisms to our advantage and develop them into products that can be readily produced and applied? Research is focusing on these biocontrol agents and other natural products and ways of reliably and cost-effectively using them to control turf pests. The work is supported in part by organizations such as the Ontario Turfgrass Research Foundation, Landscape Ontario, Agriculture and Agrifood Canada through its AgriScience Research Cluster Program, the CUPRI Program, companies involved in the production and sale of biopesticides and private lawn care companies.

A number of approaches are being taken, including the search for and testing of novel strains of fungi and nematodes that may be better suited to work in Ontario's cooler soils. So far, several of these microbial biocontrol agents have been recovered from field-collected insects and are being tested in lab/greenhouse studies to allow

those best suited to further investigation and development to be identified. Most of our work is presently focusing on existing control agents to provide users with options in the near term. Although some of these have been available for some time, considerable improvements are needed to devise robust use practices to enable their use in a novel environment and to develop 'best use' practices for their application, either alone or in combination with another control agent, in order to maximize control over a range of conditions in the most cost-effective manner. As living control agents, as with any other living organism, they have to be produced, formulated, stored, handled and applied correctly to maintain viability and achieve maximum efficacy.

Nematodes, fungi and two natural products have been tested against European chafer and chinch bug. Research still has some way to go, but encouraging results were obtained in field trials carried out in summer/fall 2010, where various products, formulations and application techniques were tested. The nematode *Heterorhabditis bacteriophora* (Hb) is currently recommended for chafer control in Canada; a second species, *Steinernema glaseri* is a new addition to the bio-arsenal for 2011. For both species, timing of application is critical to their successful use. Soil temperature (ideally around 12 to 15 degrees), insect age and location in the soil all influence efficacy. The fungus *Metarhizium anisopliae* is already registered in Canada for use against black vine weevil in nursery crops. We are assessing its potential utility for both chinch bug and chafer grubs

be successfully transitioned for future use on amenity and sports turf, and in larger operations such as sod farms.

### Target Pests

The main research targets include 'white grubs,' European chafer and Japanese beetle, and hairy chinch bug. European chafer is predominant in most of southern Ontario, while the Japanese beetle is a more recent arrival, now established in the Niagara Peninsula and spreading west, and may even be displacing European chafer as the dominant pest in some areas. Larvae of these insects preferentially feed on organic matter and the fibrous roots of turf grasses and damage usually becomes apparent in

**Main.** Chinch bug feeding damage on an Ontario lawn. **Adjacent Left.** Late stage European chafer (*Rhizotrogus majalis*) larva, a very hungry grass root feeder. **Adjacent Right.** A white grub infected and killed by the fungus *Metarhizium anisopliae*.



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and its use together with nematodes. One of the plant-derived products included in our trials is an all-natural organic fertilizer which, in addition to other plant-derived ingredients, also contains neem seed cake. The product functions as a bio-fertilizer and a pre-emergent herbicide; the neem component may also have an impact against some insects, so this product could provide multiple benefits.

### Results From Field Trials

Results of the lab and greenhouse trials against chafer grubs showed that they were susceptible to the microbial biocontrol agents and clearly demonstrated the influence of temperature on performance. In the field trials, treatments were applied in late September when the grubs were older, harder to control and residing lower in the soil profile where they are more difficult to contact. Soil temperatures were also decreasing. All of these factors can result in reduced susceptibility to control agents; however despite the fact that this timing was not ideal, observed downward population trends in plots treated with the Hb nematode, *Metarhizium anisopliae* and biofertilizer were on par with or slightly better than those obtained with the standard insecticide, Merit. It is likely that efficacy can be improved considerably with better formulations, improved application techniques and better timing. Trials planned for 2011 will encompass some of

these improvements and will include additional experimental products.

What about chinch bug? A similar suite of microbial and botanical products were included in tests against damaging natural infestations of the pest which were detected in late July/August 2010. Given the high temperatures and dry conditions experienced at that time, results were very encouraging. While results were not conclusive from a statistical standpoint due to uneven distribution of the chinch bug populations, the trials have provided us with some excellent lead candidates for testing in 2011. These include a *Metarhizium anisopliae* spray and the nematode *Steinernema carpocapsae*, particularly when used together with a botanical wetting agent. An essential oil product also provided excellent knock-down of the bugs and may be an ideal partner with a biological, the combination providing rapid knockdown and extended control.

