Sports Turf Manager

for safe, natural sports turf

Autumn 2008

VOLUME 21, NUMBER 3

Field Day Coverage

Thanks to generous sponsors and exhibitors and loyal participants, STA's Annual Field Day September 11 at Chinguacousy Park, Brampton, was another great success. See pages 11-15 for a photo gallery showcasing the popular event.

The Saturated Hydraulic Conductivity of Sand Root Zones

ARE THEY REALISTIC OR OVER-DESIGNED? DR. R.W. SHEARD, PH.D., P.AG.

In 1993, the original guidelines of the saturated hydraulic conductivity rate for sand used in constructing sports fields was set at 15 to 60 cm/hour by the USGA Greens Section. In 2004, the rate was changed to a single value of 15 cm/hr In 2007, Dr. Stephen Baker, writing in the *Turfgrass Bulletin* of the Bingley Sports Turf Research Institute, noted that the guidelines were set to cover a wide range of climatic conditions in the United States, ranging from the desert of Arizona to the hurricane regions of Florida. He suggested Canada, the northern US states and the UK, all with an intermediate rainfall intensity, should require a lesser rate. Under UK conditions, greens having a hydraulic conductivity as low as 3 cm/hr have proven satisfactory. In writing the recently released *Athletic Field Construction Manual,* the STA chose a rate of 10 cm/hr.

One objective of a relatively high hydraulic conductivity is to transmit excess water from the root zone as rapidly as possible and return the soil to its maximum aeration (non-capillary) porosity so that the roots will have an adequate oxygen supply. The higher the saturated conductivity, the more rapidly oxygen will return to the root zone. A saturated condition for an hour can certainly be tolerated by the root system without damage. In a study conducted at the Guelph Turfgrass Institute on a USGA specification root zone, irrigation was applied until water flowed freely from the drainage system. Using computer analysis of sensitive electronic measurements of water in the profile, it was shown that within 1.5 hours a significant portion of the aeration porosity was free of water. Removal of excess water was complete within 24 hours. How long would the rain delay be? Less than an hour!

➟ page 7

SPORTS TURF MANAGER
Volume 21, Issue 3, ISSN 1201-3765

is the official publication of the
SPORTS TURF ASSOCIATION INC.
328 Victoria Rd. S., RR 2, Guelph, ON N1H 6H8
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SPORTS TURF MANAGER
is published quarterly by the STA for free distribution to its membership. An annual subscription may be obtained for $60/year. Please direct advertising inquiries to Lee Huether at the STA office.

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CANADA POST PUBLICATIONS MAIL SALES AGREEMENT No. 40031883
Postmaster: Please return undeliverable copies to the STA at 328 Victoria Rd. South, RR 2, Guelph, ON N1H 6H8.

STA OFFICE HOURS
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The President's Desk – Gord Dol

Wow! What a season. We have just experienced one of the wettest summers I can remember. I trust that your wet field policies were put to good use to protect your fields.

Kudos to All On The Field Day

We recently held our 21st Annual Fall Field Day. As per usual, attendance was high with a great line-up of speakers and a first class venue. Thanks to the Field Day Committee for a job well done and to the City of Brampton for hosting this event. A special thanks to our speakers for sharing their expertise and to all the exhibitors and sponsors for their participation and generosity in making this day possible. Turn to pages 11-13 to view a photo gallery of the day. We will be setting our sights on the 2009 Field Day in short order and your ideas are most welcome.

Key February Events

The 2009 Ontario Turfgrass Symposium is February 18th and 19th in Rozanski Hall at the University of Guelph. This year promises to be another great educational forum. The Sports Turf Association is proud to be a co-sponsor of the symposium, now in its 18th year.

During the OTS, we hold our annual general meeting which is open to all members. We will also be electing directors to the board. Now would be the time to consider allowing your name to stand for election. If this interests you, please speak to any board member or call Lee at our office.

Construction Specifications Available

Earlier this year we launched the *Athletic Field Construction Manual*. It has been very well received by the industry. Numerous municipalities have already adopted this manual for future construction. Do you have your copy yet? Our e-commerce store is now open at www.sportsturfassociation.com. And while you're surfing, check out our website! After a lot of hard work, we have everything working including the Members Only section. If you do not have your password, please contact the office. If you do have the information but have yet to log on, it's about time to do so!

The AFCM is available online. Our *Athletic Field Construction Manual* has been very well received by the industry and numerous municipalities have already adopted it for future construction projects.

Applications for the STA Robert W. Sheard Scholarship are now being accepted. The deadline is November 1st. Details about the scholarship and the application form are available online.

Winter is fast approaching. The grass will not be green for much longer. Talk to you in again in December. ♦

Employment Listings...

Are you advertising a position or searching for a job? See the Turf Trades ad on page 21 or contact Lee at the office for details.

EVENT CALENDAR

★ NOVEMBER 1 ★
Sports Turf Association
Robert W. Sheard Scholarship
Application Deadline
Info: 519.763.9431
www.sportsturfassociation.com

December 3 & 4
ON Recreation Facilities Association
Facilities Operational Forum
& Annual General Meeting
Burlington, ON
Info: 416.426.7062
www.orfa.com

January 6-8
Landscape Ontario Congress
Toronto, ON
Info: 905.875.1805
www.locongress.com

January 13-17
Sports Turf Managers Association
20th Annual Conference & Exhibition
San José, CA
Info: 800-323-3875
www.stma.org

January 21-23
ON Golf Superintendents' Association
Golf Course Management
Conference & Trade Show
Toronto, ON
Info: 519.767.3341
www.golfsupers.on.ca

February 2-27
University of Guelph
Turf Managers' Short Course
Guelph, ON
Info: 519.767.5000
www.open.uoguelph.ca/turfmanager

February 4 & 5
Ontario Parks Association
53rd Annual Educational Conference
Explorations Trade Show (Feb. 5)
Hamilton, ON
Info: 905.864.6182
www.opassoc.on.ca

★ FEBRUARY 18 & 19 ★
Ontario Turfgrass Symposium
The Challenge of Green
University of Guelph
Guelph, ON
Info: 519.767.5000
www.open.uoguelph.ca/ots

Ontario Turfgrass Symposium Addresses 'The Challenge of Green'

The University of Guelph will host the 18th Annual Ontario Turfgrass Symposium (OTS), February 18th and 19th, 2009 at Rozanski Hall. Speakers from both industry and academia will provide valuable insight reflecting the OTS 2009 theme – *The Challenge of Green*.

