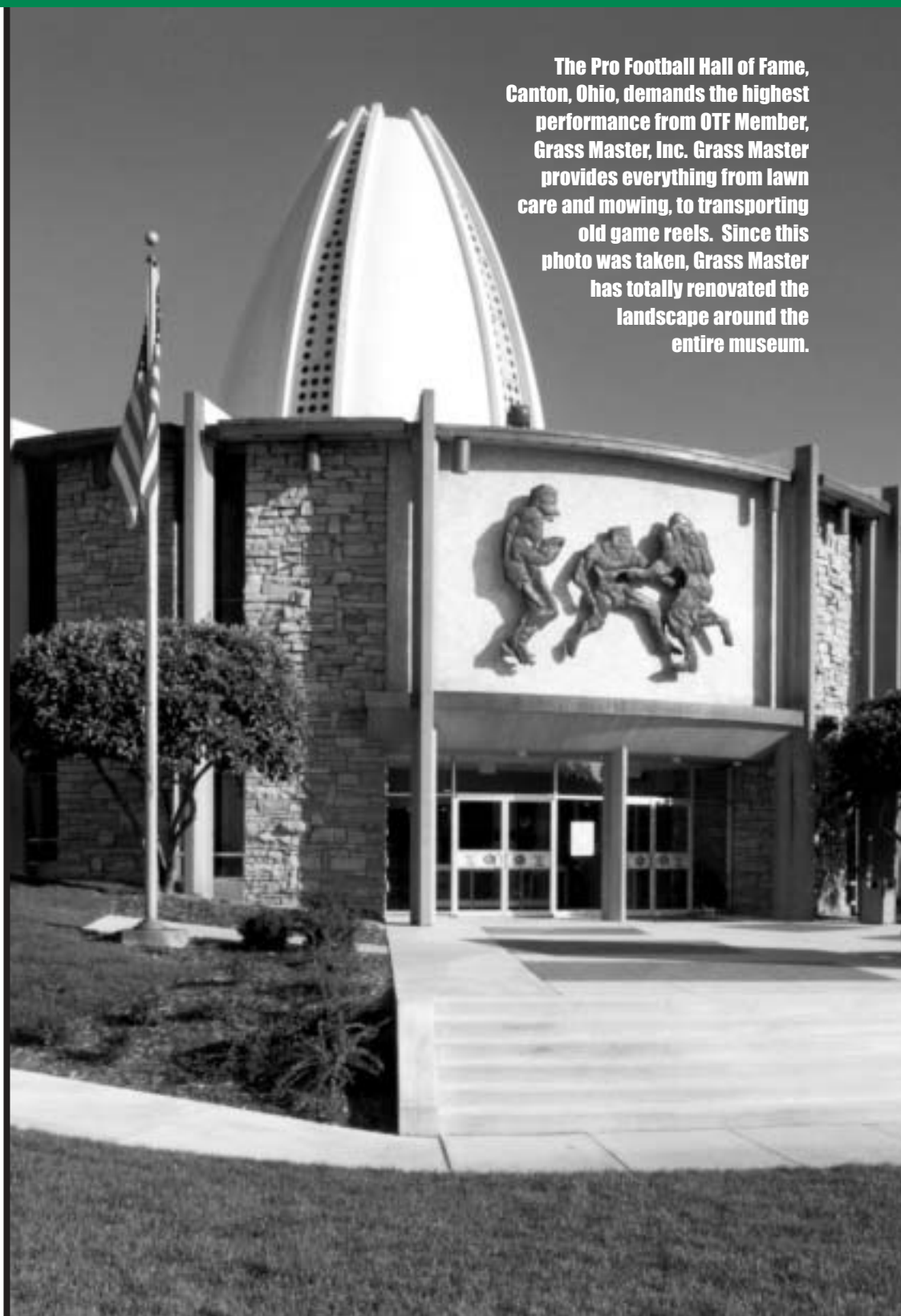
Volume 67 • No. 2
March - April 2005

OTF TurfNews

The Newsletter of the Ohio Turfgrass Foundation

Inside:



The Pro Football Hall of Fame, Canton, Ohio, demands the highest performance from OTF Member, Grass Master, Inc. Grass Master provides everything from lawn care and mowing, to transporting old game reels. Since this photo was taken, Grass Master has totally renovated the landscape around the entire museum.

OTF TurfNews
The Newsletter of the Ohio Turfgrass Foundation

TurfNews distributes useful and timely advice, information and research from Ohio's most knowledgeable experts and professionals to OTF members and those in the turfgrass industry.

Vol. 67 • No. 2 March - April 2005

TurfNews is produced by the Ohio Turfgrass Foundation
PO Box 3388, Zanesville, Ohio 43702-3388
1-888-OTF-3445 and is available to all members
www.OhioTurfgrass.org

Back issues of OTF *TurfNews* are available on our Website at www.OhioTurfgrass.org.

Inside

2005 Calendar OF Events

Northeast Ohio Lawn Care Seminar (OLCA)
June 16, 2005
OARDC, Wooster, OH
800-510-5296

OLCA/OSTMA Collaborative Golf Outing
July 28, 2005
Apple Valley GC, Howard, OH
800-510-5296 (OLCA) or 888-824-9805 (OSTMA)

Ohio Sod Producers Association Summer Field Day
August 6, 2005
Eastside Nursery, Columbus, OH
888-683-3445

OTF/OSU Turfgrass Research Field Day
August 17, 2005
OTF Research & Education Center, Columbus, OH
888-683-3445

Ohio Lawn Care Diagnostic Seminar (OLCA)
August 18, 2005
OTF Research & Education Center, Columbus, OH
800-510-5296

For more information or to register for OTF events, please contact the OTF office at 888-683-3445 or visit www.OhioTurfgrass.org.

MESSAGE FROM THE PRESIDENT

ONE STEP BACKWARDS ... TWO STEPS FORWARD

First, let me say that I am honored and humbled by being chosen to lead the Ohio Turfgrass Foundation in 2005. I would like to thank our immediate Past President, George Furrer for his dedication and diligent service to OTF. Since joining the Board in 1993, the hard work and dedication of the Board members and their committees in serving the turfgrass industry in Ohio has never ceased to amaze me. As I travel around the country, OTF and its mission to further turfgrass research and scholarships is looked upon with envy.

However, as it is said ... "Times they are a changing." In 2004 we saw a decline in the participation at every OTF sponsored event. Projected attendance was well below expectations in our inaugural year for the Annual Ohio State Golf Turf Spring Tee-Off Conference. The OSU Turfgrass Research Field Day saw lower than normal attendance and our Annual Golf Tournament failed to fill the field. Our management team at Offinger Management did a yeoman's job to fill the tradeshow floor at the Conference and Show, however attendance figures fell below normal.

These shortfalls have not gone unnoticed by the Board and the respective committees in planning for the year. We constantly strive to improve OTF sponsored events to appeal to a larger audience. Several new initiatives developed from our Strategic Planning Meeting in October have been brought into our operating plans for 2005. However, without the *PARTICIPATION* of everyone whose livelihood revolves around turf, OTF cannot effectively complete its mission which serves all of us in this great turfgrass industry in Ohio. As OTF members, my message to you is to spread the fever and bring at least two co-workers to the next OTF event!

