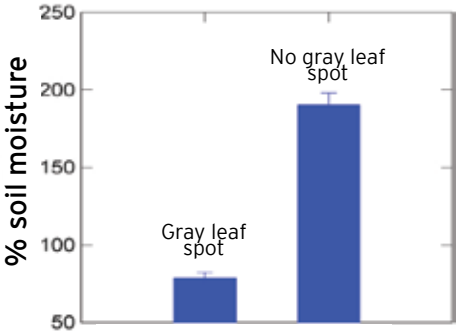
Highlights

NOVEMBER, 2008

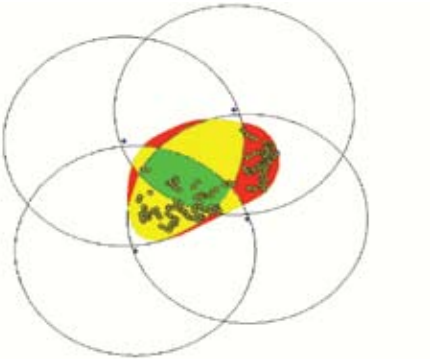
Surprising relationship between disease and moisture

Kikuyugrass in moist soils was not attacked by gray leaf spot (turf at left), while turf in drier soil had GLS.



Gray leaf spot caused more damage in dry soils than in moist soils.

Can you control turf diseases by withholding water? Many people think so. But new research shows why keeping turf dry frequently hurts more than it helps. We first came across this counter-intuitive phenomenon while studying gray leaf spot, a disease caused by the fungus *Magnaporthe grisea*, and the first example that we encountered where dry conditions caused increased disease damage, rather than decreased damage. The two photos above illustrate this trend.



Brown ring patch, caused by *Waitea circinata*, is another example of a disease that causes more trouble when soils are dry.

In trials conducted this spring and summer in conjunction with Dr. Frank Wong (University of California), we mapped the areas on poa greens where brown ring patch occurred (brown dots on map to right). We then mapped the irrigation coverage on the green, and found that there were areas covered by 2 heads (red), 3 heads (yellow) and 4 heads (green). We found that BRP was most common in the dry areas that were irrigated by only 2 heads. In contrast, the disease was much less common in areas irrigated with 3 and 4 heads.

Other researchers have found similar patterns with anthracnose (Bruce Clarke and colleagues from Rutgers University) and Pythium root dysfunction (Lane Tredway and colleagues from North Carolina State).

The bottom line? Monitoring soil moisture is essential for effective disease management (for a detailed procedure, type "measure soil moisture" into the search box on the PACE Turf member web site). Although overly wet soils can also result in increased disease (especially for anthracnose), we now know that it is at least important to pay as much attention to dry areas as wet areas when trying to avoid diseases.

In This Issue:

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PACE TURF

Things are seldom what they seem

This southern California bermudagrass fairway was overseeded with ryegrass in October, and was irrigated with recycled water. Everything looked fine for about 3 weeks, but then rapidly collapsed, as shown to the right. The final diagnosis was a good lesson in the importance of always challenging your initial assumptions.

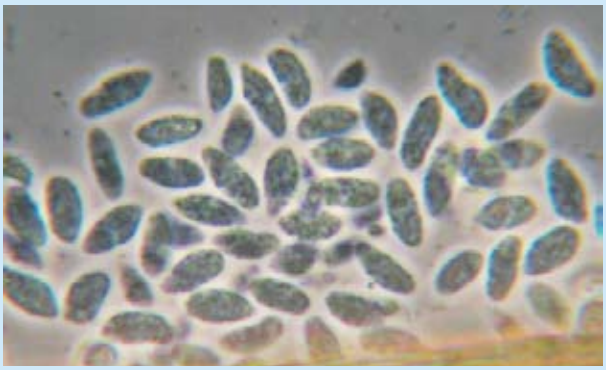
When we visited the golf course, we found severe damage to ryegrass, with soil salts exceeding 9 dS/m (and in particular, soil sodium exceeding 900 ppm) in many locations -- much higher than the 6 dS/m total salts and 110 ppm sodum that ryegrass usually tolerates. So at first, salts seemed to be the culprit.

But when we looked further, we found that some areas had high salts, but no sign of collapse. Further evaluation revealed that there were some irregular patterns to the turf decline. Typically, salt stress is more uniform and does not have irregular patches. So, what else was going on?

The telltale sign that the cause of the problem was not entirely due to salts was that the seed had no trouble germinating. The damage occurred only afterwards, and in patches, a scenario very typical of a seedling disease. When the damaged turf was examined back in the lab, we found that it had been attacked by rapid blight (*Labyrinthula terrestris*), a disease that depends upon high soil salts or high soil sodium. Although soil salts were high everywhere, the damage only occurred where the combination of salts and disease were present.

This is the first time that we have seen rapid blight causing significant fairway damage in California, though it has been a long-time problem on California poa greens (as well as long-time problem on overseeded fairways in many other locations). The California drought has led to higher soil salts than had been observed in previous years, and conditions are therefore perfect for rapid blight.

Newly overseeded ryegrass collapsed about 3 weeks after overseeding. Damage occurred in patches.



Micrograph of the organism responsible for rapid blight, *Labyrinthula terrestris*. The spindle-shaped cells invade the ryegrass leaf tissue.

The only treatment for this type of problem is application pyraclostrobin (Insignia at 0.9 oz/1000 sq ft). To prevent future outbreaks, soil salts must be below 2 dS/m and soil sodium below 110 ppm.