Recent governmental policies have placed demands on turf managers that require new knowledge and skills. Delegates will participate in sessions providing current information that respond to the complexities of maintaining healthy turf in today's more restrictive growing environment. Sports turf, facilities, golf and lawn care professionals and nursery sod growers will all benefit from the many topics including the economics of the turf industry, new pest and disease controls, safety issues for staff, and other industry-related sessions.

Turf industry leaders and associated staff will benefit from both learning sessions and the opportunity to network with colleagues in the turf industry. Share success stories and strategies to create optimum conditions for healthy turf.

OTS is an invaluable forum for discovering the best practices coming from Ontario, Canada and internationally.

Visit the conference website at www.open.uoguelph.ca/ots or call 519.767.5000 for more information.

Stay tuned for more details! In the winter issue of the Sports Turf Manager, we'll publish a detailed list of OTS sports turf sessions as well as early bird registration information for STA members.

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

Winter 2008 Submissions
If you have something you'd like to submit for the next issue, please forward it to the STA office by November 7, 2008.

Editorial Content
Opinions expressed in articles published in *Sports Turf Manager* are those of the author and not necessarily those of the STA, unless otherwise indicated.

Guelph Turfgrass Institute/ Ontario Turfgrass Research Foundation Field Day

Participants attending the 2008 GTI/ OTRF Research Field Day were treated to a beautiful, sunny summer day. After welcoming remarks from the Honourable Leona Dombrowsky (Minister of Agriculture, Food & Rural Affairs), Kevin Falls (President, Ontario Turfgrass Research Foundation) and Dr. Rob Gordon (Dean, Ontario Agricultural College) the approximately 100 participants headed out for a ten stop tour covering a wide range of research from aquatic toxicology to the very latest pesticide alternatives.

Popular tour stops included the NTEP Kentucky bluegrass trials that include some of the new Texas bluegrass hybrids which have the potential to introduce a new level of drought tolerance into bluegrass seedings. A new mowing trial shows the performance of a number of the newer dwarf bluegrass varieties cut at fairway height and above. Tom Hsiang provided an excellent overview of his disease research and discussed some of the newer products that are making their way to the marketplace. There was also a chance to score a goal on the GTI soccer field to win a GTI 20th anniversary hat.

Results from current research projects will appear in future GTI *Annual Research Reports*. Thanks to all faculty and staff who helped with the field day as well as the industry professionals who took time from their busy schedules to join us for the morning. The next GTI/OTRF summer field day will be in 2010.

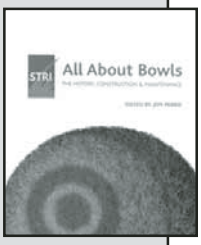
New Release

All About Bowls: The History, Construction & Maintenance of Bowling Greens

Now available from the Sports Turf Research Institute (STRI) bookstore, the new book is a fully updated version of the original 'bowls bible,' *Bowling Greens – Their History, Construction and Maintenance*, which has been out of print for over four years. First published in 1988, the original was produced in black and white.

The new version is now available in full colour with additional content in a hard back cover. The 224 pages have been revised and brought up to date with current images and photographs by editor Jeff Perris, STRI Consultant Agronomist for 42 years.

All About Bowls is an indispensible aid to all bowling clubs and greenkeepers. It provides a comprehensive year round guide to the management of both flat and crown greens. It is fully supported by Bowls England, who provided the book's foreword, and the British Crown Green Bowls Association.



Cost of the new book, ISBN-978-187-343-1603, is £22.50 plus postage and packing. It is available via STRI's website at www.stri.co.uk/bookshop.

STA Scholarship

Deadline: November 1, 2008
In order to encourage, support and provide leadership to those considering a career in the sports turf industry, the STA offers the Robert W. Sheard Scholarship. One scholarship in the amount of $1,000 may be awarded annually.

We encourage you to apply for the STA Robert W. Sheard Scholarship if you:

- are a Canadian citizen or landed immigrant;
- are currently enrolled in and have completed one full year of education in a post-secondary program in turf management at a recognized college or university in Canada; or, have completed the University of Guelph's Turf Managers' Short Course, or equivalent, in the current year;
- have been employed in the sports turf industry in the current year (including seasonal employment) by a member of the Sports Turf Association;
- have a desire to pursue a career in the sports turf industry.

The Scholarship Program is funded through STA membership fees. The award is intended to assist students with the cost of tuition, books and related expenses.

Visit www.sportsturfassociation.com for scholarship policies, application requirements and an application form.

QUOTABLE QUOTE...

Even if something is left undone, everyone must take time to sit still and watch the leaves turn.
~ Elizabeth Lawrence

TOWN OF OAKVILLE

NEW ONLINE TURF FARM & TURFGRASS DIRECTORY DEVELOPED BY TPI

Need turfgrass? Locate a turf farm near you and buy the turfgrass type best suited for your next project! Turfgrass Producers International (TPI) offers an online comprehensive directory of turfgrass growers at www.TurfGrassSod.org.

Search for turfgrass farm growers by state, country or turf type (species). The directory allows you to further refine your search by selecting criteria based on specific turf cuts such as big roll, slab, fold, plugs, sprigs, standard roll or washed turf. Turf installation is also indicated in the farm listing if they provide this service. Turfgrass farms are sorted geographically (country, state and province) and include contact name, company, address, phone, fax, email and website (with hyperlinks to take you directly to the farm website).

