

# Highlights

OCTOBER, 2009



## Timing snow mold applications

With many effective products available, both Microdochium patch (pink snow mold) and gray snow mold are relatively easy to control. As long as fungicides are timed correctly, that is.

This can be tricky because you want to apply as late as possible to allow the fungicides to last as long as possible. At the same time, the application has to be made before turf goes dormant and before the ground is covered with snow.

This is a balancing act that requires your judgment and experience. But we'd like to offer a quick tip that can help to confirm your timing decisions.

Take a look at your most recent emailed PACE Turf Weather Alert (see example to right), or for even more current information, go to the member website's Weather page. Scan down the column labeled "Cool GP" (cool season turf growth potential) and look at the last 2 weeks.

- If the numbers are shaded in green, that means that cool season turf is actively growing, and that it's too early to make your snow mold application.
- If the numbers are shaded in red, that means that cool season turf is getting ready to enter dormancy, and that it's possibly too late to obtain optimum performance from your fungicide application

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Microdochium patch spores emerging from sporodochia, as seen under the microscope.

Day	Avg Temp F,C	RH min	Cool GP %	Warm GP %	Stress Index
9/28/2009	65,18	66	95	15	138
9/29/2009	60,16	48	73	7	114
9/30/2009	55,13	55	43	2	115
10/1/2009	51,11	59	24	1	114
10/2/2009	56,13	51	48	3	115
10/3/2009	67,19	84	100	22	164
10/4/2009	68,19	41	98	19	115
10/5/2009	60,16	43	73	7	110
10/6/2009	58,14	42	61	4	120
10/7/2009	63,17	37	88	11	108
10/8/2009	58,14	43	81	4	106
10/9/2009	64,18	57	92	14	126
10/10/2009	58,14	46	81	4	112
10/11/2009	55,13	36	43	2	100
10/12/2009	48,9	41	14	0	94
10/13/2009	55,13	43	43	2	107
10/14/2009	47,8	41	11	0	94
10/15/2009	42,6	53	3	0	102
10/16/2009	42,6	65	3	0	111
10/17/2009	45,7	56	7	0	104
10/18/2009	43,6	70	4	0	115
10/19/2009	46,6	32	9	0	87
10/20/2009	55,13	39	43	2	104
10/21/2009	60,16	48	73	7	116
10/22/2009	64,18	35	92	14	109
10/23/2009	57,14	44	55	4	108
10/24/2009	59,15	90	87	5	165
10/25/2009	57,14	39	55	4	101
10/26/2009	53,12	40	32	1	100

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### Member benefits



corner

**"Hiding in plain sight: frit flies on turf".** Frit flies occasionally cause problems on cool-season turf. In this video, we show you what these secretive little pests look like, and tell you how to manage them.

**"Herbicide use precaution".** Using new formulations of herbicides can be a risky proposition, especially when used on unlabeled turf types. In this video we illustrate the unexpected damage caused by Ronstar Flo (oxadiazon) used on actively growing kikuyugrass and bermudagrass fairways.

**"Fall aeration triggers disease outbreak".** Fall aeration can be essential for maintaining healthy greens because it helps relieve compaction and dilute organic matter. Unfortunately, fall aeration can also sometimes contribute to disease development, as you will see in this video on a rapid blight outbreak.

**"Putting out a biorational nematicide trial".** Ever wondered what goes into putting out a field trial? In real life, it's all about attention to detail, and lots of repetition – important, but not exactly thrilling. However, thanks to the wonders of time-lapse photography, we can reduce two hours of somewhat tedious field work into an entertaining 60 second video. The results of this trial are reported on page 4 of this Highlights.

For a full listing of PACE Turf videos that are available exclusively to members, see the "Index: PACE Turf Videos" on the website at [www.paceturf.org](http://www.paceturf.org).

# Mussels invade irrigation systems



The LP-3000 dry pellet chlorinator is an easy way to chlorinate water for the purpose of controlling mussels. Chlorination also assists in decreasing sludge that forms inside pipes from precipitated iron and manganese.



Zebra and quagga mussel distribution map. Courtesy of the U.S. Geological Survey.

Complaints about plugging of irrigation systems due to the presence of small, freshwater mussels has been growing. In this article, we'll give you some brief background information on these pests, and the most current information on control methods.

There are two main types of problem mussels in golf course irrigation systems. The first, and most famous, is the zebra mussel, *Dreissena polymorpha*. Introduced into the Great Lakes in 1988 (from Eastern Europe), it has since spread to much of the eastern and central U.S., as shown on this map. The zebra mussel ranges from one to two inches across, and many have striped patterns on their shells.

The quagga mussel, *Dreissena bugensis*, is closely related and similar in appearance to the zebra mussel. However, this species, which was introduced into the U.S. only two years ago from the Ukraine, has spread more rapidly, and is now present in the Great Lakes Basin, the Lake Meade, Lake Havasu and Lake Mojave waterways, and many reservoirs in Southern California.

The mussels cause problems when they attach onto hard surfaces within irrigation pipes, eventually reaching high enough numbers to clog pipes, filters and screens.

