



Volume 69 • No. 4  
August – September 2007

# TurfNews

THE NEWSLETTER OF THE OHIO TURFGRASS FOUNDATION

**The OTF Annual Golf Tournament will be held October 1  
at NCR Country Club's Famous South Course**



**WHAT'S INSIDE:**

**GREEN INDUSTRY NEWS**  
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**OHIO TURFGRASS CONFERENCE & SHOW PREVIEW**  
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# 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. 69 • No. 4 August – September 2007

*TurfNews* is produced by the Ohio Turfgrass Foundation  
1100-H Brandywine Blvd, Zanesville, Ohio 43701-7303  
1-888-OTF-3445 and is available to all members  
[www.OhioTurfgrass.org](http://www.OhioTurfgrass.org)

Back issues of OTF *TurfNews* are available on our website at [www.OhioTurfgrass.org](http://www.OhioTurfgrass.org).

*The purpose of the Ohio Turfgrass Foundation is to promote the turfgrass industry in Ohio, to encourage the further research and education in turfgrass science and to speak on matters of policy affecting the turfgrass industry – all of which provide better turf for everyone.*

**This Issue Sponsored By:**



Bayer Environmental Science

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## 07 Calendar <sup>O</sup>F Events

### OTF Annual Golf Tournament

**October 1, 2007**

**NCR Country Club, Dayton, OH**

**888-683-3445**

### Ohio Turfgrass Conference & Show

**December 3 – 6, 2007 (Conference)**

**December 4 – 6, 2007 (Trade Show)**

**Greater Columbus Convention Center, Columbus, OH**

**888-683-3445**

### Ohio State Golf Turf Spring Tee-Off

**February 20 – 21, 2008**

**Holiday Inn on the Lane, Columbus, OH**

**888-683-3445**

**FOR THE LATEST RESEARCH  
AND INFORMATION FOR OHIO'S TURF  
AND LANDSCAPE PROFESSIONALS  
VISIT THESE IMPORTANT WEBSITES:**

**Golf Course Turf Management & Sports Turf Management  
Buckeye Turf**  
[www.buckeyeturf.osu.edu/](http://www.buckeyeturf.osu.edu/)

**Lawn, Grounds & Landscape  
Buckeye Yard & Garden Line**  
[www.hcs.ohio-state.edu/bygl](http://www.hcs.ohio-state.edu/bygl)

*These sites can also be accessed from the  
OTF website at [www.OhioTurfgrass.org](http://www.OhioTurfgrass.org).*



# MESSAGE FROM THE PRESIDENT

Hopefully everyone has managed their way through meteorological roller coaster this year ... to say the least it has been interesting mix of hot/dry and hot/moist conditions throughout our region. Since our industry depends so much on the weather, adjustments of various magnitudes to short term or long term plans can be changed in a matter of one major weather event. Whether you operate a lawn care business, golf course, athletic field, grounds manager or sod farm adjusting your agronomic, business or personnel practices are key to your businesses success.

OTF's in season educational opportunities provides a great resource for information to assist with your adjustments. Attending events such as Research Field Day and Regional seminars not only allows you to see evidence first hand, but also provides the opportunity to talk to the turf team one on one about any specific challenges you may have. If you're unable to attend any of the events, keep in mind you are only a finger tip away from most of the information presented at these educational sessions via the internet or other forms of electronic media. Please visit the newly revamped OTF website ([www.OhioTurfgrass.org](http://www.OhioTurfgrass.org)) to review a variety of industry links that will assist in your research.

With the summer quickly coming to an end, if you have turf students or interns working for your business, please communicate to them that OTF scholarship applications can be found on the website. This is a great way to help reward the future turfgrass professional who have worked hard for you and your business this year. OTF awards \$10,000 in scholarship money annually to students throughout the state. Based on the number of scholarship applications submitted the past few years, I am positive there are Turfgrass Management students who aren't aware these monies are available.

One final note, please circle the date of October 1 and reserve it to play in the 2007 OTF Scholarship and Research Golf Tournament at NCR Country Club's esteemed South Course. If you haven't had the privilege of playing NCR, plan on bringing your team to participate and experience this beautiful, challenging layout. Registration forms can be found on page 15 and on the OTF website.

Until next time ... Keep it green!

Yours for Better Turf,  
Mark Jordan, CGCS

## OTF SEEKS NOMINATIONS FOR AWARDS

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**Do you know anyone who deserves recognition for contributions to turf management?**

OTF members received forms in their membership packets for nominating this year's recipients of **Professional of the Year** and **Professional Excellence** awards.

Nominees for "Professional of the Year" awards are judged on the following attributes:

- Fellowship – willingness to share knowledge with and help train fellow turf personnel.
- Inventive Ingenuity – leadership in developing new ideas and trends in turfgrass management.
- Membership and activity in turf related and other civic organizations.
- Length of dedicated service to the turf industry.

Professional Excellence awards are based upon similar criteria, and are awarded to those deserving special recognition for significant contributions to the turfgrass industry. Awards and scholarships will be presented right before the Keynote Address, Tuesday, December 4, at the Ohio Turfgrass Conference & Show.

The 2006 Professional of the Year was awarded to Joe Duncan, Ever-Green Lawn Care. Professional Excellence Awards were presented to Dr. David Gardner, OSU Department of Horticulture & Crop Science and Gary Rasor, former Superintendent, OSU Golf Courses.

OTF Annual Awards Nomination forms are available on the OTF website at [www.OhioTurfgrass.org](http://www.OhioTurfgrass.org) or by calling 888-683-3445.

The deadline to submit your nomination is October 22.

## OTF Scholarships Available

OTF is committed to improving turfgrass through research and education. One of the best ways to foster this commitment is by providing scholarships to students pursuing green industry studies. In 2006, OTF and OTRT provided over \$25,000 in scholarships.

OTF members are encouraged to recommend any of their student employees, interns, friends, or family who they feel are qualified. Scholarship applications were recently mailed to all OTF members in their membership packets. They were also sent to members via email. The deadline to apply for a scholarship is October 22, 2007.

OTF scholarship information and applications are available on the OTF website at [www.OhioTurfgrass.org](http://www.OhioTurfgrass.org) or by calling 888-683-3445.

## OTF Unveils Newly Designed Website

The OTF website has recently undergone major renovations. The new design allows users to get an overview and interaction of all the major OTF pages, making it easier to locate information and improving navigation.

The new home page includes Integrated RSS feeds that provide automatic research updates from OSU's Buckeye Turf website – with links to TurfNotes, LandscapeNotes and SportsNotes. The home page also features a basic OTF member search, upcoming event information, and the latest OTF news. Lots of other improvements have been made to the site.

OTF thanks Gregg Kish, Front Porch Solutions for doing an excellent job redesigning the site – check it out at [www.OhioTurfgrass.org](http://www.OhioTurfgrass.org)!

## Help OTF Save Money

The green industry experiences a lot of employee turnover, making it difficult to keep records up-to-date.

Do you receive mailings from OTF addressed to individuals you no longer employ? If the answer is “YES”, you can save OTF money by helping to update our database.

OTF urges you to help. If you receive mailings for former employees, or others who should not receive mailings, please call OTF office at 888-683-3445 and speak with a Customer Service representative.

Postage rates continue to increase. OTF funds turfgrass research and education – not the US Postal Service! Please give us a call.

## Spotlight on Giving



### THE FOUNDERS CLUB

**Randy Kehres, Superintendent, New Albany CC**

*“The education and research funded by the OTF has directly benefited me throughout my career. I joined the Founder's Club to help continue these programs.”*

Say YES to the Founders Club! For more information please contact Ohio Turfgrass Research Trust, 1100-H Brandywine Blvd., Zanesville, OH 43701, phone toll free 888-683-3445, email [info@OhioTurfgrass.org](mailto:info@OhioTurfgrass.org) or visit [www.OhioTurfgrass.org](http://www.OhioTurfgrass.org).



# OSPA Summer Field Day a Big Success!

The Ohio Sod Producers Association Summer Field Day took place August 7 at Henderson Turf Farm, Tipp City, OH. Eleven companies displayed the latest equipment and products for sod production, while meeting with more than 50 of Ohio's leading sod producers.

In a break from tradition, the field day was held on a Tuesday afternoon rather than Saturday morning. Despite the near 100 degree temperatures, a great day was had by everyone in attendance. Sod producers visited with equipment suppliers while watching and participating in equipment demonstrations.

A chicken and pork chop barbeque dinner, prepared by Ohio CAT, followed the demonstrations. After dinner, OSU Extension Plant Pathologist, Joe Rimelspach, gave a brief presentation on Brown Patch and other Summer Turf Diseases. OSPA thanks Henderson Turf Farms for doing such a great job hosting the event, and to the following companies for providing equipment displays:

Allfed Environmental Group  
Barr-Net, Inc.  
BEFCO, Inc.  
Bucyrus Equipment, Co.  
Kesmac/Brouwer Turf Equipment  
Lindsay Corp.

Ohio CAT  
Princeton Delivery Systems  
Sod Equipment & Parts  
Trebco Manufacturing  
Trimax Mowing Systems



## OSU/OTF Turfgrass & Landscape Research Field Day Draws Nearly 400 Hundred to OTF Research Facility

A warm, sunny day in the low-nineties welcomed nearly 400 turfgrass and landscape professionals to the 2007 Ohio State University/OTF Turfgrass and Landscape Research Field Day, August 15 at the OTF Research & Education Facility.

On behalf of the OSU College of Food, Agricultural, and Environmental Sciences, Assistant Dean, L.H. Newcomb welcomed everyone to the research facility and thanked them for their partnership with the OSU Turfgrass Science Program. Following Dr. Newcomb was 2007 Field Day chairman Dr. John Street, OSU Department of Horticulture & Crop Science, to explain the program's format. The audience was then divided into four groups: Golf Turf; Lawn & Sports Turf; Nursery/Landscape; and Spanish, and the tours of the research facility began.

Each group then rotated among turfgrass and landscape plots, learning about the latest research being conducted at OSU. The topics covered included:

### TURFGRASS RESEARCH

#### Golf

- Management of Shaded Bentgrass
- Nitrogen Fertility, PGR's & Dollar Spot Incidence
- Poa Annual Control with Velocity
- Green Speed Studies
- Fungicide Efficacy Update for Dollar Spot and Brown Patch
- Dollar Spot Control

#### Lawn & Sports

- Primo and Megalex for Improved Turfgrass Shade Tolerance
- Postemergence Crabgrass Control with New Chemistry & Synergists

- Bermuda Grass Adaption & Management in the Cool-Season Region
- Establishing Athletic Field Grasses
- Using the Plant Growth Regulator, Trinexapac-ethyl, on High Cut Turf
- Broadleaf Weed Control
- Updates on New Insect Control Products

### NURSERY/LANDSCAPE RESEARCH

- Herbicide-Treated Mulches
- Tree Liner Field Production
- Tree Bark Cracking
- IR-4 Trial Evaluations
- Irrigation Systems, Container Whip Production, Magnolia Breeding
- Landscape Plant Establishment

### SESSIONS IN SPANISH

- Turf Basics
- Woody Plant ID
- Basic Insect ID

The afternoon program featured three optional sessions offering re-certification credit. Dr. Hannah Mathers and Randy Zondag presented "Weed Control in Landscape Beds," Dr. John Street and Dr. David Gardner discussed "Turf Weed Control" and Joe Rimelspach presented "Turf & Ornamental Diseases." All three sessions attracted large audiences from many seeking credit in each respective category.