The TPI online directory is offered as a convenient resource in finding turfgrass sod farms for landscape contractors, golf course superintendents, city/state municipalities or others interested in purchasing turfgrass sod. All companies listed in the directory are current TPI members. The directory also features industry-related suppliers of equipment, machinery, parts and business services for turfgrass sod farms.

For your next landscape or turfgrass needs project, visit the TPI directory at www.TurfGrassSod.org and click on the tab "Turfgrass Sod Producers" next to "Find" from the home page. For further information about TPI or if you have questions about the directory, please contact Susan Hall at 1-800-405-8873 or email shall@TurfGrassSod.org.

About TPI

The Turfgrass Producers International (TPI) is the leading organization for turfgrass sod growers, with more than 1,100 members worldwide. Founded in 1967, TPI is dedicated to the advancement of the turfgrass sod industry. Through the education of its members, product users and various green industry and government entities, the association serves to encourage the use of turfgrass sod. TPI also advocates the role and value of turfgrass sod to businesses, media, government entities and the general public. By providing members with access to a full range of programs and services, and by publishing the industry's No. 1 publication dedicated solely to turfgrass sod production, *Turf News* magazine, TPI leads the way for advancing the turfgrass sod industry. Visit the TPI website at www.TurfGrassSod.org.

Saturated Hydraulic Conductivity of Sand Based Root Zones *cont.*

From the front cover. Under Ontario conditions, the highest daily rainfall ever recorded occurred on October 15, 1954, during Hurricane Hazel when 18.29 cm fell over a 24 hour period. The previous rain that approached this amount per day was in 1887. During the 1954 rain, a once-in-a-hundred year storm, the maximum intensity of rainfall was 5.2 cm/hour which is easily accommodated by the USGA rate

of 15 cm/hr. During intense summer storms, which are very localized, 10 cm of rain may fall in 15 minutes on an individual field but the frequency of such storms is less than one per summer. Most rainfall is at a rate of 0.5 cm/hr or less. Should we design a root zone with sand which has a hydraulic conductivity of 10 cm/hr? There is a price to pay for designing a root zone to accommodate this infrequent occurrence of an intense rain. That price is the cost of water.

The facts of water movement in soil show that the higher the saturated conductivity of the root zone mix, the lower the amount of available water the root zone will retain. Thus more frequent irrigation will be required and less of the natural rainfall on the soil will be utilized as much of it will be lost by drainage. This loss through drainage is a waste of a valuable commodity.

If a saving of 25% can be achieved using a finer sand which will have a lower hydraulic conductivity but which will result in the root zone holding more plant available water, it will save 2,480 cubic metres of water with a value of $4,340 per season on one soccer field.

With today's emphasis on more efficient use of water, there is a great and immediate need for research in the relationship between particle size distribution of sand, saturated hydraulic conductivity and aeration porosity in sand based root zones. This research must include the time required for a return to full aeration porosity on both an hourly basis and on a daily basis. Studies at Bingley Sports Turf Research Institute have shown a significant decline in the hydraulic conductivity as a field matures, particularly those using organic amendments, or as the active and decaying root system develops. Therefore the project must extend over several years.

The studies must be done in the field. The technology is available. Where is the money for the research?

Examine this scenario. If using finer sand will result in a lower hydraulic conductivity and result in the root zone holding more plant available water – and savings of $4,340 per season on one soccer field – more research must be done in this field.

FYI

New Online Forum Available

The Professional Lawn Care Association of Ontario has added a new online forum to its website www.plcao.on.ca .STA members are invited to take advantage of this opportunity to initiate discussion, post questions and look for answers on a variety of turf-related topics.

NEW MEMBERS

WELCOME TO THE STA!

Urban Turf Ltd., St. John's NL
Jim Floyd

Town of Oakville, ON
Stephen Booth

Nutrite, Kitchener, ON
Paul Proulx

Dol Turf Restoration Ltd.
Bond Head, ON
Andrea Wallis

Town of Midland, ON
Dave Hamelin

Town of Newmarket, ON
Jeff Bond & Derek Walsom

Township of Centre Wellington
Fergus, ON
Andy Goldie, Dan Reeves & Matt Tucker

City of Kingston, ON
Mark Fluhrer

Appleby College, Oakville, ON
Ken Rivers

City of Mississauga, ON
Chris Katotikidis, Anthony Alfano, Rob D'Ovidio, Wayne Graham, Jane Maffrett, Cliff Towers, Mark Trudelle, David Warden & Andy Wickens

Figure 1

Figure 2

WHAT DO RUST DISEASES HAVE TO DO WITH TEA DRINKING, RED DOGS AND BARBERRY PLANTS?

DR. TOM HSIANG, PROFESSOR, DEPARTMENT OF ENVIRONMENTAL BIOLOGY, UNIVERSITY OF GUELPH

There used to be a very popular garden plant called barberry which has attractive variegated foliage (Figure 1), and served very well as hedges since they have prickly thorns. But then they mostly disappeared from the urban landscape. What did the disappearance of this plant have to do with turfgrass rusts? Barberry was banned in 1966 for import into and trade within Canada. The reason for this was because barberry acts as the alternate host for the rust *Puccinia graminis* which causes stem rust of wheat and also rust on a variety of turfgrasses (Figure 2). The meaning of alternate host is that the fungus needs both the grass host and the alternate host to complete a full life cycle.

Rust diseases on plants have been recognized since ancient times and are one of the few plant diseases mentioned in the Bible. The Romans even had a God of Rust, Robigus, who was honoured annually by sacrifices of red coloured animals such as cows or dogs, and red wine. Rust diseases have had severe economic impact, and a severe outbreak of rust on coffee in the mid-1800s was probably responsible for changing Britain to a land of tea drinkers. Rust diseases are notorious on cereal crops, and world-wide losses to wheat stem rust are estimated at several billion dollars each year. Rust fungi require living host tissue to feed, although spores can survive on the surfaces of dead plant tissues. Rusts are also highly specific to their host species, and a rust of perennial ryegrass may be unable to infect Kentucky bluegrass, and vice-versa. In some cases, some rust isolates are specific to particular host cultivars, so that they cannot attack other cultivars even within the same host species.