### The Final Word

The primary goal of the current project is to provide functional biopesticides to control chinch bugs and European chafer in lawn turf. Field trials have allowed effective candidate organisms to be identified for field validation studies. The project will, in the near term, deliver new pest control tools and techniques to homeowners, lawn care and turf professionals that successfully mitigate turf pests



in a cost-effective and environmentally-benign manner. Applications of some of these technologies seem likely to extend into other turf sectors, particularly in high-traffic grassed areas such as recreational and sports fields as legislation and the general public drive change towards the use of sustainable 'green' products.

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## Biology of Entomopathogenic Nematodes (EPN)

Article & Photos By Shahram Sharififar, Entomologist, Natural Insect Control



**OTS HIGHLIGHT**  
Presented February in  
Guelph, Ontario.

**What are nematodes:** Nematodes are often referred to as round, eel or threadworms because of their cylindrical and elongated bodies. These non-segmented, invertebrate animals range in size from 0.1 mm to several metres in length. Over 28,000 species have been recognized worldwide and over 16,000 are parasitic. It has been estimated that there are approximately 1,000,000 different nematode species in the world.

**Beneficial or Entomopathogenic Nematodes (EPNs):** The term entomopathogenic comes from the Greek word entomon referring to insect, and pathogenic, which means producing disease. EPNs of the families called Steinernematidae and Heterorhabditidae are lethal pathogens of insects. All

EPNs are symbiotically associated with bacteria located in their intestinal tract.

**Host search behaviour & EPN strategies:** This can be divided into two broad categories: ambushing and cruising. Ambusher species such as *Steinernema carpocapsae*

**Top.** EPN application with a backpack sprayer. **Adjacent.** Nematodes parasitic on plants obtain food by sucking juices from them. Feeding is accomplished through a hollow, needlelike mouthpart called a stylet. The nematode pushes the stylet into plant cells and injects a liquid containing enzymes, which digest plant cell contents. The liquefied contents are then sucked back into the nematode's digestive tract through the stylet.

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tend to remain stationary; they search by standing on their tail and elevating most of their bodies. This sit-and-wait approach to finding hosts serves as a mechanism for host attachment. Ambushing is clearly an adapted behaviour in the top two inches of non-compacted soil, as it is not possible to do this function effectively deeper in the soil. Cruiser nematodes such as *Heterorhabditis bacteriophora* and *S. glaseri* tend to be highly mobile searching in comparatively large areas for hosts. They are highly responsive to host-released volatiles like CO<sub>2</sub> that they use to orient toward insects. Cruiser species are found distributed throughout the soil profile as would be predicted from their search behaviour. Cruiser nematodes are best adapted to parasitize sedentary, below ground hosts such as white grubs. The cruisers tendency is to move downward about eight to ten inches and horizontally up to 10 feet to seek their host.

### Major turf grass grubs & identification:

Some of the most important white grubs in turf grass are: European chafer (*Rhizotrogus majalis*), June beetle (*Phyllophaga spp.*), Japanese beetle (*Popillia japonica*), Asiatic garden beetle (*Maldera castanea*) and black turf grass *Ataenius* (*Ataenius spretulus*). The first three species are the most common pests in Ontario and throughout most of Canada. Correct identification of white grub species is important in determining management strategies and timing of controls.

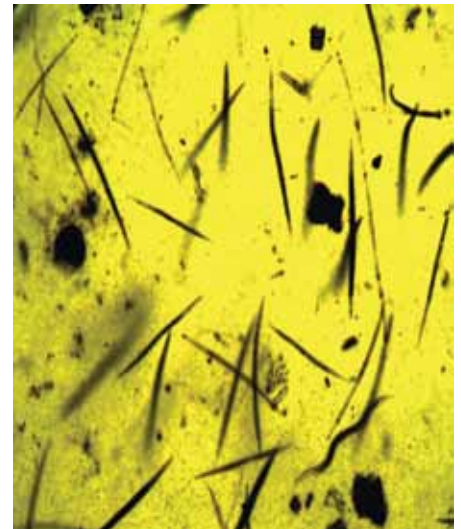
To identify different species we should observe the grub's raster (arrangement of bristles and hairs on the underside tip of the abdomen). A 10x hand lens is needed to see this pattern on most mature white grubs.