Chuck Darrah, OTF President

Announcing Two NEW *TurfNews* Features

1. Question of the Month:

Do you have a question you'd love to ask other turf professionals? It could be a real-life question to help you solve a problem, handle a situation, or become a better turf manager. Questions can be about turf, employees, management, products, etc. Each issue will feature a "Question of the Month." Replies will be published in follow-up issues.

To Submit Your Question:

Type "TurfNews Question of the Month" in the subject line and email to: info@OhioTurfgrass.org or mail to:

OTF
Attn: Question of the Month
PO Box 3388
Zanesville, OH 43702-3388

2. Cover Photo Contest

Do you have a special project that you would like to have featured on the cover of *TurfNews*? We're looking for high-profile projects – landscaping, grounds, renovations, etc. Send us your photo and brief description to the addresses above and your photo could be on the next cover of *TurfNews*.

2005 Officers & Trustees Elected at Annual Meeting

2005 OFFICERS

President

Dr. Chuck Darrah is the President of CLC LABS, a soil testing and green industry consulting group. He has served as an OTF Trustee since 1993. He has served on the Program Development Committee since 1994, and was the 2002 Membership Development Committee chair.

Chuck graduated from the University of Delaware (B.S.), University of Maryland (M.S.) and Cornell University (Ph.D.). He was an Assistant Professor of Agronomy and Extension Turf Specialist for the University of Maryland from 1976-79. Later, he was the Senior Research Scientist for Chemlawn Services Corp. and Director of Technical Service at Chemlawn from 1982-1990. He is a Past President of the Ohio Lawn Care Association.

Vice President

Boyd Montgomery, CSFM, is the Facilities & Maintenance Director for Sylvania Recreation Corporation and also a member of the Sports Turf Managers Association, Professional Grounds Management Society, Ohio Lawn Care Association, and President and Co-Founder of the Ohio STMA Chapter. He currently serves on the Program Development Committee and Tradeshow Development Committee. Montgomery has been an OTF Trustee since 2001.

Treasurer

Glen Pottenger has been involved with the turfgrass industry since 1972. After graduating from high school in 1967, he enlisted in the Marine Corp. After four years of active service, he received an honorable discharge and attended Hobert Welding School. In 1972 he continued his education at the Agricultural Technical Institute (ATI) at The Ohio State University and earned an Associates Degree. He is proud to be a part of the first class to graduate from there. Glen is a certified Superintendent and a part time instructor at Clark State Community College. Pottenger has been a member of the Ohio Turfgrass Foundation for most of his 30 years in the turfgrass industry.

Trustees - Term Expires 2008

Doug Gallant, head Groundskeeper of the Cincinnati Reds, was elected to his first term as an OTF Trustee. Doug oversees all aspects of the daily playing field maintenance. He attended Wilmington College, where he played baseball for two seasons for former Reds star Brooks Lawrence. He later transferred to The Ohio State University and graduated in 1994 with a degree in turfgrass management. Doug previously worked for Cincinnati-based The Motz Group where, as a project foreman, he helped supervise Cinergy Field's conversion from artificial turf to natural grass following the 2000 season. He also was a project foreman for projects at Pro Player Stadium in Miami, Turner Field in Atlanta, Dodger Stadium in Los Angeles and Ohio Stadium in Columbus. He also was a member of the sod crew for SuperBowl XXXIII and Super Bowl XXXV. Doug resides in Georgetown, Ohio, with his wife, Lisa, his daughter, Erica and son, Zachary.

Don't Let Your Member Benefits Expire!

It is time to renew your membership to OTF. The OTF Membership year runs from February 1 – January 31. Membership renewal invoices were mailed to all 2004 members in late January, with a May 1 due date.

Please renew your membership immediately. **If OTF does not receive your renewal before May 1, you will not be listed in the 2005 Membership Directory, you will stop receiving this newsletter, and other valuable OTF member benefits and services will expire.**

Following is a brief description of each OTF Membership Type:

Organizational - Any one company that is currently involved in the management of turfgrass. Includes golf courses, lawn care companies, parks & recreation, cemeteries, nurseries, landscapers, sod producers, athletic fields, suppliers, and related organizations. Organizational Members have one contact person with full voting privileges.

Affiliate Organizational Member - Any one person whose company has joined as an Organizational Member. Affiliate Members will receive all OTF mailings, will be listed in the membership directory, and will have all other member benefits, but will have no voting privileges.

Individual - Any one person who is currently involved in the management of turfgrass. Individual Members have full voting privileges.

Faculty - Any person involved in teaching turfgrass management, landscape, horticulture, or other related fields. Faculty Members have no voting privileges.

Student - Any student currently enrolled in a high school, vocational, technical school, college, or university. Student Members have no voting privileges.

PLEASE NOTE:
New this year, OTF Membership Renewal notices were mailed as a self-mailer brochure, rather than in an envelope. If you did not receive your renewal invoice, or have questions about your membership, please call OTF at 888-683-3445, or visit www.OhioTurfgrass.org.

2nd Annual Ohio State Golf Turf Spring Tee-Off A Big Success!

The Ohio Turfgrass Foundation was very pleased with the 2nd Annual Ohio State Golf Turf Spring Tee-Off, March 2-4, and would like to thank everyone who helped make it a successful event. OTF Trustee and Spring Tee-Off Committee Chair Todd Voss, Double Eagle Club, initiated the program with a goal of creating an annual reunion and networking atmosphere for OTF Members, OSU alumni and current turfgrass students. Attendees participated in a three day comprehensive educational program presented by OSU and OARDC faculty and industry professionals.

A highlight of the Conference was the OSU Turf Club Luncheon where club President Ryan Beeson, OSU senior, announced the great success of the OSU Turf teams in the National GCSAA Collegiate Turf Bowl in Orlando, FL (see related article). OTF President Chuck Darrah presented the Turf Club with a $1,000 check from OTF to assist in their travel expenses.

Comments from attendees included, "Overall, great conference and will be back!" and "Thanks for another opportunity to receive education, advice, and networking with our peers at a very reasonable price." OTF is already planning the conference for 2006, set tentatively for March 1-3. OTF appreciates all those who attended, presented, and participated in the 2nd Annual Ohio State Golf Turf Spring Tee-Off.

Tee-Off Committee Chair, Todd Voss of Double Eagle Club welcomed attendees to the 2nd Annual Ohio State Golf Turf Spring Tee.

GOLF COURSE TIPS

Microdochium Patch

Joseph Rimelspach, Department of Plant Pathology, OSU

In the snow belt region of Northeast Ohio snow molds are always a concern on creeping bentgrass and *Poa annua* turf. In the rest of the state snow molds can also be a problem especially Microdochium patch (pink snow mold, fusarium patch). The various snow molds that are a concern include:

Typhula blight *(Typhula incarnata)* is a common snow mold in Ohio and is first evident at snowmelt in late winter. Symptoms appear as circular areas of straw to grayish brown turf. The turf may also appear matted with the appearance of a grayish-white mycelium at time of snowmelt. The mycelium often dries and becomes encrusted over the patch. A diagnostic key to Typhula blight is the appearance of small hard spherical fruiting structures called sclerotia. Often times these sclerotia appear reddish to reddish-brown in color.

Microdochium patch is the most common snow mold found in Ohio and is often associated with Typhula blight. Multiple common names exist for this disease with pink snow mold used in association with snow cover, while fusarium patch is used for the disease in the absence of snow. In both cases the organism causing the disease is *Microdochium nivale*.