The OSU Turfgrass Science Team did an excellent job preparing this year's program and the turfgrass research facility. The team consists of members of the OSU Department of Plant Pathology, Entomology, School of Natural Resources and Horticulture & Crop Science.

Thank you to everyone who attended, and for those whose hard work helped make the Field Day a success.

OTF hopes everyone enjoyed the day and that those who attended gained valuable information that will help make them better turf managers.







# 2007 OHIO TURFGRASS CONFERENCE & SHOW UPDATE

**Why Gamble with Your Future ...  
When OTF is Your Best Bet?**



**KEYNOTE ADDRESS**  
**Marty Brennaman**  
**Cincinnati Reds Radio Announcer**  
**Tuesday, December 4, 3:00 – 4:30 pm**

**Sponsored by:**

**syngenta**

Reds radio announcer Marty Brennaman received the Ford C. Frick Award on July 23, 2000, in ceremonies at the National Baseball Hall of Fame in Cooperstown, N.Y. The award is presented each year by the Hall of Fame to a broadcaster “for major contributions to the game of baseball.”

Brennaman, Red Barber (WSAI, 1934-38) and Russ Hodges (WFBE, 1932) are the only Reds announcers ever to receive the Hall of Fame’s prestigious broadcasting award. On May 2, 2005 he was inducted into the National Sportscasters and Sportswriters Association Hall of Fame in Salisbury, NC. On November 5, 2005 he was inducted into the National Radio Hall of Fame in Chicago. In 1999 he was inducted into the Virginia Sports Hall of Fame.

The 2007 season was Brennaman’s 43rd as a broadcaster. He joined the Reds radio team in 1974 and for 31 seasons (1974-2004) shared the 700 WLW Radio booth with Reds Hall of Fame pitcher Joe Nuxhall. Brennaman has been named Ohio Sportscaster of the Year 13 times, most recently in 2006. He won the Virginia Sportscaster of the Year Award 4 times while broadcasting basketball games for the American Basketball Association’s Virginia Squires, baseball games for the New York Mets’ Class AAA affiliate in Norfolk and football games for both Virginia Tech and William & Mary. He also has broadcast games during the NCAA’s men’s basketball tournament, including 15 regional tournaments and 11 Final Fours.

Brennaman and his wife, Sherri, live in Cincinnati. In 2007 he broadcast about 45 games with his son, Thom. Marty also has 2 daughters, Dawn and Ashley, and 4 grandchildren, Dylan & Cal Venerus and Ella Mae & Luc Brennaman.

## **What You Need to Know about This Year’s Conference & Show**

### **MONDAY, PRE-CONFERENCE WORKSHOPS**

The last couple years, pre-conference workshops have not been offered at the OTF Conference & Show, but due to popular demand, they make a return this year.

Three workshops will be offered on Monday, December 3:

- **GCSAA Workshop** – Mike Jousan, Clear Communications will present his GCSAA approved workshop on Communications for Superintendents (sponsored by the Central Ohio GCSA) – 6 Hrs
- Toro Irrigation University – 6 Hrs
- Programming & Designing a Turf Care Facility/Today’s Environmental Center Wash Pads, Chemical Storage, Mix & Load – 3 Hrs
- USGA Workshop – Interact with the Rules of Golf – 3 Hrs

*Workshops 1 and 2 require a separate fee and lunch is included. Workshop 3 is free.*

### **New Education Tracks to be Offered:**

- Organic (Sustainable) Landscapes
- Landscape Irrigation for Turf & Ornamentals
- Golf Course Maintenance on a Budget
- Sports Turf on a Budget
- Golf Course Owners/General Managers
- Hispanic Turf Management and Safety (in Spanish)



## Hotel Accommodations

Planning an overnight stay during the 2007 Ohio Turfgrass Conference & Show? Plan ahead and reserve your hotel rooms early. Many hotels may be sold out if you wait too long.

Discount pricing has been negotiated at the following hotels. Make sure to inform the reservation desk that you are with the Ohio Turfgrass Conference & Show when making reservations.

**IMPORTANT:** OTF urges you to make accommodations by contacting the following hotels. Room reservations made outside the OTF room block may result in financial penalties to OTF and lead to higher fees in the future!

### Hyatt Regency Columbus

(Headquarters Hotel)  
350 North High St  
Columbus, OH 43215  
614-463-1234  
\$129 + Tax Single/Double  
\$149 + Tax Triple  
\$159 + Tax Quad  
Cut-off date: November 9, 2007

### Hampton Inn & Suites

501 North High St  
Columbus, OH 43215  
614-559-2000  
\$115 + Tax King Standard  
\$125 + Tax Double  
Cut-off date: November 2, 2007  
(Refer to Code OT7 when  
making reservations)

### Drury Inn & Suites Columbus

88 East Nationwide Blvd  
Columbus, OH 43215  
614-221-7008  
\$99 + Tax Single/Double  
\$109 + Tax Triple/Quad  
Cut-off date: November 3, 2007

## Education Preview

Following is a tentative listing of educational sessions to be offered this year. Complete details and registration information will be mailed to all members in early October.

### MONDAY, DECEMBER 3

#### GCSAA WORKSHOP

9:00 AM – 4:00 PM

#### Communications

Mike Jousan, Clear Communication Co.

#### PRE CONFERENCE WORKSHOP

9:00 AM – 12:00 PM

#### Today's Environmental Center Wash Pads, Chemical Storage Mix & Load Application

John Glover, ESD Waste2Water, Inc., Keith Kresina, The Golf Club, Eric Materkowski, Wildwood Golf Club & Kyle William, Ivy Hills CC

#### Programming and Designing a Turf Care Facility

Michael Vogt, The McMahon Group, Inc.

1:00 PM – 4:00 PM

#### Interact With the Rules of Golf

Bill McCarthy, USGA

#### PRE CONFERENCE WORKSHOP –

#### TORO UNIVERSITY

9:00 AM – 4:00 PM

#### Sprinkler Maintenance & Trouble Shooting, Satellite Trouble Shooting, Field Troubleshooting, Winterization/Spring Start-Up & Pump Station Winterization

Jim Sharp, Sam Moore, Jerry Riley & Joel Braun, The Toro Co.

### TUESDAY, DECEMBER 4

#### ORGANIC SUSTAINABLE LANDSCAPE

8:00 AM – 9:00 AM

#### Low Maintenance Plantscapes

Joe Boggs, OSU Extension Hamilton Co., Piketon Research Center & Jim Chatfield, OSU Extension – Wooster

9:00 AM – 10:00 AM

#### Weedless Lawns without Chemicals?

Dr. Ron Calhoun, Michigan State Univ., Dept. of Crop & Soil Sciences

10:00 AM – 11:00 AM

#### Using State of Art Natural Organics for Maintaining Turf and Trees in Central Park New York

Matthew Brown, Central Park Conservancy

11:00 AM – 12:00 PM

#### Understanding the Spectrum of Organic Fertilizers and Their Use Strategies for Agronomic Success

Dr. Chuck Darrah, CLC LABS

1:00 PM – 2:00 PM

#### Using Natural Controls and Host Plant Resistance to Manage Insects

Dr. Parwinder Grewal, The Ohio State University, Dept. of Entomology

2:00 PM – 3:00 PM

#### Natural Organic Programs in the Field or Real World

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#### LAWN CARE BUSINESS MANAGEMENT

8:00 AM – 9:00 AM

##### **Employee Retention**

*Dr. Bernie Erven, The Ohio State University*

9:00 AM – 10:00 AM

##### **How to Control Your Rising Health Care Costs**

*Dennis Recker, Fewcett, Lammon, Recker & Assoc.*

10:00 AM – 11:30 AM

##### **Developing Middle Management**

*Dr. Bernie Erven, The Ohio State University*

1:00 PM – 2:00 PM

##### **H2B Update**

*John Wargowsky, Mid American Ag. & Hort. Services*

2:00 PM – 3:00 PM

##### **Developing a Culture of Safety**

*Brad Hunt, RiskControl360°*

#### SPORTS TURF

8:00 AM – 9:00 AM

##### **Renovation and Construction Improvements in Sports Turf Over the Last 10 Years**

*Dave Saltman, Pitchcare*

9:00 AM – 10:00 AM

##### **Synthetic Turf Field Maintenance**

*Darian Daily, Cincinnati Bengals*

10:00 AM – 11:00 AM

##### **Managing Traffic and Wear on Sports Fields**

*Dr. John Sorochan, University of Tennessee, Dept. Plant Sciences & Land Sys.*

11:00 AM – 12:00 PM

##### **Optimizing Cultural Practices to Improve Field Performance**

*Dr. Ron Calhoun, Michigan State University, Dept. of Crop & Soil Sciences*

1:00 PM – 2:00 PM

##### **Managing Athletic Fields without Pesticides**

*Matthew Brown, Central Park Conservancy*

2:00 PM – 3:00 PM

##### **Procedures for Drainage Improvements on Existing Fields and During Renovation**

*Ryan Gregoire, Ag Design, Inc.*

#### GOLF

8:00 AM – 9:00 AM

##### **Predicting & Management of Pink Snow Mold (The Whole Story)**

*Dr. Phil Dwyer, Scotts Company*

9:00 AM – 10:00 AM

##### **Hiring and Maintaining a Latino Work Force**

*John Wargowsky, Mid American Ag. & Hort. Services*

10:00 AM – 11:00 AM

##### **Risk Management**

*Mark Farrell, Westfield Group CC*

11:00 AM – 12:00 PM

##### **Phosphites & Pythium Management**

*Dr. Brandon Horvath, Virginia Tech, Dept. of Plant Pathology*

1:00 PM – 2:00 PM

##### **Poa annua Seedhead Suppression Options – An Art or a Science?**

*Dr. Ron Calhoun, Michigan State Univ., Dept. of Crop & Soil Sciences*

2:00 PM – 3:00 PM

##### **Do My Greens Have the Chicken Pox?**

*Dr. Peter Dermoeden, Univ. of Maryland, Dept. of Natural Resource Sciences & Landscape Architecture*

#### GOLF COURSE MAINTENANCE ON A BUDGET

8:00 AM – 9:00 AM

##### **Economic Disease/Fungicide Management**

*Joe Rimelspach, The Ohio State University, Dept. of Plant Pathology*

9:00 AM – 10:00 AM

##### **Economic Insect/Insecticide Management**

*Dr. David Shetlar, The Ohio State University, Dept. of Entomology*

10:00 AM – 11:00 AM

##### **Kentucky Bluegrass for Ohio/Midwest Fairways**

*Dr. Doug Brede, Jacklin Seed Co./JR Simplot*

11:00 AM – 12:00 PM

##### **Customer Service and Your Course Image – A Superintendent's Perspective**

*John Miller, GCSSA LPGA Tour Agronomist*

1:00 PM – 3:00 PM

##### **PANEL – Cost Savings**

*Moderator: Dr. John Street, The Ohio State University, Dept. of Hort. & Crop Science; Panelists: Ted Cox, Running Fox Golf Course & Charlie Mozingo, Turkey Foot Golf Course*