### Ordering, Receiving & Storage

#### Ambusher or cruiser, which one to order:

According to the type of pests, we can determine which category would be the better choice for application. Generally, to control soil-surface pests, ambushers are more effective. Conversely, to control pests in deeper areas of soil, the cruiser nematode will produce the highest efficacy.

**Labeling and necessary information:** For



assurance of EPN quality and their efficacy, all the nematode packages should have a label with the necessary information including: nematode species, quantity, application rate and the expiration date.

**Viability:** There are different methods for checking EPN's viability. First of all, check the attached label and consider the expiry date. If nematodes are on a sponge, make sure it was shipped with icepacks overnight and refrigerated upon receiving. Fresh nematodes will have a slight earthy smell and appear light gray, beige or pinkish (depending on strain). Dying or dead nematodes will have a strong putrid odour. If nematodes are in powder, the same indication as above applies, but be careful that the plastic bag is clean and free of any fungus infection symptoms.

**Ambusher or cruiser? Generally, to control soil-surface pests, ambushers are more effective. Conversely, to control pests in deeper areas of soil, the cruiser nematode will be better.**

#### Monitoring for freshness & activity assurance:

In case of a sponge carrier, after opening a package, extract a tiny sample of nematode paste by using a small utensil and place it on flat clear surface (solo cup lid) then mix 2 ml of tap water with nematode paste and in case of a powder carrier, mix and dissolve approximately 1 g to 20 ml of tap water. Separate 2 ml on a flat surface. In both cases, look at the suspension by use of magnifier equipment. The fresh nematodes are active and their

**Above.** Nematodes under the microscope. On the left they are alive; on the right they are dead.

bodies wiggling under at least a 10x hand lens or a microscope.

### Desired Conditions Before Applying EPN

**Moisture:** Sufficient soil moisture plays a main role in the infective juvenile's (IJ) efficacy and survival. EPNs use the water channels like roads to reach their hosts. Therefore the soil needs to be moist down below the level of the grubs. Keeping the soil wet for 2-3 days after an application can provide an ideal situation for EPN efficacy.

**Texture:** the capacity of different soil textures in holding oxygen is an important factor in the IJ's survival. For example: a field trial in different soil textures confirmed that the lowest survival for EPNs was recorded in the clay soil (compared to sand, sandy loam and clay loam). This lower survival rate is probably related to the lower oxygen level because of small pores in clay soils. Note: if the soil is saturated from heavy rains or lack of drainage, the nematodes could die from lack of oxygen.

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A soil sample infested with European chafer.



**Temperature:** The effect of temperature on survival varies with nematode species and strains. Nematode species isolated from temperate regions tend to be more tolerant of low temperature than species isolated from tropical or subtropical regions. Soil temperature determines the activity and efficacy of EPNs. If is too cold, they are inactive and therefore will not seek the hosts. Conversely, if the soil is too warm, they will use up their energy source too quickly.

**U.V.:** Nematodes will die from ultraviolet light. From a practical viewpoint, the application of EPNs is recommended in early morning, late afternoon or on cloudy days to minimize detrimental effects of desiccation, ultraviolet light and extreme temperatures.

### Application Time

**Fall & spring:** Fall application is a crucial factor to control pest population and their damage. Application from August to the end of September (depending on the weather and soil temperature) when the young instar of European chafer and Japanese beetle larvae are hatched from their eggs would be the an ideal time for EPN application. The 1<sup>st</sup> and 2<sup>nd</sup> year grubs of June beetle can also be controlled at this time. Fall applications will decrease grub populations under threshold levels,

which means preventing both fall and spring damage.

Grubs in Ontario generally overwinter as larvae. With increasing weather and soil temperatures, overwintering larvae will move from the deeper soil depth to the upper layer. When soil temperatures rise above 10° C (late April to early May in Ontario), this would be the time for EPN application. The EPN spring application (even against the last instar of pest larvae, which have tougher bodies) can reduce the total number of grubs by reducing the number of fertilized adults in the next months. Note: Spring application will be necessary only if grubs are found in the soil. This application indicates necessity for fall application.