Microdochium patch is active under cool wet conditions. Temperatures in the range of 32 to 45 F are ideal for this pathogen to infect along with prolonged periods of wetness or snow cover. Microdochium patches initially appear as small patches that commonly increase in size reaching 12-inches in diameter. Leaves become water soaked, turn reddish-brown then turn a bleach color. In cool wet weather, the leaves are matted together, which is especially true on high cut turf, and covered with a whitish pink mycelial growth that is slimy when wet. The pink mycelium is often observed in the early morning. The circular patches may exhibit a pink coloration when exposed to light.

Additional snow molds include Coprinus snow mold and snow scald, which are not common in Ohio, but are a problem farther north and west of Ohio. Coprinus snow mold *(Coprinus psychromorbidus)* is often associated with the northern high elevation locations where extended periods of deep snow cover occur. The pathogen, *Coprinus psychromorbidus*, is considered a low-temperature basidiomycete, thus the term low temperature basidiomycete is often used to describe this disease. Two strains exist of the pathogen one that produces sclerotia and the other does not.

Under deep snow, snow scald *(Myriosclerotinia borealis)* may also occur. Snow scald is more severe if the ground is frozen. With both Coprinus snow mold and snow scald, promoting early spring melt will help reduce disease severity.

Photo 1 - The reddish sclerotia of Typhula incarnata the pathogen that causes Typhula blight.

Photo 2 - Microdochium patch symptoms.

RESIDENTIAL LAWN CARE TIPS

Turfgrasses Versus Trees and Shrubs in Water Conserving Landscapes

Dr. Jim Beard of the International Sports Turf Institute

There are certain adversary groups that continue to be active in promoting the reduction of turfgrass areas within urban landscapes and the replacement of the areas with trees and shrubs as a means of water conservation. Statements have been published such as "all turfgrasses are higher water users than trees and shrubs." This is totally false. Actually, the major grasslands of the world are located in the semi-arid climatic regions, whereas the major forests of the world are located in the high rainfall areas.

Just what is our current state of knowledge backed by sound scientific data concerning these issues of proper plant use for water conservation within the urban landscape?

- Very few of the many hundreds of tree and shrub species available have actually been quantitatively assessed for their water use rates.

- In contrast, a major portion of the turfgrass species have been assessed for water use rates.

- The few comparative water use studies that are available prove that the commonly used trees and shrubs are much higher water users than turfgrasses, especially when soil moisture is available. This is based on the sound scientific premise that the rate of water use increases with leaf area.

- Much confusion has arisen from the "low water use plant lists." It has been incorrectly assumed that those plants capable of surviving in arid-regions are in fact low water users. However, the physiological mechanisms controlling the water use rate and drought resistance are entirely different, and are in no way directly correlated across plant species.

- For unirrigated sites, detailed studies have been conducted on drought resistance and dehydration avoidance of many turfgrass species and cultivars. Results have shown that a number of warm-season turfgrass cultivars can survive 158 days in a sand root zone without irrigation under the hot summer conditions in College Station, Texas.

- Comparative studies of drought resistance among tree and shrub species are lacking.

- It should be recognized that when turfed areas are irrigated the adjacent trees and shrubs also are being irrigated as a result of the multitude of shallow roots that concentrate under the irrigated area.

- There are numerous turfgrasses capable of ceasing growth, entering dormancy, and losing chlorophyll during summer drought stress, that readily recover once rainfall occurs. Why assume that turfgrasses must be green throughout the summer season? Many trees drop their leaves during drought stress, or during the winter period, with only brown bark remaining. What then is wrong with a tan to golden brown turf during droughts, if one chooses not to irrigate?

- There is no valid basis for water conservation legislation requiring the extensive use of trees and shrubs, in lieu of turfed areas. Rather the sound strategy based on good science is the use of appropriate low water use turfgrasses, trees, and shrubs for moderate to low irrigated landscapes and to select appropriate drought resistant turfgrasses, trees, and shrubs for non-irrigated areas.

- In most situations it is the "human" factor that wastes water through improper irrigation practices and landscape designs.

SPORTS TURF TIPS

Establishment Rate and Traffic Tolerance of Cool-Season Grasses for Sports Fields

P. J. Sherratt and J. R. Street, Department of Horticulture & Crop Science, OSU

Introduction

Establishment and vigor of cool-season grasses from high-low would rank: perennial ryegrass>tall fescue>Kentucky bluegrass. In contrast, wear tolerance would rank: tall fescue>perennial ryegrass>Kentucky bluegrass, and recuperative potential would rank: Kentucky bluegrass>tall fescue>perennial ryegrass (Turgeon, 2002). Recent advances in turfgrass breeding have produced cool season grasses that have improved vigor, wear tolerance and recuperative potential traits. The aim of the study was to evaluate some of these newer grasses.

Materials & Methods

The trial area was broadcast seeded May 21st, 2003, at the Ohio Turfgrass Foundation Research & Education Facility in Columbus, OH, USA. The soil texture was silt clay loam. The trial plots were maintained at 38mm mowing height with a walk-behind rotary mower. The level of turf management was similar in nature to a LEVEL B maintenance schedule (Stier et.al., 2000). A standard Brouwer TR224 turf roller was used to create simulated wear on the plots. The roller was modified to produce differential slip-type wear similar to the Brinkman traffic simulator developed by Cockerham and Brinkman (1989). The experimental design was a randomized complete block, with sixteen cultivar treatments:

- Tall fescue (TF) *(Festuca arundinacea)* - Labarinth RTF®, Grande II, Titan Ltd., Rendition, Kittyhawk 2000 and Winter Active Fescue (WAF),
- Kentucky bluegrass (KBG) *(Poa pratensis)* - Orfeo, Showcase (+ 20% SR5100 Chewings fescue and SRX52961 strong creeping red fescue), Bariris and Rugby II
- Texas x Kentucky Bluegrass hybrid (HBG) *(Poa arachnifera x Poa pratensis)* – Thermal Blue
- Perennial ryegrass (PRG) *(Lolium perenne)* – Aberelf, SR4420, Nexus, Barlennium and Renaissance
- Festulolium *(Festuca pratensis x Lolium perenne) x Festulolium loliacium* – Barfest and Spring Green

Turfgrass germination was measured by point quadrant. Quality, traffic tolerance, spring green-up and recuperative potential were evaluated using the rating system derived from the National Turf Evaluation Program (NTEP, 2004). Percent rhizome activity was evaluated by counting the percent of plants with rhizomes in a known sample. Traffic tolerance ratings were taken in Nov. 2003 following 50 passes with the wear machine. Spring green-up and recuperative potential ratings were taken in May 2004 (Table 1). All measurements were subjected to analysis of variance using the General Linear Model and correlation procedures in the Statistical Analysis System (SAS Institute, 1990).

Results & Discussion

- Perennial ryegrass and Festulolium cultivars germinated in 3-5 days and established rapidly. All treatments had germinated within eight days. However, establishment rates varied greatly, with some cultivars of bluegrass and tall fescue much slower to establish than others. In particular, Orfeo and Showcase were so slow to establish that they did not perform well for the duration of the study.
- Fast establishing cultivars, markedly Festuloliums, did not have the prohibitive weed pressure apparent with slower establishing cultivars.
- Several of the tall fescue cultivars had dark green, fine leaf textures and a higher sward density, particularly WAF and Grande II. Furthermore, Grande II blended well with Kentucky bluegrass at the 38 mm mowing height.
- Festuloliums did not respond well to the mowing height. All perennial ryegrass cultivars exhibited comparable quality. Bluegrass cultivars varied in quality.
- Cultivars within the same statistical grouping that displayed the best wear tolerance were: Aberelf + SR4420, Bariris, Barlennium, Grande II + Rugby II, Rugby II + Renaissance and Thermal Blue. Labarinth RTF®, Showcase and Orfeo were not particularly wear tolerant, the latter possibly because they were so slow to establish. Titan Ltd, Rendition + Kittyhawk 2000 did not perform as well as the monostand of Rendition, suggesting that a monostand of tall fescue may have better wear tolerance than a blend. The Festuloliums were the least wear tolerant with over 90% grass cover lost.
- Orfeo and Showcase were slow to green-up in spring and did not have good recuperative potential, compared to the other cultivars.