### **WEDNESDAY, DECEMBER 5**

#### GOLF

7:00 AM – 9:00 AM

##### **Morning with the USGA**

*Bob Brame, USGA*

9:00 AM – 10:00 AM

##### **Poa annua Control Options – What is New?**

*Dr. Ron Calhoun, Michigan State University, Dept. of Crop & Soil Sciences*

10:00 AM – 11:00 AM

**Summer Stress, Diseases and Greens Management – Correlated Confusion Clarified**

*Dr. Peter Dernoeden, Univ. of Maryland, Dept. of Natural Resource Sciences & Landscape Architecture*

11:00 AM – 12:00 PM

**Rolling For Dollars**

*Dr. John Sorochoan, University of Tennessee, Dept. Plant Sciences & Land Sys.*

3:00 PM – 3:30 PM

**Mesotrione (Tenacity) – A New Herbicide for Golf Courses**

*Dr. Peter Dernoeden, Univ. of Maryland, Dept. of Natural Resource Sciences & Landscape Architecture*

3:30 PM – 5:00 PM

**Innovative Superintendent & New Technology Panel**

*Moderator: Dr. Karl Danneberger, The Ohio State University, Dept. of Hort. & Crop Science; Panelists: Bob Brame, USGA, Dr. Peter Dernoeden, Univ. of Maryland, Dept. of Natural Resource Sciences & Landscape Architecture, John Miller, GCSAA LPGA Tour Agronomist, Ed Mitchell, The Legacy Club, Heather Downs & Dan Walter, City of Blue Ash*

**SPORTS TURF**

8:00 AM – 9:00 AM

**Techniques for Recrowning and Regrading Sports Fields – A Necessity for Success**

*Mike Schiller*

9:00 AM – 10:00 AM

**Maximizing Your Fertilizer Dollar**

*Brad Jakobowski, University of Nebraska, Dept. of Agronomy & Hort.*

1:00 PM – 2:00 PM

**Overseeding Athletic Fields: High Seeding Rates for Maximum Recovery?**

*Federico Valverde, Pioneer Seed Company formerly Iowa State University*

2:00 PM – 3:00 PM

**Improving Your Status and Getting More From Administration**

*Dave Saltman, Pitchcare*

3:00 PM – 4:30 PM

**PANEL – Preparing for, Surviving and Recovering From a Rain Game**

*Moderator: Pamela Sherratt, The Ohio State University, Dept. of Hort. & Crop Science; Panelists: Frank Dengg, Columbus Public Schools, Dave Saltman, Pitchcare, Mike Schiller, Dr. John Sorochoan, University of Tennessee, Dept. Plant Sciences & Land Sys., Federico Valverde, Pioneer Seed Company formerly Iowa State University & Kevin Vaughn, City of Dublin*

**LAWN & GROUNDS**

8:00 AM – 9:00 AM

**Snow Removal**

*Doug Freer, Blue Moose Co., Inc.*

9:00 AM – 10:00 AM

**Management Strategies for Reducing Brown Patch on Tall Fescue**

*Dr. Brandon Horvath, Virginia Tech, Dept. of Plant Pathology*

12:00 PM – 1:00 PM

**How to Make Money Mowing Grass**

*Todd Pugh, Todd's Enviroscape*

1:00 PM – 2:00 PM

**PANEL – Estimating Lawn & Grounds Work**

*Moderator: Mark Grunkemeyer, Buckeye Ecocare; Panelists: Doug Freer, Blue Moose Co., Inc., Tony Newport, Brickman/ GroundMasters & Todd Pugh, Todd's Enviroscape*

2:00 PM – 3:00 PM

**Busted! A Review of the 2007 Investigations and Enforcement Actions by ODA**

*Jim Belt, Ohio Dept. of Agriculture*

3:00 PM – 4:00 PM

**Maximizing Your Fertilizer Dollar**

*Brad Jakobowski, Univ. of Nebraska, Dept. of Agronomy & Hort.*

4:00 PM – 5:00 PM

**Synthetics Versus Natural Organic Fertilizer Programs**

*Moderator: Mark Grunkemeyer, Buckeye Ecocare; Panelists: Dr. Chuck Darrah, CLC LABS, Dr. Parwinder Grewal, The Ohio State University, Dept. of Entomology, Rick Geise, Nature Safe & Ted Shull, Kettering Medical Center*

**GOLF COURSE OWNERS/GM**

8:00 AM – 9:00 AM

**Club Operations**

*Robert Green, Wedgewood Golf & Country Club*

9:00 AM – 10:00 AM

**Risk Management**

*Mark Farrell, Westfield Group CC*

10:00 AM – 11:00 AM

**Club Marketing**

*Heidi Voss, Bauer Voss Consulting*

11:00 AM – 12:00 PM

**PANEL**

*John Evans, GE Real Estate, Mark Farrell, Westfield Group CC, Robert Green, Wedgewood Golf & Country Club and Heidi Voss, Bauer Voss Consulting*

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2:00 PM – 4:00 PM

**The Golf Industry – Down But Not Out!**  
**(SPONSORED BY – FORE! RESERVATIONS)**  
*Jim Koppenhaver, Pellucid Corp.*

GENERAL

8:00 AM – 9:00 AM

**Industrial Weed Control**  
*Randy Zondag, OSU Extension Lake Co.*

12:00 PM – 1:00 PM

**Perimeter Pest and Vertebrate (Mole) Control**  
*Dr. David Shetlar, The Ohio State University, Dept. of Entomology*

1:00 PM – 2:00 PM

**Emerald Ash Borer: Update and Management Options**  
*Dr. Dan Herms, The Ohio State University, Dept. of Entomology*

2:00 PM – 3:00 PM

**Aquatic Weed Management**  
*Dr. Bill Lynch, The Ohio State University, School of Natural Resources*

3:00 PM – 4:00 PM

**Pesticide Safety and Health Issues for the Green Industry**  
*Joanne Kick-Raack, The Ohio State University, Dept. of Entomology*

SOD PRODUCTION

8:00 AM – 9:00 AM

**What's New in Turfgrasses for Sod Production**  
*Dr. Doug Brede, Jacklin Seed Co./JR Simplot*

9:00 AM – 10:00 AM

**The Environmental Impact of Lawns: Science and Perception**  
*Dr. Parwinder Grewal, The Ohio State University, Dept. of Entomology*

10:00 AM – 11:00 AM

**Brown Patch Management on Tall Fescue and Diseases of the New Heat Tolerant Blues: What Your Customers Need to Know!**  
*Dr. Brandon Horvath, Virginia Tech, Dept. of Plant Pathology*

11:00 AM – 11:30 AM

**Yellow Nutsedge Control: What's the New Story**  
*Dr. Dave Gardner, The Ohio State University, Dept. of Hort. & Crop Science*

SPANISH TURF WORKSHOP (en Español)

1:00 PM – 2:00 PM

**Basic Turfgrass Cultural Practices to Reduce Pest Problems**  
*Alejandra Acuna, The Ohio State University*

2:00 PM – 3:00 PM

**Seguridad y Manejo de Pesticidas**  
**(Safety and Proper Handling of Pesticides)**  
*Samuel Contreras, The Ohio State University*

3:00 PM – 4:00 PM

**The Basics of Turfgrass Weed Control**  
*Alejandra Acuna, The Ohio State University*

EVENING WORKSHOP

7:00 PM – 9:00 PM

**Turfgrass Insect Control Strategies Using New and Existing Insecticide Technology**  
*Dr. David Shetlar, The Ohio State University, Dept. of Entomology*

## THURSDAY, DECEMBER 6

GOLF

8:00 AM – 9:00 AM

**Sun Exposure 30 Years of Exposure ... the rest of the Story!**  
*Gary Rasor, Golf Course Consultant*

9:00 AM – 10:00 AM

**Groundwater Wells and Maintenance**  
*Bob Hardin, President, HD Water Services*

12:00 PM – 1:00 PM

**New Insecticide Technology – Are We Using It Well?**  
*Dr. David Shetlar, The Ohio State University, Dept. of Entomology*

1:00 PM – 2:00 PM

**Over Seeding and Inter-Seeding of Golf Turf: Good News and Bad News!**  
*Dr. Karl Danneberger, The Ohio State University, Dept. of Hort. & Crop Science*

2:00 PM – 3:00 PM

**Turfgrass Disease Update on OSU Research, Dollar Spot & Problematic Diseases of 2007 with Q & A**  
*Dr. Mike Boehm, The Ohio State University, Dept. of Plant Pathology & Joe Rimelspach, The Ohio State University, Dept. of Plant Pathology*

LAWN & GROUNDS – TURF

8:00 AM – 9:00 AM

**Broadleaf Weed Control: Correlated Confusion Clarified**  
*Dr. Dave Gardner, The Ohio State University, Dept. of Hort. & Crop Science*

9:00 AM – 10:00 AM

**Selecting Grasses for Problem Landscapes**  
*Dr. Doug Brede, Jacklin Seed Co./JR Simplot*

10:00 AM – 11:00 AM

**Annual and Perennial Grassy Weed Control Options**  
*Dr. Dave Gardner, The Ohio State University, Dept. of Hort. & Crop Science*

1:00 PM – 2:00 PM

**Drought Tolerant Grasses and Management Strategies for Drought Survival**  
*Dr. Doug Brede, Jacklin Seed Co./JR Simplot*

2:00 PM – 3:00 PM

**Optimizing Crabgrass Control Strategies**

*Dr. Dave Gardner & Dr. John Street, The Ohio State University,  
Dept. of Hort. & Crop Science*

**LAWN & GROUNDS – ORNAMENTAL**

8:00 AM – 9:00 AM

**Top Performing Annuals for Midwest Landscapes**

*Pam Bennett, OSU Extension/Clarke County*

9:00 AM – 10:00 AM

**Landscaping with Flowering Trees and Shrubs**

*Jim Chatfield, OSU Extension – Wooster*

10:00 AM – 11:00 AM

**Strategies to Deal with Compacted Soils in the Landscape**

*Joe Boggs, OSU Extension Hamilton Co., Piketon Research Center*

1:00 PM – 2:00 PM

**Ornamental Bed/Landscape Weed Control**

*Randy Zondag, OSU Extension Lake Co.*

**SPORTS TURF ON A LOW BUDGET**

8:00 AM – 9:00 AM

**Sensible Management Strategies for Low Budget Sports Programs**

*Pamela Sherratt, The Ohio State University, Dept. of Hort.  
& Crop Science*

9:00 AM – 10:00 AM

**Equipment and Products I Couldn't Live Without**

*Mike Schiller*

10:00 AM – 11:00 AM

**Stretching Your Fertilizer Dollars for Best Agronomic  
and Sports Field Performance**

*Brad Jakubowski, University of Nebraska, Dept. of Agronomy  
& Hort.*

1:30 PM – 2:30 PM

**Management Tips and Ideas for Low Budget Baseball Fields**

*John Mott, The Ohio State University*

2:30 PM – 3:30 PM

**Make the Correct Insecticide Use Decisions on a Tight Budget**

*Dr. David Shetlar, The Ohio State University, Dept. of Entomology*

**MECHANICS WORKSHOP**

8:00 AM – 11:00 AM

**Reel Technology Technicians Seminar**

*Jim Nedin, Century Equipment*

**ASSISTANTS/TECHNICIANS**

8:00 AM – 9:00 AM

**Procedures, Techniques and Tools for Making Proper  
Diagnosis of Turf Problems**

*Joe Rimelspach, The Ohio State University, Dept. of Plant Pathology*

9:00 AM – 10:00 AM

**Simplicity in Making Fertilizer and Pesticide Calculations**

*Dr. John Street, The Ohio State University, Dept. of Hort.  
& Crop Science*

10:00 AM – 11:00 AM

**Basic Safety**

*Gary Hanson, RiskControl360°*

1:00 PM – 2:00 PM

**Succeeding as a Leader**

*Dr. Bernie Erven, The Ohio State University*

2:00 PM – 3:00 PM

**Interpreting the Pesticide Label to Ensure a Legal, Safe  
and Environmentally Protective Workplace**

*Joanne Kick-Raack, The Ohio State University, Dept.  
of Entomology*

1:00 PM – 3:00 PM

**ODA TESTING FOR PESTICIDE APPLICATOR RE-CERTIFICATION  
AND LICENSING**

12:00 PM – 4:00 PM

**PLANET TESTING FOR:**

Certified Turfgrass Professional – Cool Season Lawns (CTP-CSL)