Many methods for mussel removal have been investigated, including physical removal, biological control and various chemical treatments. At this point, the approach that is most effective and safest for turf involves the use of chlorine in the wet well, at concentrations of 0.5 to 2.5 parts per million (ppm). Use of a pellet chlorinator makes this process a bit safer and easier to implement.

For more information on quagga and zebra mussels, see the U.S. Geological Survey website at: <http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/>.

## Snow mold applications

*continued from page 1*

- If growth potential numbers are shaded in yellow, that means that turf growth is slowing down, and that dormancy is just around the corner. In other words, as Red Riding Hood would say, the time is "just right" for making your snow mold application

Of course, fall is a time where temperatures jump around a great deal, and the growth potentials can go from green to yellow to red in a matter of a few days. For this reason, you'll want to see a con-

sistent run of days in yellow and/or red to trigger your application. A good rule of thumb is that if cool season GP numbers are either yellow or red for 10 of the last 14 days, as in the example on page 1, it is probably time to spray. This is a rough guideline, and should be coupled with your good judgment, of course.



Microdochium patch on *Poa annua*. Symptoms at the time of sampling (top) and 24 hours after incubation (bottom).

# Scalping on bentgrass with Proxy: a "Providence" effect?

Proxy (ethephon) has been a very useful tool for suppression of poa seedheads, especially when used in combination with Primo (trinexapac-ethyl). There are, however, some watch-outs when using this product, as detailed in an article in the June, 2009 edition of Applied Turfgrass Science, "Scalping and creeping bentgrass quality as influenced by ethephon and trinexapac-ethyl" by PH Dernoeden and RL Pigati of the University of Maryland.

The study was conducted on Providence creeping bentgrass, mowed at 0.15 inch (4 mm), at the University of Maryland research facility in College Park, Maryland. Products were applied at standard rates (5 oz/1000 sq ft for Proxy and the equivalent of 0.125 oz/1000 sq ft for Primo Maxx). Key conclusions were:

**SCALPING:** Proxy caused significant scalping on Providence bentgrass. Turf injury was delayed, showing up 6 weeks or more after the first Proxy application. The scalping injury persisted for up to 3 months after the first Proxy application.

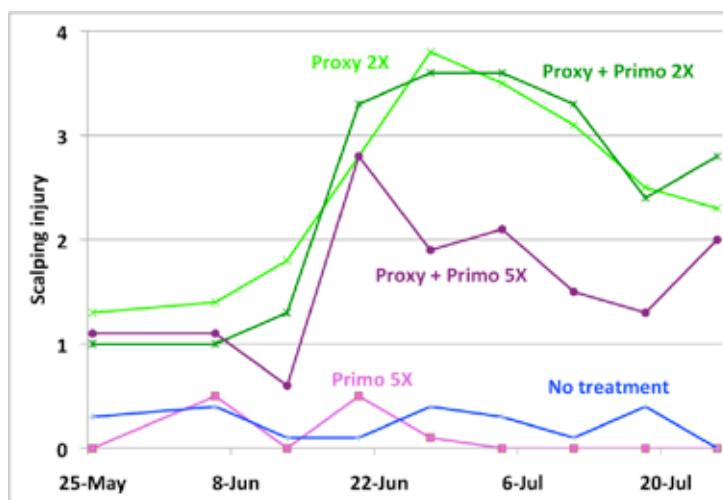
**EFFECT OF PRIMO:** Addition of Primo to the tank caused a slight reduction in scalping injury, but severe injury still occurred.

**EFFECT OF MULTIPLE APPLICATIONS:** The more applications of Proxy plus Primo that were made, the less scalping was observed.

**WILL IT HAPPEN EVERYWHERE?** The authors note that others have observed similar scalping problems with Proxy, but also address the fact that many superintendents and researchers (including us) have used Proxy plus Primo on bentgrass without observing scalping damage. There are several reasons why the scalping problem may be a variable effect, including:

- The variety of bentgrass (in this study, Providence was tested). This is the most likely explanation, and is backed up by observations made by several others.
- The timing of application (in this study, applications were started in April, several weeks later than is typical)
- The frequency of application (in this study, applications were made every 2 weeks, while usually applications are made every 3 to 4 weeks)

**THE BOTTOM LINE:** Though scalping may not be a consistent problem that results from use of Proxy on bentgrass, care should be taken, especially if this product is being tried out for the first time. It is possible that Providence bentgrass is particularly susceptible to this effect. Scalping effects can be mitigated through the addition of Primo to the tank, and through a program that uses multiple applications of this product combination.



2008 results from University of Maryland trial. Scalping damage showed up 6 weeks or more after April applications, but that the turf recovered several weeks later. Scalping has not been a consistent problem with Proxy on bentgrass in other locations, however.

## Watch nitrogen levels



Effect of excessive N on ryegrass overseeded bermuda collar.



Effect of low N on turf. The area on the right was attacked by red thread due to low nitrogen levels in the soil.