Rust fungi have among the most complicated life cycles of all living organisms, and there may be five distinct spore stages with two different host plant species required to complete a full cycle. Over 500 years ago, wheat farmers first started to notice that wheat rust was often worse when barberry bushes were growing nearby. This led to eradication programs for alternate hosts that were mentioned at the start of this article. Did these eradication programs for the alternate host manage to both break the life cycle and eradicate the rusts? Not really, because not all barberry plants were eradicated, and mostly because in North America, the rust can survive on living host tissue near the Gulf of Mexico and then travel northward in spring time.

In this article, we'll look at the major rusts that attack cool season turfgrasses. We'll discuss their biology and ways of recognizing and controlling these diseases on turfgrass.

Hosts

Nearly all grasses can be affected by their own rusts, but among cool season

turfgrasses, perennial ryegrass seems to be most greatly affected. Rust is also a problem on Kentucky bluegrass, but often only one species is affected in an area. All of these rusts also have their cereal hosts, for example, *P. graminis* on wheat and *P. coronata* on oats. However, as they are so specialized, the strain attacking the cereal may not be able to attack turfgrasses. The alternate host for *P. graminis* is barberry (Figure 1), and that for *P. coronata* is buckthorn (Figure 3). Orange spots are visible on these alternate host plants in the spring to early summer. The common rust on perennial ryegrass is called crown rust (Figure 4) caused by *Puccinia coronata*. It is called crown rust, not because it attacks the crown of plants, but because the spores have protrusions that look like crowns (Figure 5).

Season of Occurrence

Rust on turfgrass is most commonly visible on leaf blades in late summer into fall. However, infections may start in late spring, and through several cycles of infection, the levels of rust build up by the end of summer.

Conditions Favouring Disease

The conditions that are favourable for initial infection differ from those that encourage development of the disease in the field. Infection is favoured by low light intensity, 20 to 25ºC, and high humidity (e.g. long dew periods). After infection, disease development is enhanced by high light intensity, 25 to 35ºC, and dry leaf surfaces. Alternation of wet cooler weather with hot dry weather during summer will greatly enhance infection and allow disease levels to build up. In the last part of summer and into early fall, dry, warm and sunny conditions slow the growth of the grass, and also allow the rust to almost completely infect the entire leaf blades and produce abundant spores.

Symptoms

The first symptoms on grass are small yellow flecks on leaves or sheaths on upper or lower leaf surfaces depending on the species of rust. Reddish-brown pustules (Figure 6) appear on leaf blades bearing masses of summer spores (Figure 7).


Figure 3

Fig. 1: Variegated barberry plant which was very common in the mid-1900s but almost disappeared because of efforts to eradicate wheat stem rust by eliminating this alternate host.


Figure 4

Fig. 2: Rust on Kentucky bluegrass surrounding a creeping bentgrass green in August. The creeping bentgrass is not susceptible to the Kentucky bluegrass rust and the thicker, more lush Kentucky bluegrass also contributes to more infection.

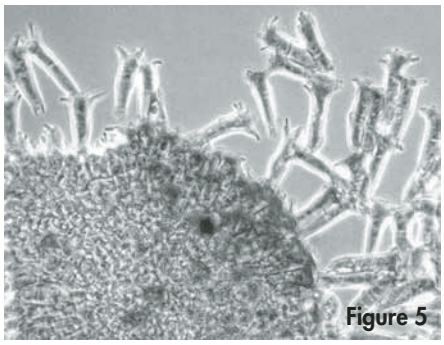


Figure 5

Fig. 3: Buckthorn in late spring infected by the crown rust fungus. The spores produced in specialized small cups on this host can only infect turfgrasses such as perennial ryegrass.

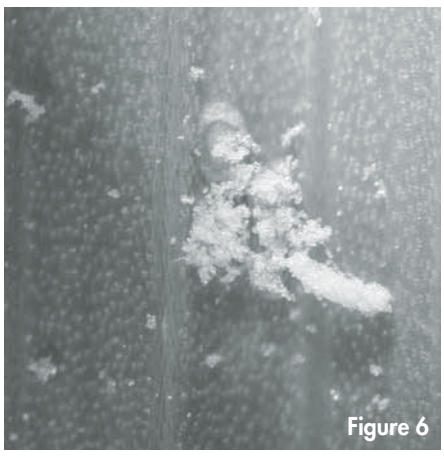


Figure 6

Fig. 4: Crown rust of perennial ryegrass in late August causing widespread yellowing on a sports field. The yellow-orange colour comes both from the infected grass blades and the yellow colour of the rust spores and the bodies that produce the spores.

Fig. 5: *Puccinia coronata* causing crown rust. It is called crown rust not because it attacks the crown of the plant, but because the spores have protrusions that look like a crown.

Fig. 6: A yellow spot on a leaf blade caused by a rust is composed of the yellow plant tissue due to feeding by the rust and the yellow-orange rust spores.