### Method of Application

**Home gardeners & landscapers:** First step is to pre-water the area being treated thoroughly 5-8 cm deep. If EPNs are on sponges, remove sponge from sealed bag and rinse both sponge and bag in a minimum of 4 litres of water to make a concentrate. Stir the concentrate vigorously to suspend nematodes equally as they are heavier than water. Use a hose-end sprayer or pump sprayer to apply immediately (100 gal/2000 ft<sup>2</sup>). In powder carriers, the nematodes should be diluted in a large amount of water (a minimum of 25 gal) and apply immediately (2.25 gal/ 100ft<sup>2</sup>).

**Turfgrass:** For larger areas, nematodes can be applied by using conventional agitating spraying systems such as pump, back-pack, truck sprayers, an overhead/misting sprayer system or soil injecting sprayer. Nematodes can be sprayed using a common type nozzle with an opening ranging from 50 microns to 1 mm. It is recommended to remove the finer screens. Recently, a soil injecting nematode applicator was developed for turfgrass which potentially could increase nematode efficacy and may decrease the cost for application.

### Post Application & Monitoring For Controlled Results

**Expected time for pest control:** It is theoretically possible for EPNs to kill their host after 48-72 hours, but because of natural barriers in the soil, it is highly unlikely this occurs in the field.

**Reapplication:** The same as all other pesticides, EPN application will not obtain 100% mortality in the grub's population. A percent of beneficial nematodes can survive during the winter in the soil, but to reach a higher level of pest control, reapplication will be necessary.

### Conclusion

- Know the pest insect and timing of its life cycle.
- Know the temperature of the soil.
- Know that the larvae are present.
- The soil must be wet to below the level of the grubs.
- Apply in low UV times.
- Water well after application to ensure the nematodes are past the surface layer and down to the root level of the grass.
- Keep the soil watered for 3-4 days after application.
- A spring infestation indicates a fall application must be done.

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## Supervising in 2011 Means More Than Wearing the Hat and a Pay Raise

Terry Piche, Technical Director, Ontario Recreation Facilities Association Inc.

Somewhere in the workplace today a worker is not using a seat belt; is talking on a hand held device while driving or; is not wearing all appropriate safety wear. Each example has accountability if the worker is caught by a governing authority. Failing to properly train workplace supervisors has the same accountability. Today's workplaces are obligated to clearly define and evaluate their supervisory needs. The definition or sanction of such individuals cannot come from the Human Resources Department nor, does it have any connection to compensation or benefit packages. Supervisory obligations are clearly defined in the Occupational Health and Safety Act (OHSA) as: "a person who has charge of a workplace or authority over a worker."

**I**n my observations, park and green-space operations often break their workforce into teams. Each is given a vehicle, a variety of equipment and set tasks to be completed throughout the work day. This work directive is usually completed by the recognized operational supervisor or manager. Each team is then sent on their way, often not in contact with the original operational supervisor or manager for the rest of the day.

The person who is by default leading the team in the field is accepting supervisory responsibilities for both themselves and those under their watch. At this point, the suggested "point person" throws up their hands and states, "this is not my job"! They identify that they are not listed as a supervisor, nor are they compensated for such responsibility. As much as they may wish to side step this workplace obligation, the fact is, should an accident occur, they

**OTS HIGHLIGHT**  
Presented February in  
Guelph, Ontario.

will be caught in the backdraft of an investigation with their primary defence being, "I didn't know it was my responsibility"! Regrettably, "not knowing" is an unacceptable legal defence to accountability.



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Remember, to meet basic acceptable training standards the session must include written materials and a testing mechanism. Merely explaining your workplace culture is not enough!

Selecting a supervisor in any work environment must be done carefully with some logic and supervisory competency must be trackable. The common past practice of promotion to workplace supervisor based solely on seniority or age needs to be re-evaluated. The basic supervisory requirements to be considered in meeting the definition of a “competent person” are defined in the OHSA as being:

- Qualified because of knowledge, training and experience to organize the work and its performance,
- Familiar with the OHSA and the regulations that apply to the work, and
- Has knowledge of any potential or actual danger to health or safety in the workplace (personne compétente).

Consider the team we defined earlier and now take a look at the person who by default (let’s call them supervisor) is in charge of the unit (because this is his/her second summer) and answer these basic questions to their competency:

- What level of knowledge does the supervisor have in respect to internal policies and procedures?
- Has the supervisor received “supervisory” training?
- What level of training has he/she received on the tools and equipment that are to be used?
- Is the supervisor’s 1-year of previous workplace experience adequate for him/her to provide leadership?
- Is the supervisor aware of the OHSA and how it is applied? Is he/she up-to-date on other legislation that may be applied as they go about their other duties (i.e. CSA Standard for Children’s Playspaces & Equipment)?
- Has the supervisor been updated on previous health and safety issues in the workplace?