Certified Landscape Professional (CTP)

Certified Landscape Technician-Interior (CLT-I)

Certified Ornamental Landscape Professional (COLP)

(ALL SESSION TOPICS, TIMES AND SPEAKERS ARE SUBJECT TO CHANGE)



# 2007 EXHIBITORS

Nearly every product or service for managing turfgrass will be on display at this year's OTF show. More than 250 exhibitors will occupy more than 50,000 square feet of exhibit space. This is a great chance to view the latest products and services while learning from many of the industry's most knowledgeable experts.

Following is a list of companies already planning to exhibit (as of August 24).

To add your name to this growing list of leading industry suppliers, call OTF at 888-683-3445.

2wayradioplus	Club Car, Inc.	Lavy Ents. Turf Grass, Inc.	Questex Media
Acorn Farms, Inc.	Commercial Tire Service	Lawn Tech	Raden Enterprises, Inc.
Advanced Turf Solutions	Co., Inc.	Lesco/John Deere Landscapes	Real Green Systems
Ag-Environ-Tech, LLC	Compensation Consultants, Inc.	Liquid Fence Co.	Sandtrapper
AGRO-CHEM, Inc.	Dakota Peat & Equipment	Logan Labs	Schreiner Golf, Inc.
Allegheny Lawn & Golf	Danner Mfg., Inc.	Mar-Co Clay Products	The Scotts Company
Alvis Materials	Dow AgroSciences	Markers, Inc.	SePRO Corporation
The Andersons	Eagle One Golf Products	Mid American Ag. & Hort. Svcs.	SISCO
Applied Biochemists	Fairway Products	Mid Ohio Golf Car, Inc.	Smithco, Inc.
AQUA DOC Lake & Pond Management	First Products	Midwest Turf Consultants	Southern Athletic Fields
Aqua-Aid, Inc.	FMC Professional Solutions	Milliken	Southwest Landmark, Inc.
Aquatrols	Foley United	Morrall Companies, LLC	Standard Golf
Baker Vehicle Systems, Inc. (Jacobsen)	Golf Course Industry/ Lawn & Landscape	Naiad Co., Inc.	Superintendent & Turf Magazines
Bayco Golf	Green Velvet Sod Farms Ltd.	Nearby Technologies	Syngenta
Bayer Environmental Science	Grigg Brothers	Nufarm Americas	Turfco Mfg., Inc.
Best Sand Corporation	Gro-Power, Inc.	Ohio Lawn Care Association	Turfgrass, Inc.
Bradfield Organics	H&E Sod Nursery	Ohio Sports Turf Managers Assn.	Turf Specialties Supply
Brookside Labs	HARCO Fittings	Ohio Utilities Protection Svc.	TYCROP Manufacturing Ltd.
C&S Turf Care Equipment, Inc.	HARCO Fittings	OSU Turf Club	UAP
Carbtrol	Harper Industries, Inc.	Otterbine Barebo, Inc.	Walker Supply, Inc.
Central Farm & Garden	Harrell's Fertilizer	Par Aide Products Co.	Watertronics, Inc.
Century Equipment (Toro)	HD Water Services	PBI-Gordon Corp.	Wehrkamp Enterprises, Inc.
Chemical Containers, Inc.	Helena Chemical Co.	Perma Green Supreme	Wolf Creek Co.
Cincinnati Mine Machinery Co.	Hydrolysate Co. of America	Phoenix Environmental Care	Xenia Power Equipment
The CISCO Companies	iHammer Technologies	Plant Food Co.	XGD Systems, LLC
Clark State Community College	Infinity Sports LLC	Power Equipment Dist., Inc.	YES Marketing, Inc.
CLC LABS	Jacklin Seed/JR Simplot	Princeton Delivery Systems, Inc.	
Cleary Chemical	Knox Fertilizer Co.	Prizelawn by PSB Co.	
	Kurtz Brothers, Inc.	Profile Products LLC	
	Lastec	Quali-Pro	



# OTF Golf Tournament Registration Form

## NCR Country Club • October 1, 2007

The Ohio Turfgrass Foundation (OTF) is excited to announce that its annual Scholarship and Research fundraising Golf Tournament will be held at NCR Country Club, Dayton, OH on Monday, October 1. NCR Country Club opened in 1954. The Club was designed by the late Dick Wilson, a famous golf course architect from Delray Beach, Florida. NCR Country Club has two distinctively different 18-hole golf courses. The courses and their facilities are situated on 350+ acres.

The OTF Tournament will be played on the famous South Course. The South Course has long been regarded as one of America's "Top 100" golf courses and is certainly one of the best classical designs of our time. During its 50+ year existence the South Course has hosted several National Championships, including the 51st PGA Championship, the 41st U.S. Women's Open, the 1998 U.S. Mid-Amateur, and the 2005 U.S. Senior Open. OTF Member Jim Campion is the golf course superintendent.

Everyone involved in professional turfgrass management are encouraged to sign up early as space is limited to the first 144 golfers. Complete the reservation form, include your registration fees and mail or fax them to us today! General information and registration forms are also available on the OTF website, [www.OhioTurfgrass.org](http://www.OhioTurfgrass.org), by sending a request to [info@OhioTurfgrass.org](mailto:info@OhioTurfgrass.org), or by calling 888-683-3445.

**HIGHLIGHTS OF THE DAY INCLUDE:** 18 holes of golf at the fabulous NCR Country Club, individual gifts for each golfer, shotgun scramble beginning at 11:00 am, box lunch, team, individual and door prizes, hole-in-one contests, putting contests, hot hors d'oeuvres and awards presentations.

The deadline for reservations is Monday, September 24, 2007 – reservations will be processed on a first-come, first-served basis.

### MEMBER INFORMATION

Member # \_\_\_\_\_

Name \_\_\_\_\_

Mailing Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip+4 \_\_\_\_\_

Phone \_\_\_\_\_

E-mail \_\_\_\_\_ @ \_\_\_\_\_

Completing the form serves management notice that you agree to be contacted by mail, phone, fax and/or e-mail.

OTF Member ☐ Yes ☐ No

☐ I am registering as a single golfer @ \$150

☐ I am registering more than one golfer @ \$150 each – list names below

☐ I am registering as a foursome @ \$600 – list organization and names below

Organization \_\_\_\_\_

1. \_\_\_\_\_ HDCP \_\_\_\_\_

2. \_\_\_\_\_ HDCP \_\_\_\_\_

3. \_\_\_\_\_ HDCP \_\_\_\_\_

4. \_\_\_\_\_ HDCP \_\_\_\_\_

(Note: combined team handicap must be 40 or more.)

#### MAIL OR FAX WITH PAYMENT TO:

OTF Golf Tournament – Ohio Turfgrass Foundation  
1100-H Brandywine Blvd., Zanesville, Ohio 43701-7303

Phone: (888) 683-3445 • Fax: (740) 452-2552

E-mail: [info@OhioTurfgrass.org](mailto:info@OhioTurfgrass.org) • Web: [www.OhioTurfgrass.org](http://www.OhioTurfgrass.org)

### SPONSORSHIPS (CHECK ONE)

☐ Tee Sponsor – \$200

☐ Beverage Cart Sponsor – \$500

☐ Meal Sponsor – \$500

### METHOD OF PAYMENT (DUE AT TIME OF ORDER)

☐ Company Check ☐ Cashier's Check/Money Order

☐ Debit ☐ Credit

☐ American Express ☐ Discover ☐ MasterCard ☐ VISA

Make checks payable to OTF. All payments in US funds drawn on a US Bank.  
A \$25 fee will be charged for a returned check.

Credit Card Account # \_\_\_\_\_

Exp. Date \_\_\_\_\_ Amt. Charged \$ \_\_\_\_\_

Cardholder's Name \_\_\_\_\_

Authorized Signature \_\_\_\_\_

### SPECIAL TOURNAMENT POLICY

Any team that has won the OTF Golf Tournament may only have a maximum of two (2) returning players compete on the same team the following year.

#### FOR OFFICE USE ONLY

RCVD \_\_\_\_\_ AMT \$ \_\_\_\_\_ CK # \_\_\_\_\_ ACKD \_\_\_\_\_



## Gray Leaf Spot – in Ohio

*Joseph W. Rimelspach & Michael J. Boehm, The Ohio State University*

Above normal temperatures in the summer and fall and high humidity are ideal environmental conditions for Gray Leaf Spot caused by *Pyricularia grisea*. This disease was first confirmed in Ohio in 1997 on perennial ryegrass. In most years the disease has been primarily a problem in the southern two-thirds of the state. However, the disease was confirmed in the Toledo area on a golf course in 2006. The North West Ohio confirmation was 100 miles north of any prior diagnosis. Even though most samples received at the OSU C. Wayne Ellett Plant & Pest Diagnostic Clinic have been observed on ryegrass athletic fields and golf course fairways/roughs, perennial ryegrass lawns of all kinds can be damaged.

### Symptoms

The Gray Leaf Spot or “blast” gets its name from the devastating scorched appearance it causes on foliage of rice & turfgrass plants. Quite literally, severe outbreaks look as if the turfgrass has been scorched with a flamethrower! Initially, symptoms may appear as drought-like symptoms. The pathogen kills the plant by causing severe leaf blight. Part of the blighting process involves the production of phytotoxic chemicals, which disrupt the normal biochemical and physiological balance within the turfgrass plant. Very early symptoms often appear as pinprick lesions which often go unnoticed or mistaken for a less aggressive turfgrass disease.

Under optimal environmental & host conditions, these small spots quickly turn into water-soaked spots, which then coalesce into water-soaked leaf tips, which then rapidly progress to twisted necrotic leaf tips. Patches of Kentucky bluegrass, fine fescues, bentgrass, and many perennial weedy grasses will not be affected. Decline of only the perennial ryegrass is an important diagnostic aid. Brown patch, rust and other leaf spotting diseases may also be present simultaneously with the Gray Leaf Spot.