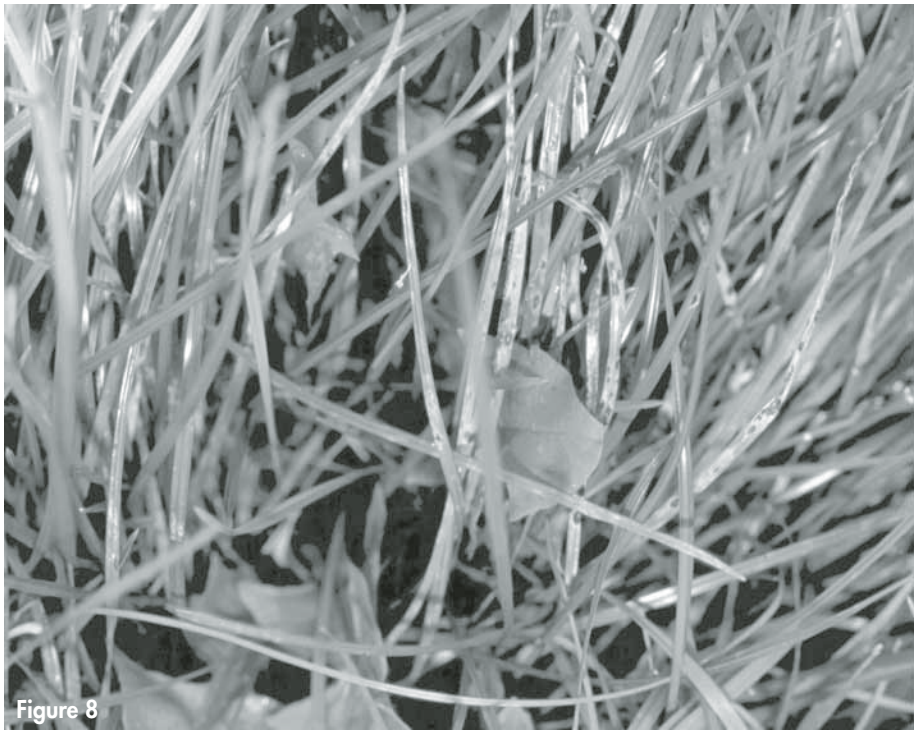


Figure 8

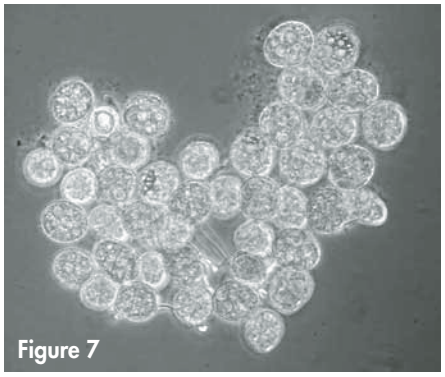


Figure 7

Fig. 7: Rust spores are thick walled to withstand drying and can travel long distances.

Fig. 8: Rust infections on perennial ryegrass later in the season. The rust has stopped producing the yellow-orange summer spore and has started producing the black winter spores which overwinter on dead grass foliage. The black spores will germinate in the spring to produce another short-lived spore that can only infect the alternate host, not the grass host.

These rust spores can easily be rubbed off, giving a reddish tinge to shoes and equipment which commonly occurs in fields with lots of rust. These rust species are not known to be poisonous or produce toxins to animals, so occasional contact or even inadvertent ingestion shouldn't cause a health problem. Only above ground plant parts are infected, and severe attacks may result in yellowing and wilt. After tissue has been killed or nearing the end of the growing season, brown or black spots composed of black winter spores may develop in place of the reddish-brown pustules (Figure 8).

Life Cycle

Most rusts require more than one host species to complete a life cycle. In addition to the grass host, the other host, known as the alternate host, is usually a woody or herbaceous species such as barberry (Figure 1) or buckthorn (Figure 3). Typically the fungus overwinters on living or dead tissue of the grass host. If the fungus overwinters on living tissue, such as in areas of very mild winters, then there is no need to pass through the alternate host, and then the dormant mycelium will produce spores which serve as the primary source of infection the following spring. This likely does not occur in northern latitudes because of the severe winters.

In the spring, overwintering resting spores (teliospores) on dead grass tissue produce other spores (called basidiospores) which will only infect the alternate host. A few weeks after successful infection of this alternate host, another set of spores (called aeciospores) are produced in late spring or early summer which then infect the grass host. Infections on the grass host lead to production of pustules which bear many more spores (called uredospores) to re-infect grass (cycling stage which increases the amount of rust). As the grass host tissue dies off, another spore stage (usually black or dark brown and called teliospores) is produced on the grass tissue (Figure 8), and these structures overwinter.

Most rusts require more than one host species to complete a life cycle. In addition to the grass host, the alternate host is usually a woody or herbaceous species.

Cultural Control

Mowing and managing fertility will usually control rust disease. The grass should be watered infrequently but thoroughly early in the day to minimize leaf wetness periods and to avoid drought stress. Fertilization should be sufficient to avoid nutrient stress and to improve leaf growth. Increased mowing height with greater frequency of mowing should reduce disease symptoms, although some researchers recommend reducing the height of cut so that there is less foliage for infection. The drawback of this method is that the plant is weakened with a relatively smaller root system, and may be less able to fight off infection. Reducing shade and improving air circulation should lead to drier leaf surfaces and less opportunity for infection.

Chemical Control

No chemicals are registered for turfgrass rust disease control in Canada, but in the U.S., azoxystrobin and propiconazole have been found to be very effective. Consult provincial publications product labels for recommendations.

Resistant Turfgrasses

Cultivars of Kentucky bluegrass and perennial ryegrass with increased resistance to rust are available. Consult local publications or contact seed company representatives for lists of varieties. ♦

21st ANNUAL STA FIELD DAY

September 11, Brampton, Ontario

Thursday, September 11th dawned crisp and clear as over 225 turfgrass industry professionals gathered at the Sports Turf Association's 21st Annual Field Day at Donald M. Gordon Chinguacousy Park in Brampton, Ontario. Our yearly event continues to offer an impressive roster of speakers with 2008 topics ranging from safety to seed to stretching your budget. This, coupled with the knowledge and expertise shared by our exhibitors, sets the stage for a winning educational forum and networking opportunity for our delegates. We now turn our attention to the 2009 Field Day with consideration given to the many evaluation responses which we received. Thank-you to all who participated in making our 21st Annual Field Day our 21st Annual Success!

Turn the page for a photo gallery...

