TOPICS COVERED

IN MEMORIAM: Dr. Kent Worthington Kurtz

The world of turfgrass agronomy lost a key contributor, a committed educator and a unique personality on February 18, 2006, when Dr. Kent W. Kurtz, aged 65, died of complications from several heart attacks and from cancer. Dr. Kurtz was a professor emeritus of Ornamental Horticulture at California State Polytechnic University in Pomona, CA for 36 years, and in that capacity mentored several generations of turf managers (an estimated 500 students!) who went on to have successful careers in sports and golf course turf all around the world. He was a productive turfgrass agronomy researcher, a dedicated member of several professional scientific societies, and an important source of guidance in the preparations for countless sporting events that ranged from the Super Bowl to the All Star game, and at locations from stadiums to horse race tracks to golf courses and city parks. He was also a loving husband and father who leaves behind his wife Marilyn, daughter Heather, son Todd, brother Kerry and many, many friends.

DISEASE

Dollar spot prevention

As the weather begins to warm, it is time for everyone with a dollar spot problem to think about an early preventive fungicide application. There is interesting data coming from Dr. Joe Vargas' lab at Michigan State University that shows 100 days control of dollar spot with an early spring application of Bayleton at 1 oz/1000 sq ft. This strategy is similar to summer patch control where we target the early growth stages of the fungus before disease is severe.

This preventive approach has been confirmed through the work of Dr. Mike Boehm, Ohio State University, Dr. Rick Latin, Purdue University, and Dr. Bruce Clarke, Rutgers University. Dr. Clarke has shared some of his preliminary observations with us:

- Fall applications (made BEFORE air temperatures dip below freezing) of dollar spot-active fungicides provide significant delays in onset of the following year's dollar spot epidemics and may reduce annual fungicide inputs.
- Early spring fungicide applications (made before plants are heavily infected) seem to provide delayed onset of disease and reduce the severity of the disease. The end result appears to be improved control and reduced pesticide input.

Based on this information as well as Dr. Vargas' data, if your course has a history of dollar spot, consider preventive spring applications of a low rate of SI (sterol inhibitor) fungicide (Banner Maxx, Bayleton, Eagle) to slow development of the disease. Follow-up applications later in the year will probably still be necessary (they should be made when symptoms first start to appear), but according to the data, you may be able to delay getting on the dollar-spot fungicide treadmill until later in the year due to your late fall or early spring treatments.

Figure 1. Dollar spot on Poa annua.

Figure 2. Compound microscope images of the thick primary hyphae (lower photo) and thin secondary hyphae (upper photo) of the dollar spot fungus, *Sclerotinia homeocarpa.*

Good news on perennial ryegrass and gray leaf spot

Dr. Frank Wong of the University of California, Riverside, has been conducting evaluations of gray leaf spot tolerance among perennial ryegrass varieties, and has some good news to report.

As summarized in the August, 2003 PACE Insights, it has been known since the 1980s that perennial ryegrass is one of the most wimpy turf types when it comes to gray leaf spot. However, there are significant differences among ryegrass varieties in their ability to stave off gray leaf spot attack. For example, The National Turfgrass Evaluation Program's 2000-2003 studies evaluated over 100 perennial ryegrass varieties in three different locations around the country, and identified many varieties that did a better of surviving gray leaf spot.

Dr. Wong's California research shows similar trends, with the variety Paragon performing particularly well (see Figure 3). Although varieties such as Paragon are not completely resistant to gray leaf spot, their tolerance to the disease can play an important role in IPM programs for perennial ryegrass.

Figure 3. Gray leaf spot tolerance of perennial ryegrass varieties PhD and Paragon. Note that Paragon is better able to tolerate gray leaf spot than PhD. Photo courtesy of Frank Wong, UC Riverside.

Springtime = fairy ring prevention time

If you have had fairy ring problems in the past, you will probably have them again this year -- and probably in many of the same spots as last year. Prevention is going to be important in order to avoid the development of the hydrophobic dry spots that this fungus causes. Once hydrophobicity develops, it is very difficult to get rid of.