As turf growth slows down due to cooler temperatures, the demand for water and nutrients declines as well. To help avoid turf damage due to excessive N, we have developed a handy tool that helps to predict the nitrogen demand for cool-season turf and warm-season turf, based on the current weather at your location.

This information appears at the top of the PACE Turf Weather Alerts that are emailed to you 3 times a week.

To make the best use of the PACE nitrogen demand forecast, keep these points in mind:

- N demand estimates are for the **maximum** amount of elemental N that should be applied during the coming week; you will probably opt for less based on your experience.
- If you have heavy rainfall (more than 5 inches per month), the maximum N rates shown may need to be exceeded. Consider the use of granular, long-chain ureaform-aldehyde nitrogen sources such as Nitroform 38-0-0, (2 - 4 lbs nitrogen/1000 sq ft or more) which is less likely to be leached by rainfall. Re-application should occur based on turf performance and color.



# Preventing Pythium root dysfunction

Pythium root dysfunction (PRD), caused by *Pythium volutum*, is a nasty problem on bentgrass greens, primarily in the southeast. Though the symptoms appear during the summer, the time for control is in the fall, winter and spring months.

Research conducted by Dr. Lane Tredway of North Carolina State University indicates that preventive measures should start in the fall, when soil temperatures stay consistently below 75F (24C). If the disease has caused severe problems in the past, then repeat applications, timed every 21 to 28 days, are usually necessary, as long as soil temperatures stay in the range of 50F (10C) to 75F (24C). For photos and a review of his recent

What if you don't have easy access to soil temperatures? We've found that the threat temperatures that appear on your PACE Turf Weather Alerts can give you a rough approximation, even though they are based on air temperatures. We have evaluated the mathematical relationship between soil temperature and air temperature and found that, in general, threat temperatures (a 5 day running average air temperature) provides a decent estimate of soil temperatures when soil temperatures are between 50 and 90 F. What this means is that:

- Your PACE Turf Weather Updates and current Threat Temperature provide a rough idea of when to trigger preventive applications for pythium root dysfunction. Target a threat temperature of 75F (24C) to trigger fungicide applications.
- If you want more accurate soil temperature measurements at your site, consider installation of soil temperature sensors. The Turf Guard and UgMo sensors provide soil temperature, moisture and electrical conductivity.

# Biorationals for nematode control



**Field trial.** Cooperators Troy Mullane (superintendent, Rancho Santa Fe Farms GC) and Dr. Mike McClure (University of Arizona) looking over PACE research plots that had just been treated.

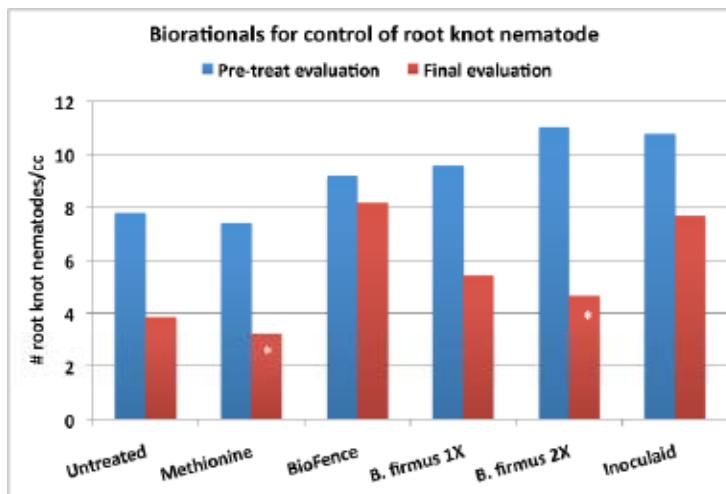


**Root knot nematode damage.** Underside of cup cutter sample from bent/poa green. Galls (or knots) that form on roots interfere with root function. Inset shows enlarged photo of roots with galls.

Nematodes are causing increasing problems on golf course greens, and, with the cancellation of Nemacur (fenamiphos), there are few effective products available for their control. For this reason, we conducted a field study on the efficacy of several different biologically-based biorational materials for control of nematodes – particularly the root knot nematode, *Meloidogyne*. We found that:

- An experimental product based on the beneficial bacterium *Bacillus firmus* had the best results, causing significant reductions in root knot nematodes (RKN) without any phytotoxicity. However, two applications of the material were required.
- The amino acid methionine also caused reductions in RKN, but also caused significant damage to bentgrass at the rate tested
- The other products tested included Biofence, which is based on ground mustard plant tissue) and Inoculaid (a mixture of beneficial bacteria). Neither of these products had an impact on nematode populations

**Bottom line:** *Bacillus firmus*, which has been shown in previous studies to have potential as a nematicidal agent, showed promise in this trial for control of root knot nematode. Further work is needed to confirm this, and to identify optimal use patterns. This product, which is under development at Bayer Environmental Sciences, is not yet available for sale, but if research continues to confirm its promise, we expect to see it made available very soon.



**2009 results.** The treatments that caused the biggest reduction in nematode counts were the amino acid, Methionine and the beneficial bacterium, *Bacillus firmus* (2 applications). Other treatments tested were not effective.