Left: Our speakers Paul Stevens/Pickseed, Dan Murnaghan/City of Guelph and Darrell MacLean/Town of Oakville.

Middle: Mike Vanderjagt of the Toronto Argonauts with Field Day Committee Member Jane Arnett-Rivers. Mike, our keynote speaker, described for us his journey though professional football from which we could all extrapolate a number of life's lessons – dedication, determination, perseverance, and belief in one's self, to name but a few. If at first you don't succeed, try *try* again.

Right: Chair of the day, Andrew Gaydon, with Lorrie O'Brien, Director of Parks, Maintenance & Operations, who welcomed us to the City of Brampton.

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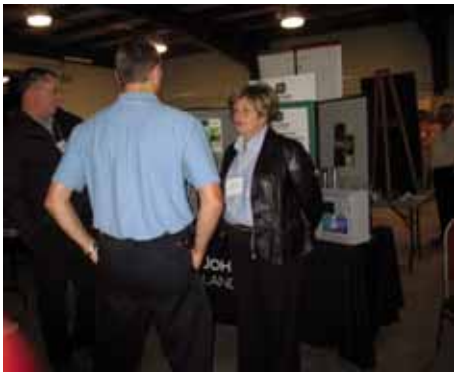





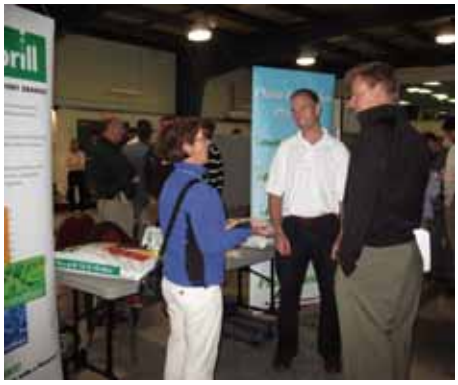

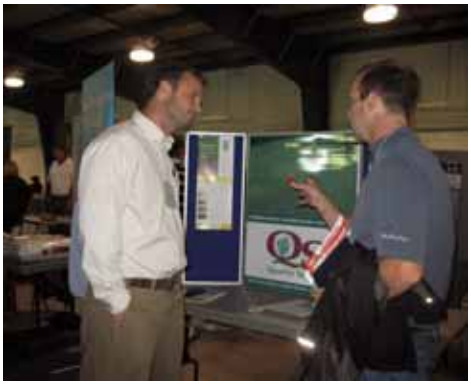

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Invaluable Resource Produced by the STA

The objective of the recently released *Athletic Field Construction Manual* is to provide specifications and guidelines for the design and construction of grass athletic fields. The Manual is designed to assess the requirements for the field and to present the specifications for construction of the field to meet those requirements. It applies to all types of athletic fields that require a natural turf surface on all or part of the play area.

Bringing uniformity to the construction of grass athletic fields, this manual is long overdue as a staple reference for those in the sports turf industry. It establishes standards for the design and construction of the root zone. The standards are based on a classification system (1-5) for the athletic field which is primarily based on the root zone material and the provision of drainage, irrigation and lights. Also included are permitting hours and maintenance costs for field categories; a checklist to evaluate the condition of existing fields; and more than 20 diagrams outlining the approved field dimensions for most field sports using a turf surface.

An invaluable, unique reference manual that takes a systematic design-oriented approach to the construction of natural turf sport fields based on a field classification system and the anticipated calibre of play and turf wear by user groups. ~ D. Murray Cameron OALA

Table 2.2.6 A summary of the design requirements for the five field categories (excerpt from Section 2 of the AFCM).

DESIGN REQUIREMENT	ONE	TWO	THREE	FOUR	FIVE
Soil (% silt + clay)	<8.0	<25	25-40	>40	All Soils
Sub-Surface Drainage System	Yes	Yes	Yes	Yes	No
Irrigation	Yes	Yes	Optional	Optional	No
Lights	Yes	Yes	Optional	Optional	No

HOW DOES 'CVOR' LEGISLATION APPLY TO YOUR OPERATION?

DARRELL MACLEAN, FLEET TRAINER/SAFETY OFFICER, TOWN OF OAKVILLE, 2008 STA FIELD DAY SPEAKER

Commercial Vehicle Operator's Registration (CVOR) is the monitoring system that the Ontario Ministry of Transportation (MTO) uses much like a report card to review the operations of the fleet and its drivers who own or operates trucks that are either registered to, or actually weigh more than 4,500 kg (including load, tools, passengers, etc.). Generally anything over a 3/4 ton truck may be a CVOR truck. *CVOR regulation does not apply to vehicles under 4,500 kg.*

How the System Works

MTO monitors the accumulation of demerit points from collisions, convictions or inspections over a rolling five year period. The more serious the incident (collision or conviction), the higher the demerit points.

Should the CVOR accumulate more than the allowable threshold of demerit points or if there is a high profile incident like a serious or fatal collision, MTO is within its rights to conduct a "facility audit" of the employer.

If an unfavourable facility audit occurs, MTO may issue warnings and fines to the corporation, and/or the driver, and/or reduce the size of the CVOR fleet, and/or withdraw CVOR driving privileges – meaning all vehicles weighing or are registered to weigh more than 4,500 kg will not be permitted to operate at all.

How to Identify Registered Weight

To identify if your truck is a CVOR, look on the mid right panel of the ownership for "Reg Gross Wt (RGW)." If it is higher than 4,500 kg, it is a CVOR truck.

If it is registered under 4,500 kg, but you are unsure of the fully loaded weight of the truck, get it scaled.

In the event the weight of the truck (including its load, passengers and anything else it carries) or gross weight weighs more than the RGW, you can be charged with an overload violation. If the gross weight is more than 4,500 kg and not registered, you can be charged for operating a truck without a CVOR. ♦

Cores, following aerification, showing thatch layer.