Several of the improved perennial ryegrass cultivars were as dense as the bluegrasses in the spring, suggesting that recuperation is possible through tillering if the turf receives a certain level of management.

- Festulolium produced immense growth in the spring, but quality and density were poor. Thus, Festulolium may not be suitable for an athletic field grass at this time, but there may be potential for its use as an over-seeding grass in the fall playing season.
- While several of the tall fescue cultivars did exhibit rhizome activity, the greatest rhizome activity was observed with the bluegrasses, namely Orfeo, Showcase, Bariris and Thermal Blue. The percent of tall fescue plants exhibiting rhizomes is far lower than initial, unpublished research has suggested. However, testing has previously taken place on spaced plants in non-compacted soils. This would suggest that tall fescue rhizome activity is dependent upon soil compaction and sward density.

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Photo 1 - Thermal Blue (Texas bluegrass x Kentucky bluegrass hybrid) had prolific rhizomes.

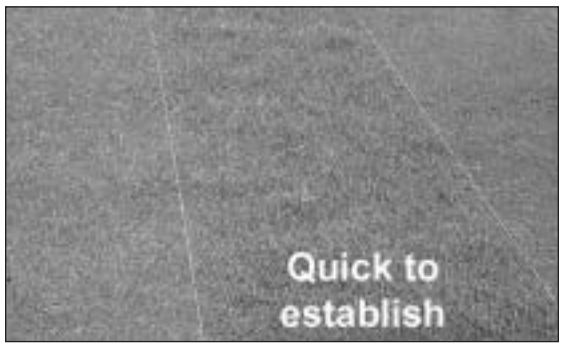


Photo 2 - Perennial ryegrass germinated in 3 days and was quick to establish.

Table 1. Characteristics of cool season grass cultivars for sports turf.

Cultivar (s)	Quality 15 WAS†	Traffic tolerance	Spring green-up	Rec. potential	Percent rhizomes
Labarinth RTF®	7.1	3.0	4.3	6.1	10.0
Grande II TF	8.6	5.8	5.6	7.5	11.0
Thermal Blue HBG	7.6	6.1	4.6	7.1	29.6
Orfeo KBG	7.1	4.6	4.6	6.0	28.3
Aberelf + SR4420 PRG (50:50)	9.0	6.3	6.6	7.8	-
Spring Green Festulolium	5.0	3.6	4.6	5.3	-
Barfest Festulolium	5.0	3.0	5.3	5.3	-
Showcase + SR5100/SRX5961 KBG & FF	7.1	4.3	4.3	6.1	28.3
Nexus PRG	8.6	5.8	6.3	8.3	-
Rendition PRG	8.3	5.6	6.0	7.6	6.0
Titan Ltd., Kittyhawk 2000 + Rendition (3-way blend) TF	8.3	4.3	5.0	7.1	13.0
Winter Active Fescue (WAF)	9.0	5.0	5.3	7.1	12.3
Grande II + Rugby II (80:20) TF & KBG	9.0	6.0	6.3	7.3	23.0
Rugby II + Renaissance (80:20) KBG & PRG	8.8	6.1	5.6	7.5	6.0
Barlennium PRG	9.0	6.5	6.6	8.1	-
Bariris KBG	7.6	7.6	5.3	7.8	33.0
LSD (0.05)	**0.5**	**1.6**	**1.9**	**1.0**	**9.5**

† 15 WAS denotes fifteen weeks after seeding

‡ Data not collected from Perennial ryegrass or Festulolium cultivars

OSPA
OHIO SOD PRODUCERS

How to Pick a Sod Supplier

Spring is just around the corner and everybody is itching to get busy. You have jobs lined up and waiting for weather to cooperate. Your customers are waiting as well. Now is the time to make sure your sod supplier is ready for you to get going. This article will look at things one should consider when selecting a sod supplier.

The best way for a landscaper to improve their image or increase business is to produce an impressive finished project. This is first accomplished by using quality materials. Find a sod supplier that delivers a consistent quality turf. Quality of the sod and the pieces are essential to a good finished job and increasing the speed at which you can get the job completed. Has the sod been mowed prior to cutting to give a manicured look? Are the pieces cut square and even so they fit together well? How much waste is there from bad pieces? These are questions you should consider before purchasing.

Another important consideration is the delivery of the product. Labor is expensive and having your crew standing around waiting on product is wasteful. There is nothing more frustrating to a site manager than waiting on product. Does your sod supplier get the product to the job site on time? If the job is large, do they have enough trucks and harvesting capability to keep your crew supplied throughout the day and the job moving forward?

Some consideration should be given to what varieties of grass the sod producer is using. Golf Course Superintendents are the most interested in grass variety, matching color, growth habit, and disease tolerance. Landscapers should be as well. Matching sod varieties with what they might be seeding around the edges or in the backyard will give the project a much improved final appearance.

Sod farms around the state use various machines for harvesting. Sod can be delivered in various forms. Slabs, small (tootsie) rolls, big rolls, some harvested automatically, some is still harvested by hand that allows the harvesting crew to sort out bad pieces. You want to explore these various forms and find which you and your crew prefer. Obviously some of that decision is based on the job size and where you are installing. Large wide open areas are ideal for big rolls while around buildings and other small areas may demand a slab or rolled piece.

A customer once said that "I don't buy sod; I buy service." If you adhere to this philosophy as well then the best advice is to find a supplier that can fulfill your needs the best. Spending a little time on these issues can save you a bunch of time this spring and summer when everyone is busy.

Environmental Benefits: Artificial Turf vs. Natural Grass

The following is a brief review of the scientifically proven benefits that humanity receives from natural turfgrass, compared to fake grass:

Benefits	Artificial Turf	Natural Grass
Generates Oxygen		✔
Cools the Air		✔
Soil Erosion Control		✔
Water Filter/Purifier		✔
Rain Water Entrapment for Ground Recharge		✔
Air Pollution Control		✔
Glare Reduction		✔
Temperature Reduction		✔
Dust Prevention		✔
Dissipates Solar Heat		✔
Fire Prevention		✔
Environmental Protection		✔
Low-Cost Surface		✔
Safety Cushion		✔
Increased Property Value		✔
All Natural		✔
Healthy for Humans		✔

Turfgrass Producers International, February/March 2005 Newsletter

Upcoming OSPA Meetings & Events

Wednesday, April 13 – Association Meeting
Saturday, August 6 – OSPA Summer Field Day, Eastside Nursery, Columbus, OH
Wednesday, November 9 – Association Meeting
Wednesday, December 7 – Annual Meeting, Ohio Turfgrass Conference & Show, Greater Columbus Convention Center, Columbus, Ohio