The fungi that cause fungi ring (over 60 different fungi have been associated with fairy ring symptoms) are most active when average air temperatures are 70F and higher, but prevention needs to begin earlier than that, roughly when the average air temperature at your location reaches 65F. Remember -- the mushrooms formed by fairy ring fungi do not have to be present for turf symptoms to occur.

Products that work very well for prevention and control of fairy ring include Heritage (azoxystrobin) at 0.4 oz/1000 sq ft, Prostar 70 (flutolanil) at 4.5 oz/1000 sq ft or Insignia (pyraclostrobin) at 0.9 oz/1000 sq ft. Products should be lightly watered in (1/10 inch, or about three turns on the heads), but do not water too much, or you risk driving the product down below the thatch and root zone. Addition of a wetting agent (for example, Aqueduct, Brilliance, Cascade Plus, HydroWet, Lesco Flo, Primer Select or TriCure) will help suppress (but will not cure) the dry, hydrophobic rings that the fairy ring fungi cause. Three monthly applications are usually enough to quash the fungi for the season.

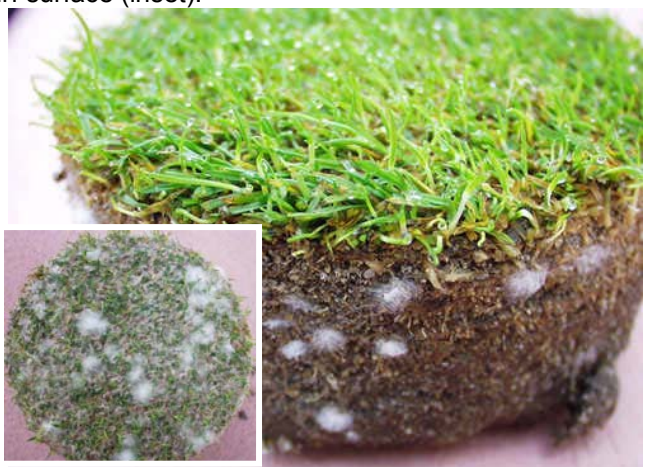
On fairways, many superintendents try to avoid the use of fungicides for fairy ring, but management can be difficult without them. However, the wetting agents listed above can help suppress some of the symptoms.

Non-pesticidal solutions can also be also effective for "Type 2" fairy rings, where turf growth is stimulated causing the formation of dark green rings. In this situation, nitrogen applications can be used to mask the effect of the disease. Low nitrogen soils will benefit from application of 0.5 lb nitrogen/1000 sq ft using ammonium sulfate. The goal is to bring soil nitrogen levels up to about 10 ppm. One or two applications of ammonium sulfate, spaced 2 - 4 weeks apart, will cause turf to green up more uniformly, thus masking the effect of the fairy ring fungus.

Another option that limits fungicide use on fairways is to map current fairy ring infestations, and then spot spray just those areas on a preventive basis in the following years

Are you uncertain whether dry spots are due to fairy ring or some other factor? One quick way to tell is to remove a cup cutter sample from the edge of a dry spot (make sure that you have some healthy turf and some damaged turf in the sample). Moisten the plug and place it into a ziplok bag and seal the bag. Allow it to incubate at least 24 hours. If fairy ring fungi are present, fuzzy white fungal mycelia will develop in the thatch area as in Figure 4.

Figure 4. Fairy ring mycelial growth in the thatch area after 24 hour incubation. Mycelium may also grow on the turf surface (inset).