One of Ontario’s Ministry of Labour (MOL) inspection objectives is workplace supervisor competence. The MOL believes that the basic supervisory abilities

must percolate down from the top of each organization. Failure to properly train workplace supervisors, or not provide adequate worker supervision, will result in fines and or incarceration for extreme circumstance.

Remember, to meet basic acceptable training standards the session must include written materials and a testing mechanism. Merely bringing someone aside and explaining your workplace culture and expectations will not suffice! ORFA, a Parks and Open Space Alliance partner, offers supervisory training workshops to help you meet your supervisory competency training objectives. Please feel free to reach me at [tpiche@orfa.com](mailto:tpiche@orfa.com) or 416.426.7062 should you wish to investigate this training opportunity further.

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# Industry News

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Professor Dave Wolyn. Photo by Martin Schwalbe.

## Rubber From Dandelion?

It might be a stretch, but Guelph plant breeder Dave Wolyn hopes to coax natural rubber from Russian dandelion to feed a growing global rubber market and to offer a potentially lucrative new crop for farmers in southern Ontario.

This summer, he'll conduct plant trials using dandelion seeds from Kazakhstan and the U.S. Department of Agriculture. Those trials will help determine whether Russian dandelion can become a new field crop for a natural rubber industry. The research is supported by the Sand Plains Community Development Fund in Tillsonburg, Ont., and KoK Technologies Inc. in Penticton, B.C. KoK owner Anvar Buranov has developed a patented process for recovering natural rubber. Wolyn joined the project after Buranov contacted U of G to find a plant breeder. The Guelph professor has bred asparagus since 1988 and developed an award-winning hybrid that now has almost three-quarters of the Ontario asparagus market. "I thought it was exciting," says Wolyn. "You're taking a wild plant and trying to turn it into a crop."

Most rubber is used for making tires. Natural rubber is better for airplane and heavy-equipment tires than the synthetic oil-derived rubber used in car tires.

The only commercial source of natural rubber, the Brazilian rubber tree, grows mostly in Southeast Asia. After rubber trees were transplanted to Asia, a fungus wiped out most of the South American trees.

Rubber forms naturally in dandelion roots and in parts of other plants. Russian dandelion rubber is chemically suited for use in tires and as latex for gloves, mak-

ing it an ideal replacement for rubber tree products, says Wolyn. Unlike other rubber-bearing plants, this dandelion species also contains inulin, a food additive and feedstock for biofuels that might also benefit growers.

A rubber shortage during the Second World War prompted scientists to study rubber from Canadian-grown plants, including Russian dandelion. They found that the plant grew well in southern Ontario, but they dropped the project after the conflict ended.



Wolyn said the Canadian Food Inspection Agency will release a review of Russian dandelion under invasive species regulations. He said American studies in the 1940s found the plant unlikely to overrun native plants.

Prof. David Wolyn is in the Department of Plant Agriculture and can be reached at 519-824-4120, Ext. 53092 or 56469, [dwolyn@uoguelph.ca](mailto:dwolyn@uoguelph.ca).

— University of Guelph news release

## Selectus Seed Brand Officially Launched In Spring by Plant Products



**PLANT PRODUCTS CO. LTD.** officially launched its new Selectus brand line of seed products on May 5 with a ribbon-cutting ceremony at its Brampton, Ontario plant. Guests toured Plant Products' new state-of-the-art blending facility. "With this initiative, Plant Products has become a direct source of seed products from the breeder to our customers," said John Lewandowski, President of the company. "We have worked hard to deliver a quality reliable product for the 2011 season. This product line makes sense both for us and our customers."

Plant Products is a Canadian-based company that has been manufacturing quality water-soluble fertilizers and marketing plant protection products for nearly 70 years. Since its beginnings, the company has continued to expand distribution, and today markets a full range of horticultural products throughout Canada to all horticulture markets, including turf markets. Visit [www.PlantProd.com](http://www.PlantProd.com) or telephone 1-800-387-2449, 905-793-7000

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