(All Association Meetings at the OTF Research and Education Center, OSU, Columbus, OH)

GRADUATE STUDENT CORNER

Corrie A. Yoder

Degree: M. S.
Department: Entomology, OARDC, OSU

EVASIVE AND DEFENSIVE BEHAVIORS OF WHITE GRUB SPECIES AGAINST ENTOMOPATHOGENIC NEMATODES

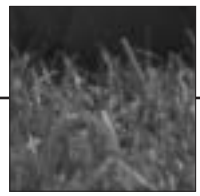
Emphasis on biological alternatives to pesticides has increased during the past decade. Entomopathogenic nematodes (Rhabditida: Steinernematidae and Heterorhabditidae) have potential for the control of many destructive insect pests in soil. Some white grub species (Coleoptera: Scarabaeidae), like the European chafer, are particularly resistant to nematodes. As white grubs have a complex arsenal of aggressive behaviors available for use in defense against irritants and potential predators, parasites, and pathogens, we hypothesize that the differences in the susceptibility of grub species may relate to the defensive behaviors of grubs. Therefore, we evaluated the aggressive and evasive behaviors of several white grub species in response to attack by three nematode species of different sizes but similar foraging (cruising) strategies. Evasive behaviors, which resulted in moving away from or avoidance of nematodes, were measured in soil observation chambers. Distance traveled from the origin, and soil cell formation characteristics, were noted. Potentially aggressive behaviors, or those resulting from direct attack of nematodes in Petri dishes, were recorded by video. Later, the frequency and duration of these behaviors were quantified by reviewing the recordings. Data were normalized, analyzed by analysis of variance, and means were separated using Tukey's Multiple Range Test.

The evasive behaviors of European chafer *(Rhizotrogus majalis)*, Japanese beetle *(Popillia japonica)*, oriental beetle *(Anomala (=Exomala) orientalis)*, rose chafer *(Macrodactylus subspinosus)*, Asiatic garden beetle *(Maladera castanea)*, and Northern masked chafer *(Cyclocephala borealis)* were evaluated against *Heterorhabditis bacteriophora* (GPS11), *H. zealandica* (X1), and *Steinernema scarabaei* (AMK 001) in translucent plastic chambers containing field soil. Grub movement was tracked for 2 hours after the inoculation of 2000 infective juveniles (IJs) in close proximity to the grub. Control treatments received only water. Distance traveled per 20-min increment, distance traveled over 2 h, final distance from inoculation point, and grub mortality and penetration were noted for each treatment and species. Additionally, soil cell formation behaviors (length, width, and orientation of cells and depth from soil surface) were studied in chambers with and without nematodes. Of the species studied, oriental beetle moved the most each period, and European chafer and rose chafer moved away from the nematodes the least overall. Length and width of soil cells generally corresponded with grub size. However, European chafer grubs formed larger cells on average than Northern masked chafer. Perhaps European chafers spend more time wiggling in place and expressing aggressive behaviors, than Northern masked chafers do. This movement would result in larger soil cells. Oriental beetle grubs formed the deepest cells, and Japanese beetles formed cells that were closest to the surface. Northern masked chafers were the only species that formed deeper soil cells in the nematode-treated chambers than in the control chambers. Japanese beetles were the only species that clearly moved further away from the *H. bacteriophora* infective juveniles than they did from the point of origin in the control. This confirmed a previous study in which Japanese beetle grubs were also shown to retreat from *H. bacteriophora* and to be able to sense contact by a single nematode. Oriental beetles were the most active species overall, followed by Japanese beetles. In conclusion, Japanese beetles seem to attempt evasion against *H. bacteriophora*, a nematode species that has likely been in contact with the grubs for a long time and therefore probably developed defensive strategies against them. European chafers probably rely more on aggressive behaviors than evasive behaviors, and Northern masked chafers may dig deeper to avoid nematodes. Alternatively, evasion could be a generalized response of most grub species to disturbances. This would explain why we did not find many differences between treatments.

European chafer grubs tended to increase frequencies of crawling, brushing, and chewing in response to one or both heterorhabditid nematode species, but did not fight much against *S. scarabaei.* European chafer grubs spent most of their time (duration) crawling, rolling, or rearing, but in the *S. scarabaei* treatment they spent a lot of time motionless. Oriental beetle grubs tended to increase frequencies of motionlessness, rubbing, and chewing to fight off *H. zealandica*, and reduced rearing frequencies in response to *H. zealandica* and *S. scarabaei.* They spent most of their time crawling, but again in the *S. scarabaei* treatment, they were motionless a good portion of the time. Japanese beetle grubs increased frequencies of scraping, brushing, rubbing, chewing, and rearing in response to *S. scarabaei*, and increased brushing frequency in aggression against *H. zealandica*. This species tended to crawl or roll most of the time. Lastly, Northern masked chafer grubs increased frequencies of crawling, brushing, and chewing in response to *H. zealandica*. They spent most of their time crawling, although considerable time was spent rolling in the *H. bacteriophora* treatment. In general, *S. scarabaei* nematodes appeared to incite less aggression than other nematode species in all grub species but Japanese beetle. This newly discovered species was not easily detected by most of the scarab species tested and must be well adapted to attacking these species.

What are the purposes of these behaviors? Are all of them aggressive behaviors? It can be argued that all eight behaviors described are defensive behaviors, but the most important aggressive behaviors are probably chewing (biting), rubbing (scratching head or sides with raster), brushing (brushing mandibles with legs), and scraping (grooming the sides or raster with the mandibles). These behaviors are direct attempts of eliminating irritants from various areas of the larval body.

In addition to the behavioral defenses studied during this investigation, the grubs may use morphological defenses such as small natural openings, covered sieve plates, powerful mandibles, and bristles and physiological mechanisms including immune response and encapsulation, and salivary and anal excretions against nematodes. This study will help in the identification of new nematode strains that are more effective at escaping from the behavioral defenses of white grubs, thus enhancing the biocontrol potential of entomopathogenic nematodes.



Management of Fungal and Oomycete Diseases of Turfgrass

Mike Boehm, Joe Rimelspach and Samantha L. Thomas, Department of Plant Pathology, OSU

The aesthetic, ecological and recreational value of turfgrass is immeasurable (1). Unfortunately, vast expanses of turfgrass are also susceptible to weed invasion, insect infestations and disease. Integrated pest management (IPM) or integrated disease management (IDM) strategies based on the use of genetic host resistance, cultural practices, chemical applications and biological control provide environmentally attractive alternatives to the sole and routine use of pesticides. The goals of this article are to: (a) highlight some of the unique characteristics and complexities of turfgrass cropping systems; (b) identify the major turfgrass diseases and pathogens; and (c) provide an overview of an integrated approach for the management of turfgrass diseases.

Why Turfgrass Turns Brown

The main reasons for brown turfgrass are adverse environmental factors such as "poor" soils, unfavorable climatic conditions, excessive wear and improper maintenance. Turfgrass pathogens and pests, alone or in tandem with abiotic factors, also significantly impact turfgrass quality. Although turfgrass managers can do little to influence regional weather patterns or regulate the amount of play or use on a given sward of turfgrass, they are entirely responsible for the management practices they employ. Maintenance practices that favor turfgrass growth over pathogen activity often lead to significant reductions in disease pressure and are considered the foundation of effective turfgrass disease management programs (Figure 1).

Figure 1. Integrated management of turfgrass diseases is based on upon the use of sound soil science and agronomic principles. Properly managed turfgrass typically reduces pest and disease pressures.