TOWN OF OAKVILLE

WHY YOU SHOULDN'T IGNORE THATCH

KATERINA JORDAN, PLANT PATHOLOGIST & ASSISTANT PROFESSOR, DEPARTMENT OF PLANT AGRICULTURE, UNIVERSITY OF GUELPH

Thatch is the intermingled layer of undecomposed organic material between the turf canopy and soil surface. It comprises living and dead plant tissue including shoots, stems and grass roots. The mat layer is the area of thatch mixed with soil, also found between the turf canopy and the soil surface, usually seen on golf course putting greens. It is often a result of frequent topdressing. Both thatch and mat are the subject of many turfgrass maintenance discussions and articles, primarily because excessive levels are responsible for a number of negative effects on the soil profile and turfgrass growth. Even with this wealth of information floating around, excess thatch continues to be an issue on a number of courses, whether on fairways, tees or greens. As such, this article will describe the effects of excess thatch, the factors that lead to its development and, most importantly, discuss preventative practices to reduce thatch levels.

What Does It Do?

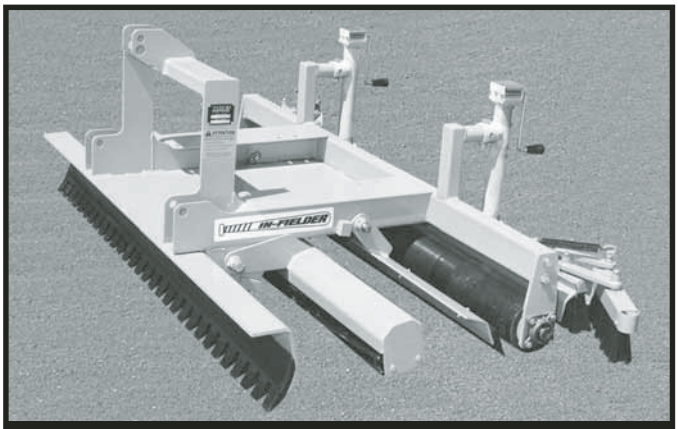
Thatch and mat play an important role in cushioning the turf surface, improving wear tolerance, decreasing soil compaction and protecting the crown of the plant. However, when levels become excessive (usually more than 1.3 cm [0.5 in.], numerous issues can arise including:

- increased pest damage
- decreased water and nutrient retention
- reduced water infiltration
- decreased root health
- increased potential for localized dry spots
- reduced tolerance to extreme temperatures
- reduced efficacy of certain pesticides
- higher potential for scalping and crown damage

Thatch layers provide a haven for insects, weed seeds and overwintering structures of disease pathogens. The high organic matter content and large pore

Excess thatch layer

ADJACENT & TOP INSET, PAM CHARBONNEAU



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space makes it ideal for the development of chinch bugs, sod webworms and cutworms. Diseases such as gray snow mold (*Typhula incarnata/ishikariensis*) and dollar spot (*Sclerotinia homoeocarpa*) are able to overseason in the thatch layer. In addition, root diseases such as summer patch (*Magnaporthe poae*) and take-all patch (*Gaeumannomyces graminis*) are more severe, due to overwintering and reduced stress tolerance. Stress-related diseases such as anthracnose (*Colletotrichum cereale*) have also proven more severe due to the decreased overall health of the plant.

Water movement is also negatively affected. When thatch layers become excessive, roots and rhizomes (horizontal stems) are restricted to those layers, likely because pore spaces are larger and easier to traverse. However, because of these larger pore spaces, water retention is quite poor. Over time, the plants suffer from drought stress; the roots are in the thatch layer, but the moisture is not. The lack of root growth in the soil layer beneath the thatch also reduces the porosity of the soil, often leading to greater bulk density. More often than not, areas suffering from excessive thatch for extended periods of time have compacted soil underneath. At this point, water infiltration is often reduced, as the water is trapped in the thatch layer and unable to penetrate the compacted soil. This further restricts root growth, as moisture is available only in the top layer beneath the plant; roots can get water without going any deeper.

If the thatch is allowed to completely dry out, water repellency can occur. Because thatch is primarily organic material, it is very difficult to re-wet after it has dried. This often leads to localized dry spots. This, in turn, causes increased runoff and wasted water, as well as drought. All of these factors damage both root and overall plant health. The roots remain shallow and more prone to drought stress, but are also more susceptible to temperature extremes as the large pore spaces cannot buffer temperatures as well as the soil layer.

Excessive thatch layers can also reduce pesticide and fertilizer efficacy. Many pesticides applied for weed, insect or disease management are organic in nature. Given the high organic matter content of thatch, pesticides can get bound in the thatch layers and not reach their targets. In addition, the microorganisms that break down thatch often break down the trapped pesticides before they have the chance to be effective. Fertilizers may also get stuck in the thatch layer due to decreased infiltration. They may be less effective for the plant because volatilization of certain nitrogen sources is found to be greater in excess thatch layers compared to soil.

TOWN OF OAKVILLE

Excessive thatch layers can also reduce pesticide and fertilizer efficacy. Both can get stuck in the thatch due to decreased infiltration and not reach their intended targets. Excessive thatch can also lead to physical damage of the plant through an exposed crown or mower scalping.

Finally, an excess thatch layer can lead to physical damage of the plant either through an exposed crown or mower scalping. Thatch often raises the level of the crown, making it and the plant more susceptible to injury. In addition, the sponginess created by a thick thatch layer increases the potential for mower scalping due to bouncing of the equipment. Even if the plant is not scalped, the cut is often uneven, which compromises playability.

Where Does It All Come From?

Thatch develops naturally from the breakdown of the various parts of the turfgrass plant. Excess thatch builds up when the rate of production of plant material exceeds the rate of decomposition. Most often, plant material that does not easily decompose contributes to thatch layers – namely stems, stolons, rhizomes and root tissue. These tissues are highly lignified and therefore much more resistant to microbial breakdown. Leaf blades are about 80 per cent water and comprised primarily of cellulose, which is much more easily degradable than lignin. This is why, in most cases, leaving clippings on the surface will not significantly contribute to a thatch layer. However, if the rate of growth greatly surpasses the rate of decomposition, thatch can result from the senescence of any plant materials.