In later stages of development, the turf may take on a gray color as a result of the mass production of conidia (spores) by the pathogen – hence its name, Gray Leaf Spot. In most cases, the ryegrass will quickly die and look like drought stress. There is a strong correlation to weather patterns of warm days and nights, high humidity and rainfall, usually from the remains of hurricanes that trace through the Ohio valley region.

### Management Strategies

This disease is difficult to manage in areas that are prone to Gray Leaf Spot and that have a history of the problem. The following cultural practices are suggested to reduce or eliminate the disease:

- Reduce or limit nitrogen fertilizer in the summer. Avoid quick-release sources of nitrogen.
- Irrigate early morning and avoid evening irrigation. Check the soil moisture level because the disease mimics drought stress. Over-watering caused by misdiagnosis increases the severity of the disease.
- On athletic fields, be wary of using rain tarps during Gray Leaf Spot susceptible times (mid-August through September in the Midwest).
- Seed areas with a resistant type of turfgrass such as Kentucky bluegrass or fescue. Avoid seeding ryegrass in warm weather since seedlings are quite susceptible to the disease.

### HOST GENETIC RESISTANCE

- New perennial ryegrass cultivars are being developed that show less susceptibility to the disease. Examples are: Paragon GLR, Panther GLS, Protege, Palmer IV, and Repel GLS.

## Chemical Management

Fungicide applications must be timely to prevent damage. Some of the most effective products are: thiophanate-methyl (Cleary's 3336, T-Storm, etc.), azoxystrobin (Heritage), trifloxystrobin (Compass), fluoxastrobin (Disarm), pyraclostrobin (Insignia), thiophanate-methyl + chlorothalonil, propiconazole + chlorothalonil, and triadimefon + chlorothalonil. Read labels carefully for information. Fungicide programs in most years should be started in July/August and follow timing outlined on the label of the product(s).

AN EXAMPLE OUTLINE FOR A FUNGICIDE PROGRAM:

Application	Date	Product(s)	Period of Protection (Days)
1	Jul 15	Strobilurin (i.e. Heritage/ Insignia)	(21)
2	Aug 5	Strobilurin	(21)
3	Aug 26	thiophanate-methyl	(14)
4	Sept 9	thiophanate-methyl	(14)
5	Sept 23	sterol inhibitor + chlorothalonil (i.e. Banner or Bayleton + Daconil)	(14)

This is an example fungicide program and more less applications may be recommended depending on the site and severity of the disease. A key point to consider is to select fungicides from different chemical families. Resistance has been reported to Gray Leaf Spot by several of these materials. There may be additional products available and registered for use on Gray Leaf Spot. Read the label of all products carefully and follow all directions.

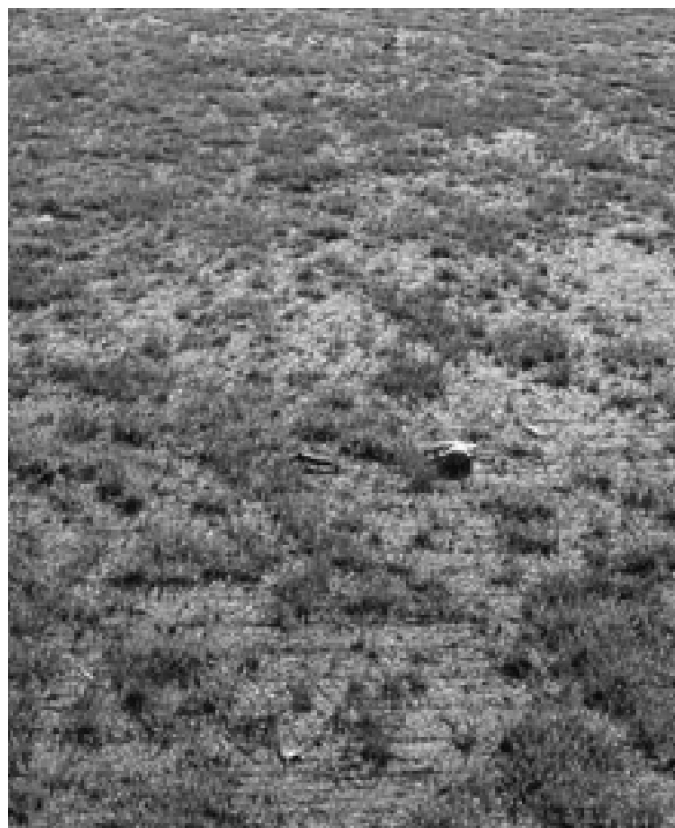
## Diagnosis

For confirmation of Gray Leaf Spot, submit samples to the C Wayne Ellett Plant and Pest Diagnostic Clinic, <http://ppdc.osu.edu>. Turf-grass sample forms are available online or by calling the clinic at (614) 292-5006.

If there are questions about this disease please contact us for additional information.



First Ohio report 1997 in the Dayton area, usually occurs in Southern 2/3 of state. Confirmed in Wood county in 2006.



An image of The Gray Leaf Spot damage to perennial ryegrass in Central Ohio in 2006.





## Moss: Part 2

*Edward McCoy, The Ohio State University*

Although it was not the principal focus of the study, we periodically collected observations of algae and moss presence on experimental putting greens during the 2000 to 2004 growing seasons. Recently, I decided to analyze these observations and have found some interesting implications that I would like to share with you.

The experimental greens were constructed in 1998 and contained 6 different root zones with each built to two depths and all overlying a gravel layer (bottom photo). Two of the root zones were 100% sand where the sands were relatively finer and coarser based on USGA guidelines, 2 used the same sands blended to contain 90% sand and 10% by volume sphagnum peat, and the final 2 root zones were blended by adding 10% soil to the sand:peat mixes. Root zone depths were 9- and 12 inches. The greens were seeded to Pennncross creeping bentgrass and maintained as putting greens with a 5/32 inch height of cut.

### Algae

During the course of a turfgrass water use study, we periodically withheld irrigation and subjected the plots to a dry-down. These dry-down treatments were performed (weather permitting) twice in years 2000 and 2001. To allow the turfgrass to recover from the dry-down treatment, we simply returned to our normal practice of applying irrigation no more frequently than 3 times per week, and at average amounts of 0.3 inches. Yet in August 2001, following the most severe dry-down treatment of the study, algae began to

appear on some of the greens during the recovery phase. Thus, we recorded this occurrence in early September, approximately one-month into recovery, as % area coverage by algae on each of the 36 plots. These values ranged from 0 to 60%.

Analysis of this data sought to determine if any of the experimental factors of the experiment; sand type, root zone amendment, or root zone depth (and their interactions) had a significant impact on algae appearance during the recovery period. Of these factors, only one showed a significant impact and this was root zone depth. Thus, the shallower, 9 inch root zones averaged 24% algae coverage and the conventional, deeper, 12 inch root zones averaged 2% algae coverage.

But why did the algae appear when it had not been previously seen on this experiment? It was not due to poor drainage as the 3 inch depth water contents measured prior to the stress period were not significantly affected by root zone depth and near surface Ksat values measured in the fall of 2001 ranged from 4 to 24 inches per hour across all greens. Rather it appeared to be due to the severe drought stress we placed on these greens to the point where we actually lost turf. On August 8th, at the height of the stress period, visual rating of stress severity showed turf on the 9 inch root zones to be more highly stressed than the corresponding 12 inch root zones, and there was a significant difference in water contents at 3 inches depth between the shallow (9% water content) and deeper (12% water content) root zones.

So the severe drought stress, brought on by the 9 inch root zones lead to turf death and the appearance of algae during our recovery phase. The exposed soil surface and decomposing plant matter likely fueled this algae bloom. And this may have been exacerbated by heavier dew formation with the approaching fall season, keeping the soil surface moist.

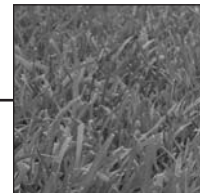
### **Moss**

Also in 2001, we observed some moss on a single plot located in the NE corner of our experimental area. During 2003 and 2004, we saw infestation progress from NE to SW across the entire experimental area, but only within certain plots. Thus, we recorded this occurrence in early October, 2004 as the % area coverage by moss on each of the 36 plots. The values ranged from 0 to 70%

coverage. Analysis of the data revealed that the only significant factor influencing area of moss coverage was root zone depth where the 9 inch root zone averaged 32% moss coverage and the 12 inch root zone averaged 15% moss coverage.

Unfortunately, I don't have a good explanation for this occurrence. Even though we continued to maintain the greens in 2003 and 2004 with regular mowing, fertilization, irrigation, herbicide and fungicide applications; we were not conducting thorough experiments on the plots. Thus I do not have any ancillary data to help explain why moss preferentially occurred on the shallow depth root zones.





## The Case of the Fire and the Frog

*Jim Chatfield and Erik Draper, The Ohio State University Extension*

For almost 15 years now, we have ploughed the fertile fields of flower, foliage, fruit and form features of crabapples, the ornamental *Malus*. We are centered in our Crablandia plots at Secrest Arboretum in Wooster, but also through our roles with the International Ornamental Crabapple Society, we travel further afield throughout the U.S. to the 17 National Crabapple Evaluation Program plots, from Oregon to Pennsylvania. This is the first in a series summarizing a little of what we have learned from this work, focusing on infectious diseases of crabapple. Hopefully it will be of use for those trying to understand the pathologically perverse nature of plant disease.

First things first: remember that to understand infectious plant disease always keep in mind the disease triangle. This simple but crucial concept is that the process of plant disease always involves the interplay of a susceptible host, a virulent pathogen, and an environment conducive to disease. All are needed for disease to occur. Controlling disease involves efforts at modifying components of this triangle. Feel the power of the triangle! Our tale this month is the Case of the Fire and the Frog

In our first years of our evaluations we thought of bacterial fireblight (which causes wilted shoots of browned and blackened leaves) as an insignificant disease at Crablandia. We knew

fireblight was potentially a serious and deadly disease, and there was some present, especially on a little-used crabapple *Malus tschonoskii*. For us, though, fireblight was not important as an evaluation criterion – it just was not all that common or severe in our plot. Then in the year 2000 this changed. We had severe fireblight on a number of taxa, including Golden Raindrops and Sinai Fire. As we puzzled over this we noted that the weather that spring conformed to the classic conditions for development of the blossom blight phase of fireblight: warm (extended periods of time over 62F during bloom) and wet weather.

This encouraged us to think a bit more about the history of fireblight. For example, fireblight was the major reason that the Ohio pear industry was largely wiped out in the early 1900s. First of all, Ohio orchardists were growing pear cultivars with high genetic susceptibility to fireblight – considerably more susceptible to fireblight than many apples and crabapples. Second, in some years, conditions were perfect for the blossom blight phase of fireblight: warm, wet weather during bloom.

Ultimately, fireblight became too much of a burden on Ohio growers compared to growers in the Pacific Northwest. Why the Pacific Northwest? Most pears (and apples) grown in Oregon and Washington are to the east or west of the of mountain ranges.

West of the mountains pear and apple bloom occurs during wet – but cool weather. East of the mountains pear and apple bloom occurs during warm – but dry weather. Warm, wet weather during bloom is less common in these areas than in Ohio. Pear production, and to a lesser extent apple production, moved to the Pacific Northwest for this and other reasons.

This type of environmental component of disease development is critical to understanding infectious plant diseases. This also underscores why it is important to have evaluation plots with different environmental conditions around the country for crabapples – and other plants. That brings us to the close of this primer on pathology. Oh, that's right, where does the frog come into play?