Most turfgrass diseases are caused by fungi and fungal-like organisms (Oomycetes – for example *Pythium*). One convenient, albeit not absolute way, to classify turfgrass diseases is to do so based on the part of the plant being attacked (i.e. foliar diseases; foliar and crown diseases; crown and root diseases). Table 1 lists the major turfgrass diseases caused by fungi and Oomycetes. There is only one economically important turfgrass disease caused by a bacterium (bacterial blight of annual bluegrass *(Poa annua)* and of some creeping bentgrass *(Agrostis stolonifera)* cultivars caused by *Xanthomonas campestris*) and one disease caused by a virus (St. Augustinegrass Decline caused by Panicum mosaic virus). Nematodes may also cause significant losses in turfgrass, especially in tropical and subtropical climates; however, their impact on cool-season turfgrasses in temperate regions is less well understood.

Complexity of Turfgrass Cropping Systems

Although the management of turfgrass diseases is similar to managing diseases of other crops, there are several unique characteristics of turfgrass cropping systems that must be considered before an effective disease management program can be developed. First, turfgrass is a perennial crop whose "yield" is measured in terms of how well it withstands use (i.e. playability of athletic fields or golf course putting greens) and/or aesthetics (color, density and overall visual quality) rather than in bushels per acre. Second, most turfgrass areas or swards represent mixed stands of multiple species, cultivars or both. The situation is even more complex because most turfgrass species are comprised of synthetic cultivars made up of co populations of genetically diverse individuals that often segregate over time based on the influence of abiotic and biotic factors. Older creeping bentgrass putting greens typically show this type of segregation. Third, turfgrass is used in many different ways (i.e. athletic fields, golf courses, home lawns, roadside ground cover, grassy waterways, etc) and typically require individualized management approaches. Golf courses are inherently complex turfgrass cropping systems because different turfgrass species/cultivars and maintenance practices are used for different functional areas (i.e. putting greens, fairways, roughs, tees and club house surroundings. Lastly, high-value turfgrass systems such as golf course putting greens and professional athletic fields are intensively managed (i.e. daily mowing, irrigation, core aerification, topdressing applications, painting, etc) and although frequent manipulation allows for timely intervention, it can

also lead to increased wear and the predisposition of turfgrass to environmental and biotic stresses. In summary, the term "turfgrass" is somewhat ambiguous and requires one to have a firm grasp on the specific attributes and complexities of the turfgrass cropping system being managed to develop effective management strategies and properly diagnose turfgrass maladies. Table 2 provides an example of some complexities faced by golf course superintendents.

Table 1. Turfgrass diseases caused by fungi and Oomycetes.

Foliar Diseases
Dollar spot *(Sclerotinia homoeocarpa)*
Gray leaf spot *(Pyricularia grisea)*
Gray snow mold *(Typhula incarnata)*
Pink patch *(Limonomyces roseipellis)*
Pink snow mold/Fusarium patch *(Microdochium nivale)*
Powdery mildew *(Erysiphe graminis)*
Red thread *(Laetisaria fuciformis)*
Rust *(Puccinia spp.)*
Stripe smut *(Ustilago striiformis)*
*Yellow tuft *(Sclerophthora macrospora)*

Foliar and Crown Diseases
Anthracnose *(Colletotrichum graminicola)*
Brown patch *(Rhizoctonia solani)*
Leaf spot/melting out *(Bipolaris, Drechlera, and Exserohilum spp.)*
*Pythium blight *(Pythium aphanidermatum)*
Yellow patch *(Rhizoctonia cerealis)*

Crown and Root Diseases
Bermudagrass decline *(Gaeumannomyces graminis var. graminis)*
Damping-off *(Species of *Pythium, Fusarium, Microdochium and Rhizoctonia)*
Fairy rings *(numerous Basidiomycete fungi)*
Bentgrass dead spot *(Ophiospaerella agrostis)*
Necrotic ring spot *(Ophiosphaerella korrae)*
Spring dead spot *(Gaeumannomyces graminis var. graminis)*
Summer patch *(Magnaporthe poae)*
Take-all patch *(Gaeumannomyces graminis var. avenae)*

* Oomycete diseases

Intergrated Turfgrass Disease Management

As pressures mount to reduce inorganic fertilizer and pesticide inputs on turfgrass, interest has increased regarding the development and use of IPM programs that either forego or limit the use of fungicides. Although voluntary in some situations, fungicide use is prohibited or strictly regulated in other situations such as in the case of home lawn or residential turfgrass disease management. Thus a significant push is underway to develop, adopt and use IPM strategies for managing turfgrass diseases.

The first line of defense to preventing or minimizing disease is through the selection and/or use of disease resistant turfgrass species/cultivars and the use of pathogen-free certified seed. Information regarding disease resistant turfgrass may be obtained by contacting local turfgrass seed distributors, extension specialists and via the National Turfgrass Evaluation Program (NTEP; 6). The use of genetically resistant turfgrass is limited to newly established or renovated turfgrass areas or in situations where overseeding is used. The second line of defense against turfgrass diseases is the use of cultural management practices designed to optimize turfgrass growth. Cultural practices related to site and seedbed preparation prior to establishment are of paramount importance especially for seedling and root diseases such as damping-off and necrotic ring spot. Sand-based rootzone mix considerations for putting greens and athletic fields are equally critical. Under certain situations, it may be possible to modify substandard soil conditions under existing swards through the use of core aerification and organic matter topdressing programs (4, 5).

Table 2. Complexities of golf course turfgrass management.

Facet of System	Specific Areas of Concern
PATHOGEN & PEST MANAGEMENT	Diseases, Insects, Grassy and Broadleaf Weeds, Wildlife Management, Regulatory Concerns, Product Availability & Selection, Rates & Means of Delivery, Environmental Stewardship
AGRONOMICS	Fertility, Mowing, Air Movement, Irrigation, Thatch, Core Cultivation, Heat Stress, Drainage, Shade/Sunlight, Bunkers, Trees & Flowers, Wear, Playability, Aesthetics, Compaction, Topdressing, Cart Path Maintenance, Traffic, Syringing, Turfgrass Selection, Water Quality, Divot Repair, Mulching, Soil Type, Age of Sward/Facility/ Lawn, Use – putting green/tee/fairway/ rough/clubhouse surrounds, Rootzone Mix Selection, Use of Growth Regulators
ENVIRONMENT	Weather, Shade, Thatch, Air Movement, Water Dynamics, Temperature, Soil or Rootzone Mix Characteristics, pH, Soil Compaction
EQUIPMENT MAINTENANCE	Irrigation System, Characteristics, Mowers, Application Equipment
HUMAN RELATIONS	Client Relations, Crew Size and Organization, Human Error, Language/EthnicityDynamics, Experience Level of Employees, Expectations & Opinions, Amount of Play
FINANCE/BUDGET	Management options, Revenue Generation, Cost Recovery Staff, Equipment

Disease management in established turfgrass swards is often achieved by modifying cultural management practices such as mowing, watering, fertilization, tree pruning, topdressing applications and core aeration. As mentioned previously, intensively managed turfgrass is often more predisposed to environmental and biotic stresses and so it is crucial that agronomic practices be timed to optimize turfgrass growth and if possible, minimize pathogen activity. To accomplish disease reductions through modification of cultural practices, intimate knowledge of the major turfgrass pathogens (listed in Table 1) and the diseases they cause is required. Specifically, those practices which influence the temperature, moisture and fertility status of turfgrass have been shown to have the greatest impact on turfgrass disease development (3, 7, 8, 9).