Factors that can contribute to thatch development include turfgrass species and cultivar, excess nitrogen fertility or irrigation, continual use of broad-spectrum pesticides, non-neutral pH levels and com-

pacted soils. Certain turfgrass species – including Kentucky bluegrass (*Poa pratensis*), creeping bentgrass (*Agrostis stolonifera*) and velvet bentgrass (*Agrostis canina*) – are more prone to developing excess thatch than others. Within these species, different cultivars have varying potential for thatch development. Newer, finer-leafed cultivars of creeping bentgrass such as the A and G series are notorious for building excess thatch layers in a relatively short period of time, as is velvet bentgrass. These species and cultivars are known for their dense growth, which produces more material than can be broken down by the microorganisms.

The effect of excess nitrogen fertility on thatch development is related to increased growth. When high amounts of quick-release nitrogen are added to turf, growth is often rapid, which leads to excess thatch formation over time. Excess irrigation, use of broad-spectrum pesticides and highly acidic or alkaline soils also lead to increased thatch development as they inhibit the microbial populations responsible for breakdown of the thatch material. Excess irrigation often leads to reduced oxygen in the thatch and soil, robbing the organisms of the oxygen they need to function. Overuse of broad-spectrum pesticides is also believed to reduce microbial population levels. Finally, most microorganisms function best at neutral pH levels (pH = 7.0); therefore highly acidic or alkaline soils decrease microbial activity and, subsequently, decomposition of thatch.

Soil compaction can result from excess thatch levels, but it may also contribute to thatch development. Highly compacted soils are resistant to root penetration and water infiltration and also have reduced pore space and subsequently oxygen availability.

As mentioned earlier, soil compaction can result from excess thatch levels, but it may also contribute to thatch development. Highly compacted soils are resistant to root penetration and water infiltration and also have reduced pore space and subsequently oxygen availability. All of these factors lead to shallow rooting and reduced microbial activity in the soil, both of which can lead to excess thatch formation.

What Can You Do About It?

Knowing the contributing factors is the first step towards prevention. Aside from species or cultivar choice, many daily maintenance decisions can affect the potential for thatch development.

- Use smaller amounts of nitrogen more often to discourage a sudden flush of growth. If large amounts are applied

only a few times throughout the season (typically the case on fairways), choose primarily slow-release nitrogen to avoid a surge of growth.

• Water turf deeply and infrequently to encourage deeper root growth and allow the surface of the soil to dry out periodically. This ensures adequate oxygen availability in the top layers of the soil.

• If you have highly acidic or alkaline soil, you can attempt to neutralize it with lime or an acidifying fertilizer. More often than not, however, the nature of the irrigation water is likely the cause of the imbalance, making any attempt to alter soil pH temporary. However, if thatch levels are already excessive, a temporary adjustment may be enough to allow for greater microbial degradation.

Although prevention is important, thatch levels will often increase over time even if you follow the above guidelines. At that point, more active maintenance methods are necessary to remove and prevent excess thatch. Numerous studies have looked at various thatch reduction practices, including core cultivation, vertical mowing, topdressing and the use of biological thatch controls. These biological controls often contain some natural bioactive ingredients and/or specific microbial populations aimed at organic matter decomposition. Unfortunately, their effectiveness is often erratic; one study showed no decrease in thatch levels compared to untreated plots.

On the other hand, core cultivation, vertical mowing and topdressing tend to disrupt the playing surface, a particularly important issue on putting greens. This is partly why thatch layers are allowed to accumulate to a detrimental level. Many superintendents would rather deal with thatch than member complaints. However, given the damage it can cause, superintendents would be well advised to take this issue seriously.

Core aerification improves soil quality by both removing thatch and opening up pore spaces in compacted soils. Very little surface area is actually affected by most


Water deeply and infrequently.

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Contributions Welcome

Contact Lee Huether at the STA office if you are interested in contributing to the *Sports Turf Manager*. We appreciate feature-length articles, column ideas and newsworthy items. Updates on innovative research or equipment are also welcomed. This is a great way to both support your professional association and enhance your resume!

Happy Fall!

core cultivation, so it is recommended this practice be done at least once per year (preferably twice) depending on other factors, including turfgrass species and cultivar. Vertical mowing involves slicing of the turf surface to remove underground material. Many superintendents prefer to lightly verticut or groom their greens to achieve the same results, as it has a less severe effect on playability. On greens, this practice may be acceptable to cut through stolons and prevent excess build-up, but research indicates water infiltration is significantly increased only through deep (~ 2 cm [0.8 in.]) vertical mowing two times annually, not with periodic grooming. Increased water infiltration was also observed with core cultivation; both thatch removal and increased soil porosity were achieved with this practice. Interestingly, topdressing alone was not found to significantly reduce thatch or increase water infiltration.

What's Next?

The Guelph Turfgrass Institute is currently conducting a rather extensive thatch reduction study on an established mixed green comprising creeping bentgrass, annual bluegrass and velvet bentgrass. Thatch levels at the onset of the experiment were ~ 2 cm (0.8 in.). Treatments include various diameter tines for core cultivation, solid tine cultivation, vertical mowing at different depths and topdressing. The study should be complete by the end of the 2009 season and I look forward to sharing the results.

The important thing to remember about thatch levels is that you need to monitor them each season since there are so many factors that can affect accumulation, including the weather itself. There is no doubt excess thatch is detrimental to turfgrass growth, regardless of what part of the golf course is affected. Although many thatch reduction maintenance practices are disruptive, a couple of weeks of less-than-ideal playing conditions is well worth it in the long run. Turf will be healthier and more stress-tolerant. Now if members start to complain, you'll have the knowledge to back up your decision. Once they understand the threat, the inconveniences may be a little easier to deal with.

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