After the fireblight problems of 2000 in Crablandia, Erik Draper, the horticulturist ego of the co-authors of this paper, lobbied constantly for major pruning in Crablandia. His argument was that this is what any normal person would do and furthermore pruning out the old strikes was best for the trees. Jim Chatfield, the pathological alter-ego, lobbied for a more laissez-faire approach of doing nothing, hoping for plentiful bacterial inoculum for the next year, thus assuring the plants would be challenged to show their relative resistance/susceptibility to fireblight. The point counterpointing raged for months, and naturally Chatfield won; doing nothing always being an effective default mode for busy people.

As it often does, neglect proved useful, albeit in this case from our research perspective rather than for the horticultural good of the trees. The next spring, stems with fireblight strikes were intact, now having completely died back. New leaves had emerged on other branches – and curiously, these new leaves on stems next to the dead stems were peppered with many, many lesions from frog-eye leafspot. Frog-eye leaf spot is caused by the fungus

*Botryosphaeria obtusa*, with symptoms of lobed leaf lesions of dead brown areas surrounded by purple rims – resembling frog eyes, supposedly.

This very same fungus, though, also causes black rot of apple and crabapple. It has its greatest success infesting declining and dying stem and fruit tissue of the plant. By leaving the old fireblight strikes, we left plenty of declining and dying plant tissue. This tissue was then preferentially colonized by *B. obtusa*. After surviving the winter, during the spring the fungus produced profuse amounts of spores. These spores then infected adjacent leaves, causing frog-eye leaf spot clusters. On those severely fireblighted plants, there was also significantly greater incidence of frog-eye leafspot, resulting in aesthetic problems for the tree. Indirectly, fireblight lead to frog-eye. Pure poetry of plant pathology in practice.



# ★ MEMBER SPOTLIGHT ★

## DAVE WINTER

**Advanced Turf Solutions Inc., Ohio Operations Manager/Sales Representative**



Wanting a career that allowed him the luxury of working outside while still providing a challenge and professionalism, Dave Winter attended The Ohio State University and received his Bachelor of Science degree with a specialty in Turfgrass in 1979. During his time at OSU,

Winter interned at OSU Golf Course as part of the maintenance crew.

Upon graduating, Winter gained a wealth of experience in the turfgrass industry. He went from being Assistant Superintendent at Brookside Golf and Country Club from 1979-1982 to becoming Market Manager for Barefoot Grass Lawn Services Inc. from 1982 to 1989. In 1989, Winter became a Technical Representative for The Scotts Co. and then in 1998 switched to being a Sales Representative for Simplot Partners. He stayed with Simplot Partners until 2003 when he began the Ohio operations of Advanced Turf Solutions Inc.

Advanced Turf Solutions Inc. is an “independent distributor of turf and horticulture products into the professional turf markets,” doing sales between 6-7 million a year in Ohio. Winter explains, “We are responsible for all aspects of servicing and delivering products to our clients in a timely and professional manner. Our Columbus branch services 7 sales representatives including myself all over Ohio, West

Virginia and Western Pennsylvania.” As Operations Manager, Winter manages the Ohio operation and 5 employees, and has a sales territory in Central Ohio. He finds the most challenging aspect of the sales part of his career to be “keeping up with a competitive edge that enables my company to provide a professional and impeccable service returning a profit to the bottom line.” As manager, he finds “keeping employees focused with positive attitudes and managing inventory at appropriate levels to meet customer demands” to be very challenging. Stemming from his biggest managerial challenge, Winter shares his wisdom with newcomers to the field by telling them to keep a positive attitude and be open to change.

With Winter’s extensive experience in the industry, it is no surprise that he began his association with OTF in 1977 as a student at OSU. He believes “OTF represents Professional Turfgrass managers in Ohio as a professional fraternity.” OTF’s role in society helps provide “a resource of continuing education and is a fraternity for Turf Professionals.” In addition to his membership with OTF, Winter also is a member of the Ohio Sports Turf Managers Association (OSTMA) and is the current President of the Ohio Lawn Care Association (OLCA).



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# COMBINING PASSION AND PLAY

## Meet OTF Research Center's New Program Manager:

### MATT WILLIAMS

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In June 2007, OTF/OSU Turfgrass Research & Education Facility welcomed their new Program Coordinator, Matt Williams. Williams began his turfgrass career in the summer of 1996 while majoring in Turfgrass Science with a minor in Plant Pathology at The Ohio State University. He entered the field in the summer of 1998 on the greens staff for Tartan Fields Golf Club and this is when he realized this was the profession for him. He explains, "After working on the greens staff at Tartan Fields for two summers, I realized that it was something that I wanted to do for a career. As a huge sports fan, I then realized that people need to manage the turf at professional sports stadiums." The realization of combining his passion with his play paved the way for William's successful career in turfgrass. He continued getting exposure in the field during the summer and autumn of 2000 while working as an intern at Scioto Reserve Golf and Athletic Club and as student worker at OSU Turfgrass Research & Education Facility.

Upon graduation from OSU in 2001 with a Bachelor of Science in Agriculture, Williams started working as Assistant Field Manager for the Cincinnati Reds. During his time with the Reds, he also worked on selected high-end athletic field construction projects with The Motz Group that included Cinergy Field, Great American Ball Park, Miami University, Ohio State, University of Dayton and Mariemont High School. Williams was Assistant Field Manager for the Cincinnati Reds managing 15 part-time crew members, creating and painting field logos, overseeing all aspects of playing field maintenance, and with no time to spare, he still found time to work with Doug Gallant, Head Groundskeeper for the Cincinnati Reds, and create a turfgrass internship program.

In 2003, Williams became Director of Stadium Grounds for Columbus Crew Stadium. He spent his days designing and implementing agronomic programs for the professional soccer field, two training fields, and 25 acre landscape footprint, finding and negotiating potential department sponsors including equipment, material and maintenance partners, managing athletic and non athletic events including soccer, football, major concerts, and festivals, while supervising all full time and part time employees. His hard work

and dedication to his job did not go unnoticed. He was awarded the *General Manager's Award* and *Outstanding Service Award*, and his greatest achievement to date was being named *Player of the Week* by the Columbus Crew Coaching Staff in 2004.

Williams believes his current position as Program Coordinator for OSU Research & Education Facility is his best job yet. His key responsibilities require all maintenance of the research areas, disease, insect and weed control programs, irrigation maintenance and programming, and assisting faculty and staff with research projects. He also is involved in recruiting and mentoring student workers and overseeing the research facility's annual budget. He sees the most challenging aspect of his career to be the "multiple species of grasses grown on several different soil types and all with different requests from the various research programs that work out of the facility," which includes 30 acres with four University Departments. He comments, "Keeping all of that straight and keeping the researchers happy is the biggest challenge that I face."

Prior to graduating from college, Williams knew the importance of being a member of such associations as OTF. In 2000, he realized the "camaraderie, networking, and helping support the things that OTF funds, like scholarships and research," to be an important factor in succeeding and progressing in his profession. OTF insures our "future of the turfgrass industry both locally and nationally." He broadens his membership to such organizations as OSTMA holding the title as Trustee, CAFES as a member of the Alumni Society Board of Directors, and OSU Alumni Association.

Matt William would like to thank his dad for being a role model in his life, and Doug Gallant for taking "a chance on a new college graduate with little sports turf experience." As Williams continues his time at the OSU Turfgrass Research & Education Facility, he envisions himself in ten years working at a university as a researcher or extension agent.



## Wear Tolerance of Cool Season Sports Field Grasses

*Pamela Sherratt, John Street and Edward McCoy, The Ohio State University*

Close mowing height and wear tolerance are 2 major requirements of most sports turfgrasses. Sports such as golf, lawn bowls, cricket and tennis demand close mowing that only a few grasses can tolerate. Only species of bentgrass, fine fescues and annual bluegrass can survive and produce playing surfaces suitable for sports at very low mowing heights (<0.25 inch). Other sports, such as football, soccer, rugby and lacrosse, do not demand such low mowing heights and turfgrasses with slightly broader textures are used. Perennial ryegrass, Kentucky bluegrass and tall fescues grow well provided the cutting height is not much below 0.75 to 1 inch.

In addition to the tolerance of mowing heights, sports turfgrasses must be tolerant of traffic or wear. There are two types of wear on sports fields: (1) compression through treading and (2) tearing-type wear:

(1) Compression of the turf results from the downward motion of foot traffic. An example of compression traffic would be the movement of 200 marching band members, marching on the same spot. This is the type of motion that causes soil compaction at the surface. The underlying soil particles are pressed together and can ultimately cap off the soil surface, restricting air and water movement into the soil. How quickly the soil becomes compacted depends upon the soil type (e.g. clay loam) and the moisture content

of that soil at the time of compression. Many sports field managers in Ohio have witnessed the complete destruction of a field in just one game if there is rain during the event. Soil compaction will have a negative effect on the turf's ability to recuperate from wear so it must be corrected by the turf manager.

(2) Tearing-type wear is caused by athletes that run, cut, and slide across the turf in a lateral manner. An example of tearing-type wear would be a sliding tackle during a soccer game, where a large chunk of grass, or divot, may fly up. How well a grass responds to the "tearing-type" wear is dependent upon its ability to tolerate compression, scrubbing and tearing (i.e. it's "durability") and once worn, how quickly it can recover from the damage inflicted. For the purpose of this article, we will refer to these two components as traffic "durability" and "recuperative potential."

### Durability

Generally, cool season grasses are ranked for wear resistance (durability) from best to worst as see in Figure 1.

Percent verdure (green leaf tissue) remaining after traffic is usually the preferred method of quantifying durability, but what determines how durable a grass is?

### *Age & Level of Care*

The age of the turfgrass plant is one of the most critical factors in determining how wear tolerant it will be. Slow-establishing species such as Kentucky bluegrass and tall fescue need a full season to establish and mature before sports turf activity takes place. Faster establishing species, such as perennial ryegrass can be “playable” within weeks. Root depth & mass plays a key role in that roots anchor the grass plant into the soil. Maximizing root growth via soil cultivation and proper mowing is therefore important. Certain grasses also have deeper root systems. Undisturbed tall fescue roots for example, can go as deep as 60. The level of care the turf receives also dictates durability. Regular mowing, irrigation and fertilizer input all play a role in maintaining a dense, healthy stand of grass. Much research on wear tolerance and nutrient status has been conducted. Generally, the range of nitrogen (N) for the maximum durability has been suggested at 4 lbs N/1,000 ft<sup>2</sup> per year. Research has also suggested that elevated levels of potassium (K) have no positive effect on cool-season grass’s ability to tolerate wear when soil K levels are adequate.

### *Morphological Traits*

Plant breeders that evaluate turfgrass species have shown that there are various morphological characteristics associated with improved wear tolerance. In summary, plants with better wear tolerance have more upright growth, thicker cell walls, lower shoot moisture content, wide leaf width, and greater shoot/tiller density. In the most recent research, LEAF ANGLE and LEAF MOISTURE CONTENT were seen as two of the major contributing factors.