Fungicide applications are generally not justified when the primary cause of turfgrass decline is environmental stress. Fungicide applications are often essential where there is a demand for high quality turfgrass during environmental periods that favor pathogen growth. Fungicides are typically more effective when applied prior to the onset of disease symptoms (referred to as preventive or preventative applications) - this is especially true for crown and root pathogens. Some fungicides are effective when applied after the onset of symptoms and are said to have curative activity. In either case, fungicides must be delivered to the area of the plant where the pathogen is active to be effective. Numerous online extension-outreach resources exist that provide specific fungicide recommendations (2). Always read and follow label recommendations when applying pesticides.

Several recent advances in the use of biological control strategies to manage turfgrass diseases have been reported (i.e. the application of composts and antagonistic microbes), however, relatively few products are commercially available that provide consistent and predictable reductions in disease (4, 5).

Conclusions

In summary, disease management strategies must be considered in concert with key agronomic practices such as fertilization, mowing, and irrigation as well as other weed and insect pest management efforts. The keys to the effective management of turfgrass diseases are to: (a) Be knowledgeable about the turfgrass species/cultivars being managed and the diseases for which they are susceptible; (b) Identify well-defined acceptability and risk thresholds for each pathogen; (c) Identify all budgetary, use and other limitations that my influence one's ability to implement an integrated management plan; (d) Develop an integrated turfgrass health management plan taking into consideration possible or anticipated interactions/conflicts with existing agronomic and pest management practices; and (e) Implement the plan, modifying as required to attain desired outcomes.

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MEMBER SPOTLIGHT

Jeffrey W. Bisker, Your Lawn, Inc., Ashville, Ohio

In the Green Industry, it's all about *Your Lawn*!

In 1977, as a senior in high school, Jeff Bisker began his career in the turfgrass industry treating lawns for Professional Lawn Care. After high school, Bisker attended The Ohio State University to obtain a degree in Marketing/ Administrative Science and continued treating lawns to pay his way through college. While attending Ohio State, a college friend encouraged him to start his own lawn care business. Bisker took this advice and while attending college, in 1982, opened Your Lawn, Inc. in Ashville, Ohio.

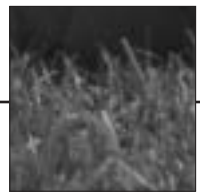
Today, Bisker celebrates 22 years of being in business. His ambition and devotion to the green industry are seen in his work ethic and his ability to maintain a successful business. Holding the title of Owner/ President of Your Lawn, Inc. brings with it the dynamic responsibility of overseeing all functions that keep the business moving forward in a legal and profitable fashion. He is in charge of maintaining 2300 accounts and manages six people. Bisker is faced with the challenge of trying to grow and tie his employees to the growth of the business while minimizing costly mistakes. Your Lawn serves all of Central Ohio including Franklin, Pickaway, Fairfield, Delaware and Ross counties.

Bisker tackles his dynamic responsibilities and job challenges by associating himself with OTF. His twenty year relationship with OTF has kept his business current and thriving by providing him with up-to-date research and exposure to the green industry. He believes that "OTF gives your business credibility." Furthermore, he views OTF as the avenue to providing his customers with "the best lawn care available." He credits OTF with being "your best business resources and partner." He wants OTF members to know that "making grass green is good. What we do and how we do it is good. We make our environment better and most people agree and love what we do."

In addition to his association and respect for OTF, Bisker prides himself on being involved with Ohio Lawn Care Association (OLCA) and recently becoming President. OLCA is closely linked with OTF and serves lawn treatment companies, mowing professionals and landscape companies. Along with OLCA, he is also a member of PLCAA. His years of working in the green industry and his diverse memberships have given Bisker knowledge and wisdom in this industry. He has learned over the years that seeking knowledge is the ticket to success. He wants to emphasize to newcomers to the field the importance of knowledge and life long learning. He wants them to "learn how to care for grass the right way, use knowledge and facts, and be honest with their customers."

Outside of work, Bisker celebrates eighteen years of marriage to his wife Barbara, has a seventeen-year old daughter named Allison, and two Bichon dogs named Lucky and Barney. In his free time, he likes to golf and ski.

HORT SHORTS COLUMN



Horticultural Myths, Part 1

Jim Chatfield, Ohio State University Extension, Nursery Landscape and Turf Team

As Yogi Berra once said: "It's not what we don't know that gets us into trouble; its what we know for sure that just ain't so!"

Myth #1: Pruning Paint Should be Applied to Cut Stems of Trees and Shrubs.
[If you think right away that this is of course a myth - keep reading.] The answer to this question would be easy for me back in the early 1970s when my entire job for the summer at the Lancaster Ohio Parks Department was to use a long pole and apply pruning paint to thousands of pruning cuts made by Brian the Pruner. The old "saw" so to speak, was that pruning paint sealed off the pruning wound, preventing loss of plant sap and keeping out plant pathogens and pests. Well, along came Alex Shigo, a plant anatomist with the United States Forest Service in Maine, who dissected countless diseased and injured trees and began to look at what actually happened when a plant was injured or the tree's defenses were otherwise attacked.

Dr. Shigo and others found that trees tend to naturally overcome such injuries, infections and infestations by callusing, walling-off and compartmentalizing the damage. This natural tree response, which Alex Shigo insists not be called "wound healing," is not helped by the use of pruning paint. Indeed in some cases the paint, especially the really gunky stuff, can sometimes hinder the plant's natural compartmentalizing by restricting availability of needed oxygen. So, the mantra changed from "paint every cut" to "never apply pruning paint." So, recommendations for using pruning paint are a clear-cut myth, right?

As with all absolutes, of course, there is an exception to the rule. For example, for oak trees, especially oaks in the red oak group, pruning paint has an important use in spring and early summer. There is a disease of oaks, called oak wilt, which is caused by the fungus *Ceratocystis fagacearum* that is spread by oak bark beetles and sap beetles. In spring, the insects pick up the fungus while feeding on already diseased oaks, and are then attracted by the sap oozing from cut branches on other oaks. The beetles then spread the fungus to the new oak and the fungus then spreads through the vascular (conducting) system of the tree, resulting in plugging it up and subsequent leaf wilting, branch dieback and tree death. How to prevent this transfer of the fungus by the insect? Prune red oaks at other times of the year, or if you must prune in spring, paint the cut.

Myth #2: Lichens Damage Plants.
For almost all intents and purposes, lichens, those unusual dual organism symbioses between algae or cyanobacteria and fungi do not cause plant damage. Lichens do not rob bark of significant amounts of moisture. The fungal symbionts of the lichen do not parasitize living plant cells and lichens do not appear to be associated with providing entranceways for pathogens into plant tissue. So why do so many people, including many horticulturists, think lichens damage plants? Perhaps it is because when branch decline occurs due to other factors, lichen growth sometimes proliferates. This is due to increased sunlight that penetrates to the bark which favors the algae that are photosynthesizing, resulting in their enhanced growth. The lichens did not cause the branch decline but rather one of the effects of the plant decline was an increase in lichen growth.