INSECTS

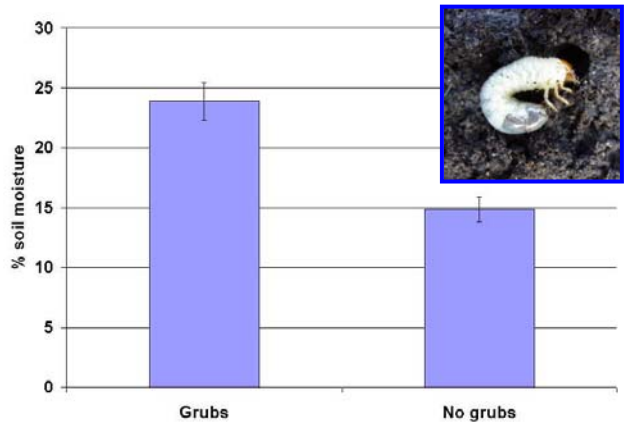
Grub mosaics: art and IPM

Late last year, we initiated a long-term research project on precision turf management. Among our goals was to look at varying levels of soil moisture and their effect on

everything from turf performance, to greens firmness to pest infestations and soil quality.

One of our earliest observations was that white grubs, such as masked chafers appeared to be occurring in areas with the wettest soil, as shown in Figure 5 below.

Figure 5. Relationship between soil moisture and the presence of masked chafer grubs (see inset). Data taken from 95 sample sites on an overseeded rough, Barona Creek Golf Club, CA. Sandy Clark, CGCS.



This observation is backed up in the scientific literature, where researchers over the years have shown that many different scarab beetles (including Japanese beetles and masked chafers) prefer to lay their eggs in moister soil, and that the white grubs that hatch from those eggs also have a better chance of survival in moister soil.

How can this information be used to improve IPM programs? And what does this all have to do with art, anyway?

The answer lies in using GPS (global positioning system) to allow us to see more clearly how much irrigation each area of turf is receiving. In most cases, we find that irrigation distribution and soil moisture are a true mosaic, with varying levels throughout the course. While some areas receive just the right volume of water, other areas are consistently underwatered, while others are overwatered. The resulting image is a pretty mosaic of different soil moisture levels (Figure 6) which, unfortunately, does not tell such a pretty tale.

In Figure 6 below, the overseeded rough is irrigated by as few as three heads in some areas, and by as many as six heads in other areas, depending on the location. Soil moisture levels vary accordingly -- and also dramatically. This is a very typical problem on most golf courses, due to a collision between irrigation system design and golf course design.

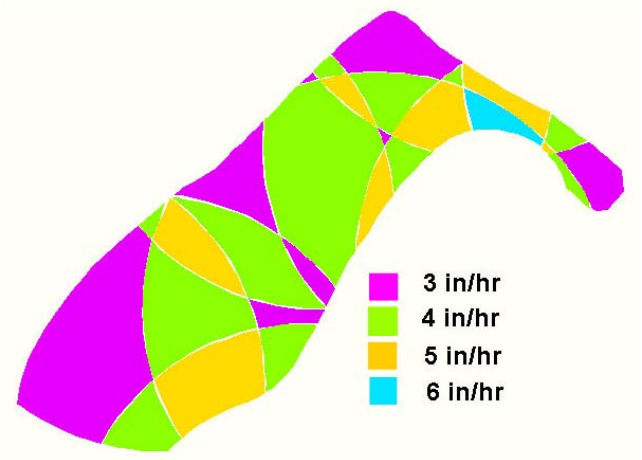
The good news is that once we know where the wettest soils are likely to be, we also know where masked chafers are most likely to be as well. When we sampled the same rough for grub damage, we found that most grubs were clustered in areas that were irrigated by four or more heads.

Armed with a GPS system, or even with a good hand-drawn map, you should therefore always be able to locate the highest risk areas for grub damage on the golf course -- it's the areas irrigated with the greatest number of irrigation heads (or the low spots, or the poorly draining spots). These are the areas that should:

- be scouted before all others for signs of grub damage.
- be considered for preventive spot treatments of insecticides such as Arena, Merit or Mach II
- be targeted for improvement through modification of the irrigation system, drainage or contour

This is just some preliminary data from our precision turf management project. Stay tuned for more data and more practical applications of our results.

Figure 6. Irrigation distribution on an overseeded rough. Note that some areas receive as little as 3 in/hr, while other areas receive up to 6 in/hr. More chafer damage was found in the most heavily irrigated areas. The lack of chafer damage in areas irrigated by 6 heads is probably due to the very small size of this area on the rough.