This leads to an interesting question. Can a turf manager control these two important factors? Best management practices already dictate that “lush” growth can be detrimental to turf durability. To that end, avoiding excessive (lush) shoot growth by keeping nitrogen and irrigation to its lowest possible level needed to sustain moderate growth is critical. Also, avoiding excessively close mowing that promotes a more horizontal leaf orientation while

depleting carbohydrate reserves needed for recovery from wear is important.

As we mentioned previously, no matter what the durability of the turf, the immediate, underlying soil is the key factor to how durable a surface is, so irrigating judiciously and improving fine-textured soils through topdressing is a key factor. Keeping the soil below field capacity prior to games is one way of preventing the quagmire conditions that can occur. Of course during a rain game there isn’t much a turf manager can do but sit it out.

Future research that may come into play (pardon the pun) might be increasing turf density through:

- Higher seeding rates that result in very dense swards may have a greater wear tolerance than those turf areas established at the more traditional rates.
- Increasing the tillering capability with plant growth regulators.
- Shorter mowing heights.
- Using higher density cultivars.

### **Recuperative Potential**

The second part of the wear tolerance story is “recuperative potential.” How well does a grass recover once it has been worn? Generally, cool season grasses are ranked for recuperative potential from best to worst as see in Figure 2.

In text books, recuperative potential is determined by the “spreading” ability of the grass. For example, Kentucky bluegrass spreads by underground stems or rhizomes, while both perennial ryegrass and tall fescue are considered plants that spread by tillers alone (all grasses spread by tillers). Thus, once the grass is worn and bare soil is exposed, Kentucky bluegrass is said to have a better

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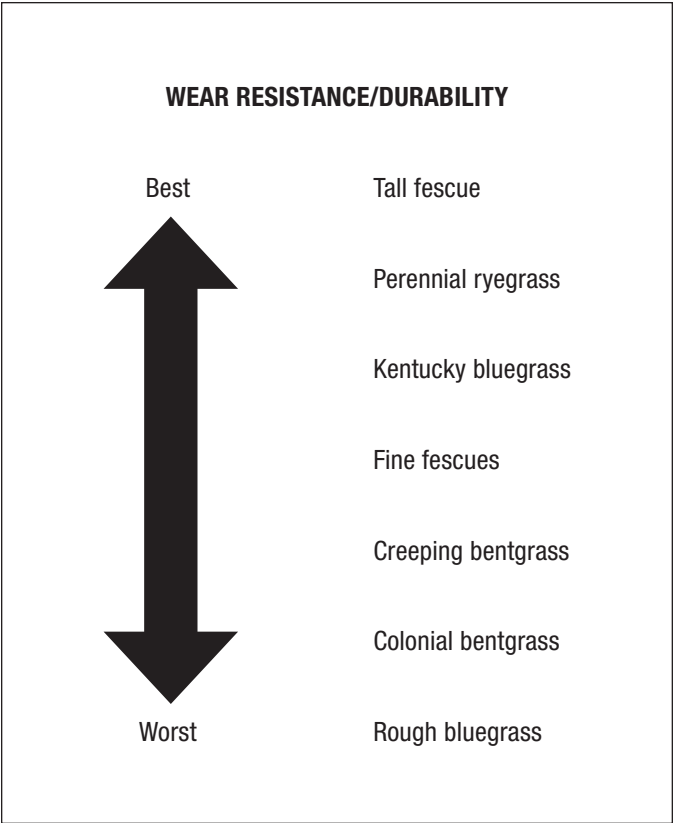


recuperative potential than perennial ryegrass or tall fescue. There are three problems with this assumption:

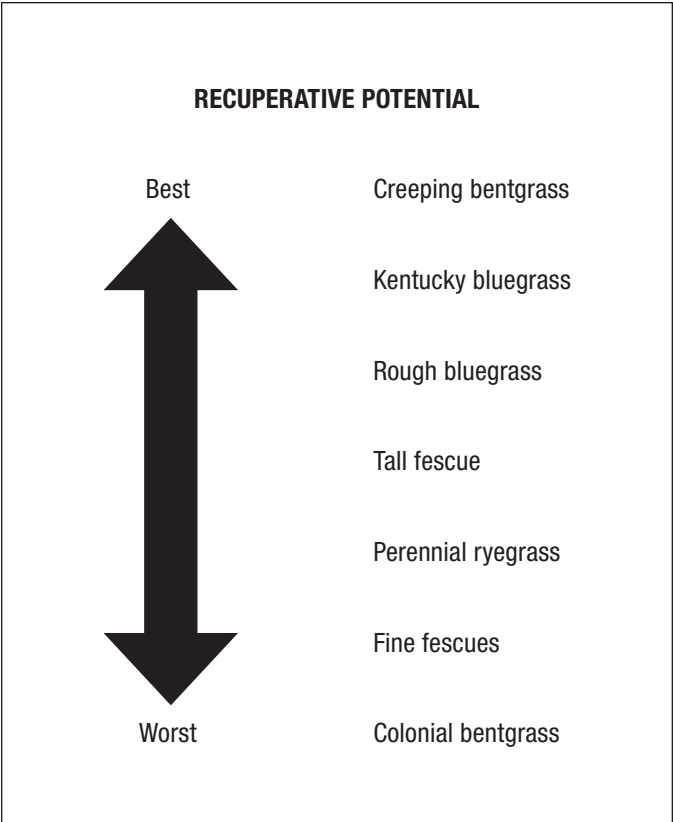
- On athletic fields, the recuperative potential of Kentucky bluegrass can rarely keep up with the amount of wear it receives and so bare spots rarely fill in unless there is adequate time for it to do so. Keep in mind that Kentucky bluegrass is slow to establish and so a baseball-sized hole may take several weeks to fill in, especially on native soil.
- The spreading nature of the rhizomes means that a tight mat forms at the grass-thatch interface. This mat cushions the athlete as they fall and can provide the athlete with good footing. However, during shearing-type wear, there is a tendency for cleats to tear out large sections of turf or divots. On perennial ryegrass turf the cleats tend to slide through the turf without tearing it out, so that even if verdure is lost, the crown (basal growing point) regenerates new leaf tissue.
- In addition to the ability of a grass to spread laterally, the VIGOR of the grass needs to be taken into consideration. Some grasses tiller much more readily and have much better vigor than others. In our research, some of the supposed “bunch” grasses have proven to be equal to, if not better at recuperative potential than some of the Kentucky bluegrass cultivars.

In summary, there is still much to learn about wear tolerance of grasses but the plant breeders are constantly working on better varieties and we are learning more and more about ways to maintain them better.

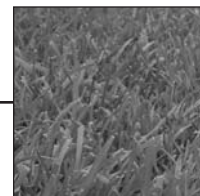
One of the areas that needs better understanding is the immediate, underlying soil and its effect on athletic turf durability and recuperative potential, as it is the author’s belief that it is the most critical factor of them all. The influence of soil infiltration rates, percent moisture during games, and ways to control these limiting factors is something we need to look at more closely.



**Figure 1:** Wear resistance or durability of mature cool-season turfgrasses, ranked best to worst.



**Figure 2:** Recuperative potential of mature cool-season turfgrasses, ranked best to worst.



## 2007 Herbicide Update

*Dave Gardner, The Ohio State University*

For the past few years there has been much activity in research and development of new herbicides for turfgrass managers. The year 2007 is no exception as one new active ingredient has already been released and a second is to be introduced this fall. In addition, an older family of herbicides is likely being taken off the market.

### The Organic Arsenicals

This class of herbicides included DSMA and MSMA, and were used as post-emergence grass controls. They were largely replaced by fenoxaprop (Acclaim®) and quinclorac (Drive® and others). However, MSMA was important because it was the best herbicide for the control of Dallisgrass (*Paspalum dilatatum*), which we are beginning to see more of in Ohio. Because of concerns that these products release arsenic into the environment, the EPA has concluded that they are not eligible for reregistration and it appears likely that these herbicides will no longer be available.

### Pyraflufen ethyl

This herbicide was released this year by SePro under the trade name Octane®. Similar to carfentrazone and sulfentrazone (Quick-silver® and Dismiss®, respectively), pyraflufen ethyl is a protox inhibitor and a fast acting contact herbicide. Like Quicksilver®

and Dismiss® it is intended for use in a tank mix with other herbicides to control perennial broadleaf weeds like dandelion and clover. When used in tank mixes it results in faster burndown of the weed tissue without affecting long term control. One note of caution, however, is that you may want to avoid combining it with a broadleaf herbicide combination that already contains another protox inhibitor, such as Speedzone®, Powerzone®, Q4®, or Echelon®.

Octane can also be used when establishing turfgrass from seed. Consult the label for specifics. Also, this product can be used as a stand alone herbicide against young summer annual broadleaf weeds, such as knotweed, spurge, and black medic.

### Mesotrione Research Update

A new herbicide tentatively scheduled to be introduced by Syngenta this fall under the trade name of Tenacity®, mesotrione has the widest spectrum of activity of any herbicide used in turfgrass. It has been available in agriculture for many years and has a very distinctive mode of action. It inhibits carotenoid pigment synthesis

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and results in a bleaching of the affected tissue which causes the target weed to turn white. Research conducted at Ohio State and other institutions over the past few years suggests that this herbicide will have many uses in turfgrass management, including pre-and post-emergence activity on dandelion, white clover, crabgrass, nimblewill, creeping bentgrass, and orchardgrass.

As a broadleaf herbicide, Tenacity® has good activity against dandelions and fair activity against clover. A unique property of this herbicide is that it benefits from or requires a second application in order to control certain weeds. Otherwise, one application will result in suppression of the weed, followed by regrowth in about 42-56 days. Dandelion is, however, an exception. Research at Ohio State suggests that two applications of mesotrione do not provide significantly better control than one application (See Figure 1). In either case you can expect about 70-85% control. You can increase control by combining Tenacity with another chemistry. Our research indicates that Tenacity® has better activity when combined with either dicamba or the pyridinony herbicides fluroxypyr or triclopyr (See Figure 2). One important note is that our research also suggests that mesotrione does not combine well with either Quicksilver® or Dismiss® for broadleaf weed control.

Tenacity® also has activity on clover. However, this is more of a suppression than control, particularly if only one application is made (See Figure 3). However, when combined with pyridinony herbicides or dicamba, control is improved (See Figure 4). Note that in this figure there is not a statistically difference between Turflon® alone and Turflon+mesotrione. However, this was due to the variability in control with the Turflon® applied alone. The combination consistently resulted in 90% control.

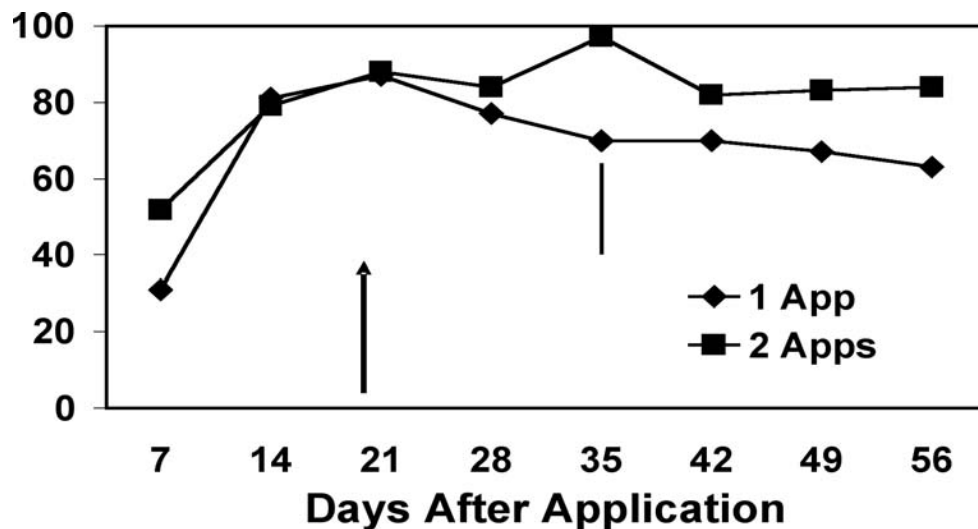
The dandelion and clover control are nice bonuses. What I consider to be the most useful aspect of this product will be its activity on grasses and also its safety to common cool season turfgrasses.