If we really want to stretch things, perhaps we could come up with a few indirect or unusual examples of lichens negatively impacting plants. For example, where lichens are especially abundant on bark their presence may obscure desirable ornamental features of certain plants, e.g. the beautiful bark features of crape myrtles in the south. Another unusual example of indirect lichen effects is reported in "Lichens of North America" (Brodo, Sharnoff & Sharnoff). In Canada, hemlock looper *(Lambdina fiscellaria)* is a serious forest pest. And guess what? This moth "lays its eggs almost exclusively on hair lichens such as *Bryoria trichodes,*" and so is an important cog in this pest's life cycle.

Finally, in states more southernly than Ohio there is an unusual role of lichens in plant disease. There is an algal plant pathogen, *Cephaleuros virescens*, which causes scurfy leaf spots and fissured twig cankers on many plants, including magnolias and azaleas. Well, guess what? In some cases, the *Cephaleuros virescens* alga teams up with a *Strigula spp.* fungus to develop

a lichen symbiosis, causing leaf spots and twig cankers due to the algal activity. However, the bottom line the almost universal rule that lichens most definitely do not damage plants.

Myth #3: Soil is Just a Bunch of Dirt.
As professionals we know this is not true - but our customers may not, so it can be useful to help them understand the importance of the complexity of soil and the importance of soil improvement. For example, we know that soil is quite a living medium. Dr. Serita Frey, a soil ecologist who once spoke at our OSU Plant Health Care Workshop, pointed out, for example, that in a typical cup of woodland soil there are:

- 50,000 arthropods
- 100,000 nematodes
- 2 million protozoa
- 200 billion bacteria
- 100,000 meters of fungal hyphae

Soil is a truly living entity, with microbial action playing a huge role in the rhizosphere environment relative to plant root health. Microbes in soil chemically transform soil nutrients into available forms, provide antagonism and competition with soil microbes we sometimes do not like such as plant pathogens, and serve as "microbial glue" aiding in aggregation of soil particles and better air pore space for roots in clay soil. That is why adding organic matter to soil is often very helpful; it promotes microbial activity in that soil environment.

Myth #4: The Fleshy Red "Gumdrops" on Taxus (yew) are Poisonous.
Actually, the fleshy red "arils" on Taxus are the only part of the Taxus plant that are not poisonous. As indicated in "Common Poisonous Plants and Mushrooms of North America (Nancy J. Turner and Adam F. Szcawaski) "the entire plant, except the fleshy 'berry' around the seed is highly toxic," though human fatalities are rare. Taxus is also toxic to many animals, though as many homeowners are all too aware, deer like it just fine. As indicated above, though the fleshy red arils are not themselves poisonous, the seeds inside them are, so the best advice is to never eat any parts of Taxus. Toxic ingredients include a range of unique alkaloids as well as ephedrine and irritating volatile oils. Symptoms of poisoning are decidedly unpleasant, ranging from nausea, dry throat and diarrhea all the way to collapse, coma, convulsions, and eventually respiratory heart failure in extreme cases. Avoid this disturbing combination of death and Taxus.

OSU Turf Team PLACES 3RD at Collegiate Turf Bowl

Nineteen OSU Turf Club members recently attended the GCSAA Conference and Show in Orlando. This great experience was made possible by a generous donation from OTF.

Four teams from Ohio State competed in the annual student turf bowl. The turf bowl is a three hour exam that encompasses everything from turf, weed, disease, insect, and soil identification, to mathematics and management. This year, the team of Ryan Beeson, Calvin Carlisle, R. Scott Pavalko, and Jason Vollrath placed third, the highest showing yet for an Ohio State University team. The turf bowl is very competitive, with 84 teams from over 50 universities around the nation competing this year.

The turf club also attended seminars and worked a booth that was donated by OTF to promote the undergraduate program at Ohio State as well as OTF. The show also gives students a chance to network with other students, company representatives, and superintendents, resulting in many internship and job opportunities.

The trip was made possible largely by the support of the Ohio Turfgrass Foundation and by club fundraising efforts at the OTF Conference and Show in December. The turf club is already planning to represent the OSU program and OTF with pride next year in New Orleans.

A MESSAGE FROM YOUR DIRECTOR OF EDUCATION

Well, the 2005 growing season is almost upon us again. I find it hard to believe that spring is near because as I write this temperatures are averaging 20˚F below normal, night time temperatures have consistently been in the high teens, wind chills are in the low teens, the soil is still frozen, and vegetation outside still looks rather brown.

Well, on a more brighter subject, our winter educational turfgrass meetings sponsored by OTF and OSU were very successful and included the OTF Conference and Show, Sports Turf Short Course, and the Ohio State Golf Turf Spring Tee-Off. Please remember that all profits from these events are channeled to OSU research and student scholarships. Thanks from the OSU Turfgrass Team for your participation.

Finally, I leave you with a list of turfgrass related Web Sites for your educational browsing and pleasure for 2005. May these sites make your 2005 a little greener. Rip this page out and post it for future viewing. The Buckeye Yard and Garden Line (BYGL), Superintendent's Korner, and Buckeye Sports Turf Web Sites are produced weekly providing information on timely topics, pest problems, and current turf and hort problems across the entire state. The BYGL site is enhanced with links to additional information and color photos. Enjoy surfing!

Yours for a greener turf,
Dr. John R. Street, Director of Education

Turfgrass Related Web Sites for 2005

WEEKLY OSU CURRENT ISSUES/TOPICS

Buckeye Sports Turf Program
http://hcs.osu.edu/sportsturf

Superintendent's Korner
http://hcs.osu.edu/sk

Buckeye Yard & Garden Online
http://bygl.osu.edu

TURFGRASS-RELATED WEB SITES AT OSU

The Ohio State University (main opening page)
http://www.osu.edu/index.php

OhioLine (main fact sheet & bulletins page)
http://ohioline.osu.edu

BugDoc Turf & Ornamental Insects
http://bugs.osu.edu/~bugdoc

Webgarden (plant dictionary & Buckeye Yard & Garden OnLine)
http://webgarden.osu.edu

C. Wayne Ellett Plant & Pest Diagnostic Clinic
http://ppdc.osu.edu

Ohio Agriculture Research & Development Center (OARDC)
http://www.oardc.ohio-state.edu

Ohio Pesticide Applicator Training
http://pested.osu.edu

Department of Horticulture & Crop Science
http://hcs.osu.edu

Department of Entomology
http://iris.biosci.ohio-state.edu/osuent/

Entomology Extension
http://bugs.osu.edu

School of Natural Resources
http://snr.osu.edu

Department of Plant Pathology
http://plantpath.osu.edu

Turfgrass Program
http://ohiostateturf.osu.edu

GOVERNMENT & PROFESSIONAL ORGANIZATIONS

Ohio Department of Agriculture
http://www.state.oh.us/agr

United States Environmental Protection Agency
http://www.epa.gov/pesticides/pestlabels

Golf Course Superintendents Association of America
http://gcsaa.org

Ohio Turfgrass Foundation
http://www.OhioTurfgrass.org

Ohio Lawn Care Association
http://www.OhioLawnCare.org

Lawn Institute
http://www.lawninstitute.com

Professional Lawn Care Association
http://www.plcaa.org

Ohio Sports Turf Managers Association
http://www.ostma.org

Sports Turf Managers Association
http://www.sportsturfmanager.com

National Turfgrass Evaluation Program
http://www.ntep.org

LABELS & MSDS SHEETS

CMDS
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Editor's note: *This issue of TurfNews is made possible by the donation to OTF from The Andersons Lawn Products Group, headquartered in Maumee, Ohio.*

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