WEEDS

Post-emergent control of Poa annua

With several effective products available for post-emergent control of Poa annua in cool-season and overseeded turf, it is sometimes difficult to identify which one is best for you. To help streamline your decision-making, use Table 1 below to compare the key features of three of the most effective post-emergent products. Of course, always consult the product label before making your final application plans.

MANAGEMENT PLANNING

Interpreting pesticide label claims

Have you ever scratched your head wondering what in the world is meant when a pesticide label claims that "this product provides suppression, but not control of pest X"? Or that the product "manages" or "reduces damage" from certain pests? Well, it turns out that you are not alone.

Manufacturers have long used different words to describe the effects of their products on pests. In some cases, the

different vocabulary may just represent differences in style. In other cases, though, the words used are important because they indicate lower or higher expectations for control. The problem is, that in the U.S. at least, there are no clear guidelines for using and interpreting these label claims.

The situation is a bit clearer in other countries, including the United Kingdom and Canada. In the U.K., recently revised guidelines indicate that "control" should refer to greater than 80% control of a given pest, while products that produce 40 - 80% control need to be described as providing "partial control" or "reduction in damage". In Canada, regulatory agencies are requiring research trial results showing 60% or greater pest control if the word "control" is used on the label. The word "suppression" is used when control is in the 40-60% range.

Although we don't have official guidelines in the U.S., it is probably safe to assume that when label language deviates from the word "control" and focuses instead on "suppression", "management" or "reduction in damage", it is likely that research results indicate less than optimal control. If you are in doubt, ask the company or distributor representative for efficacy data from independent sources.

Does this mean that you shouldn't use products whose labels suggest less than stellar control? No -- of course not. There are many reasons why you may wish to use one of these products -- perhaps because it is a biocontrol product, or perhaps because it has very good activity against other pests that you deal with. But by reading the label carefully, your expectations will be adjusted as realistically as possible.

Table 1. Comparison of post-emergent poa control options for overseeded fairways. Always consult the most recent copies of product labels prior to application.

	Trimmit	Prograss	Velocity
Active ingredient	**Paclobutrazole**	**Ethofumesate**	**Bispyribac-sodium**
Mode of action	**PGR**	**Benzofurane herbicide**	**Sulfonylurea herbicide**
Height of cut	**All**	**Fairways, roughs**	**Tees, fairways**
Turf varieties	**Almost all (not kikuyu)**	**Most rye, Kentucky blue, bent, fescue, St. Augustine**	**Rye, bent**
Signal word	**Caution**	**Danger/Caution**	**Caution**
Potential injury to active bermuda	**Low**	**High**	**Medium**
Start	**Winter (85% rye cover)**	**When bermuda dormant**	**Air temps 55F-75F**
# applications	**3 monthly**	**2 – 3 monthly**	**Up to 4 every 14 – 21 days**
Do not overseed: wks before/after	**6/2**	**2/2**	**2/10**
Other weeds?	**No**	**Yes: crab, barnyard grass; some broadleaves**	**Yes: broadleaves incl. swinecress**

EVENTS

PACE Honors

In the past few months, PACE's work has been recognized by several different organizations, and we couldn't resist bragging (just a little!)

- PACE, along with cooperators Rick Brandenburg and Fred Yelverton of North Carolina State University and Kai Umeda and David Kopec of the University of Arizona, has been awarded a two year National Research Project grant from the GCSAA. The grant proposal is entitled "Producing an IPM Template to Assist Golf Course Superintendents in Developing Written IPM plans for Golf Courses".
- Larry Stowell has just been appointed as an associate editor of the publication Applied Turfgrass Science.
- Wendy Gelernter has been appointed for a second term as a member of the International Editorial Advisory Board for the journal, Biocontrol Science and Technology.
- Wendy Gelernter will become the next president of the Society for Invertebrate Pathology (SIP) at the organization's annual meetings in Wuhan, China, in August, 2006.

PACE Highlights features turf management information recently covered in PACE's weekly Updates. For more detailed information and electronic links to background materials, visit the PACE Member Edition website at **wwww.paceturf.org.**