Research conducted at Ohio State suggests that you may achieve 100% control of crabgrass for 160 days when this product is used as a pre-emergence herbicide. However, other researchers have found it a bit less effective than this and you will want to check the label for specifics. In addition, our research suggests that mesotrione's activity on crabgrass when applied post-emergence is at least as good and occasionally better than quinclorac.

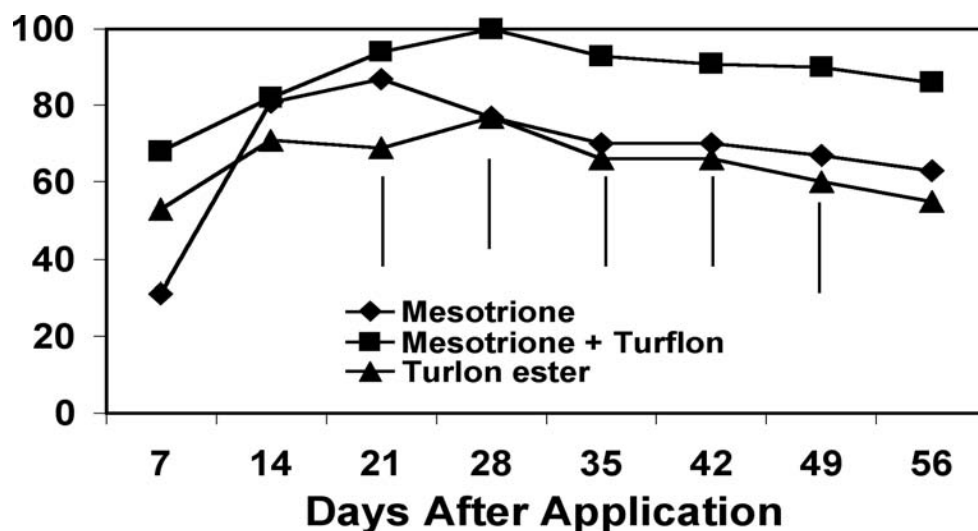
Tenacity® also has activity against a variety of perennial grassy weeds, including nimblewill, orchardgrass (See Figure 5), and creeping bentgrass (growing in Kentucky bluegrass). Multiple applications are required. However, Tenacity® has excellent safety on Kentucky bluegrass and very good safety on ryegrass and tall fescue. When introduced, Tenacity® will be the first turfgrass herbicide that results in rapid, easy to visualize reductions in these perennial grasses.

Finally, Tenacity® has excellent safety on Kentucky bluegrass, perennial ryegrass, and tall fescue. In fact, research conducted at Ohio State shows that Tenacity can be applied at seeding and results in no visible injury beyond 7 days after emergence nor any reduction in establishment rate. Figure 6 shows research conducted this past May. In the untreated controls there is as much as 70% crabgrass, purslane and yellow nutsedge. The Tenacity® plots, however, are 95-99% perennial ryegrass and are weed free. This was the case whether applied as a liquid or as a granular. Siduron, the current industry standard, resulted in about 90-95% ryegrass and 5-10% weeds during this same period.

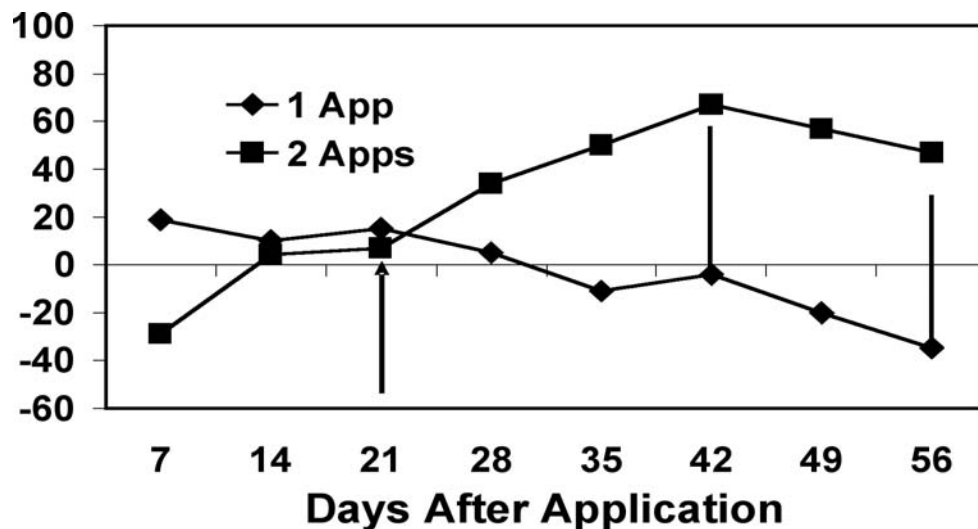
Research with Tenacity® will likely continue for a few more years. However, our results to date suggest that it is likely the most versatile herbicide with the broadest weed spectrum to have been released to the turfgrass market.



**Figure 1:** Dandelion control following 1 or 2 applications of Tenacity in 2006 (second treatment 21 days after first and denoted by the arrow). Two applications occasionally resulted in better control. But this was usually not statistically significant.



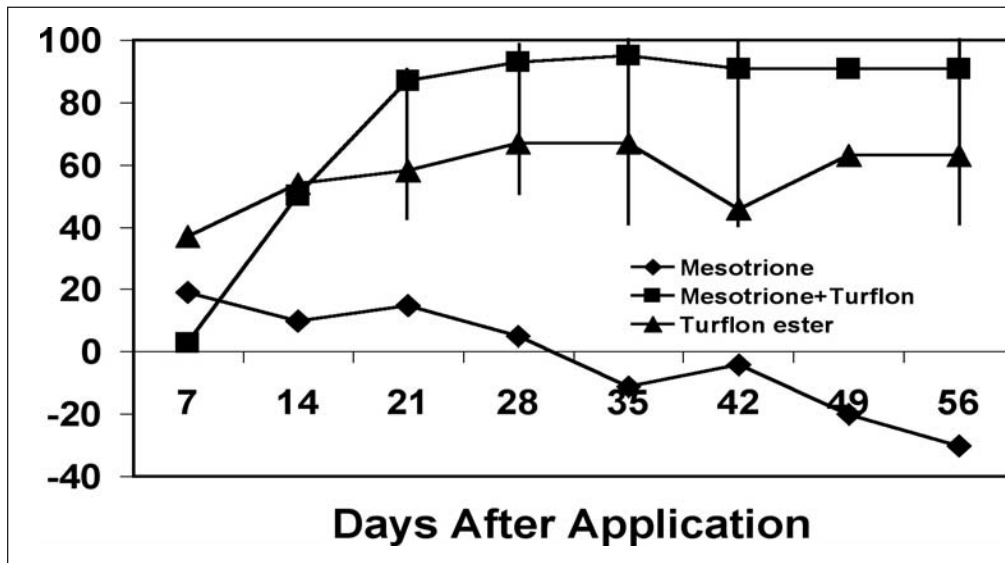
**Figure 2:** Dandelion control following application of mesotrione, turflon ester, or both products combined. Tenacity®, when paired with dicamba or the pyridix-only herbicides, tends to result in better control.



**Figure 3:** Clover control following 1 or 2 applications of mesotrione (Tenacity®) in 2006. Two applications are required in order to achieve fair to good control (second application 21 days after the first and denoted by the arrow).

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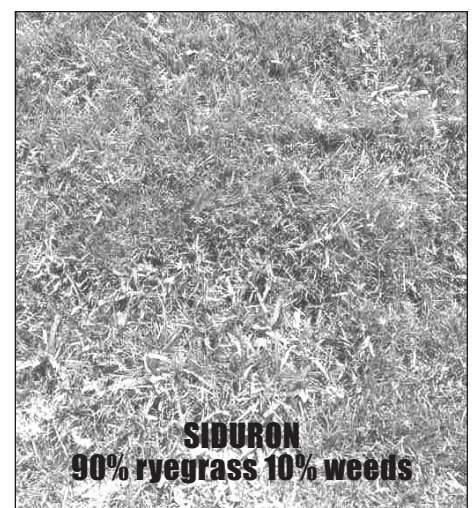
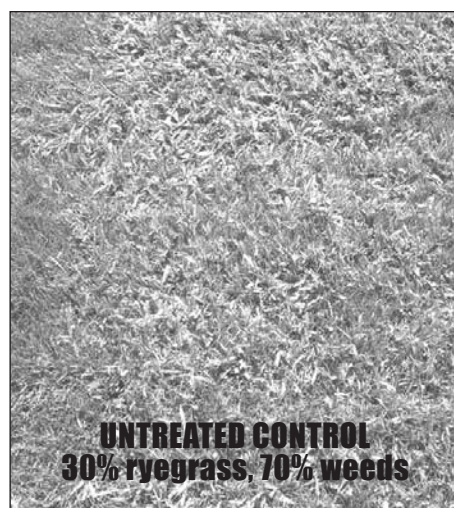
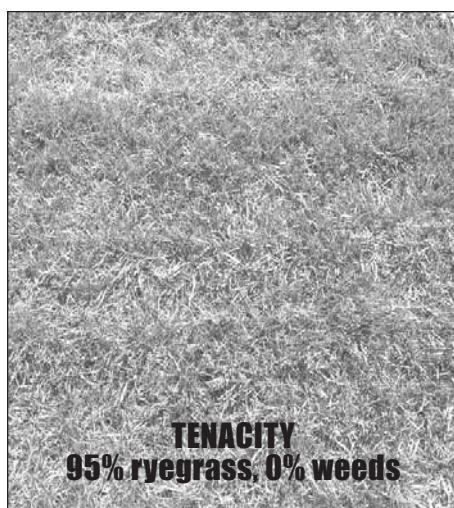




**Figure 4:** Clover control following application of mesotrione (Tenacity®) alone or in combination with turflon. Combining mesotrione with turflon, dicamba, or Spotlight® (fluroxypyr) resulted in more consistent control of clover.



**Figure 5:** Injury to orchardgrass following application of Tenacity®. Herbicidal activity is also observed on nimblewill, creeping bentgrass and nutsedge. Multiple applications are required. However, there is no phytotoxicity to desired cool season turfgrass. This makes Tenacity® one of the first rapidly effective and selective herbicides for the control of certain perennial grassy weeds in turfgrass.



**Figure 6:** Establishment of perennial ryegrass 28 days after application of either Tenacity® or siduron. Herbicides were applied immediately following seeding.



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