The angle on topdressing sand

Many of you have already embraced light sand topdressing, or "dusting" into your greens management programs for its myriad benefits in pest control, moisture management, thatch control and greens smoothness and firmness. But what kind of sand should be used?

Data recently presented by Dr. John Inguagitao and colleagues at Rutgers University addressed this question in their study on the effect of topdressing sand shape on anthracnose severity. In a two-year project conducted on poa greens, they found that topdressing with sub-angular sand was more effective in preventing anthracnose than topdressing with round sand. But they also showed that topdressing with either sand—either sub-angular or round—was much better than not topdressing at all, with up to 29% reduction in anthracnose severity.

Why does sand help out in the fight against anthracnose, and why is sub-angular sand in particular more effective? The researchers believe that the stress inflicted by low mowing is one of the major causes of anthracnose infestations. The small layer of sand that accumulates with a weekly topdressing program counteracts this stress by effectively raising the height of cut, they reason. And sub-angular sand works better than round sand because it provides a firmer surface, due to the fact that the sharper edges of the sand allow the particles to interlock and thus form a tighter arrangement than round sand can.

So, if you have access to sub-angular sand, it appears to be a better choice than round sand, at least when it comes to anthracnose management. But even round sand is much better than no sand at all. The general recommendation for dusting, or light sand topdressing is to topdress every 1 to 2 weeks during the late spring and summer, when poa is actively growing, using 10 to 50 lbs of a USGA specification sand per 1000 square feet (sands with small percentages of 1.0 mm and larger particles are the best choice). To avoid dulling of mowers, the sand can be irrigated in.

Who's afraid of the big, bad grubs?

The worst time to find white grubs is in the fall, when they are large, hungry, hard to kill and a magnet for digging birds and animals. Luckily, there are several effective tools for getting rid of these "land shrimp".

In the past, hard chemicals such as trichlorfon (Dylox) did a great job of curative control, but these products have been phased out by regulators in most areas. Newer products such as imidacloprid (Merit), thiamethoxam (Meridian), clothianidin (Arena) and chlorantraniliprole (Acelepryn) work best preventively, but recent research indicates that they are useful curatively as well.

Turf researchers at the recent "2008 National Turfgrass Entomology Workshop" in Gainesville, Florida, agreed that all of the new products named above provided decent (80-90%) curative control of white grubs including chafers, Japanese beetles, Oriental beetle, June beetles, Asiatic garden beetle and black turfgrass ataenius. However, the products varied in their speed of control. Arena was the fastest, killing large grubs in 3 to 5 days, while Merit was the slowest, at 10 or more days to achieve control.

The bottom line? It's always best to prevent grubs from occurring in the first place, with applications made in late spring or early summer. However, if you are surprised by grub damage (or damage from animals digging for grubs) in the fall or early spring, any of the new products discussed above —Acelepryn, Arena, Meridian or Merit— will provide good control. You just need to be patient. See the article to the right on watering in and grub control for more information on effective use of these products.

Animals digging for white grubs can cause more damage than the white grubs themselves. This type of damage is most common in the late summer and early fall.

Watering in and grub control

When applying grub-active, systemic products such as clothianidin (Arena), imidacloprid (Merit) or thiamethoxam (Meridian), the label recommendations for watering in are vague.

Most labels provide only general information on the volume of water needed for best results, indicating only that it should be sufficient to reach the thatch. In our experience, we have seen success with about 1/10 inch (0.25 cm), or a few turns on the heads.

On the question of when to water in, there is also minimal guidance on the labels.

To help provide clearer guidelines on this issue, Dr. Chris Williamson of the University of Wisconsin recently conducted research trials that showed that it is possible to wait up **until seven days after application** before irrigation or rainfall, without any decrease in activity.

Evaluation of leaching tactics

Managing soil salts is a challenge wherever rainfall is limited and infrequent. That is why Patty Reedy and Bruce Williams, CGCS at Los Angeles Country Club have taken time to study leaching tactics to refine the process to a science.

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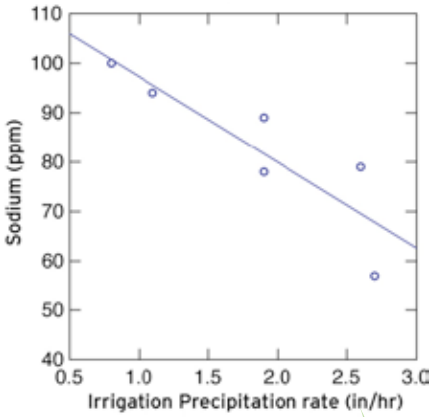
Note how the highest sodium occurred where the least irrigation was delivered



Evaluation of leaching tactics

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In their latest study on LACC's USGA spec, A4 bentgrass greens, they leached test greens for 3.75 hours and generated the following results:

- The reduction in salinity was the same (about 20%), whether the drains were left open during leaching or they were closed during the initial period of the leaching event followed by opening the drain once the root zone was saturated.
- When catch cans were used to evaluate the precipitation rates on different areas of the test greens, they found a range between 0.8 in/hr (20 mm/hr) and 2.7 in/hr (69 mm/hr). Although this range is very wide, we have seen similarly wide ranges in precipitation rates in other locations, as shown in a recent study on irrigation distribution and turf disease. This variability is at least partly due to general problems in irrigation design that result in uneven distribution patterns.
- The more than three-fold range in precipitation rates had a significant effect on the pre-leaching levels of sodium detected in the soil, with the lowest precipitation areas showing the highest sodium levels, as shown in the graph on the right.
- After leaching, the differences in sodium that were a result of differences in precipitation rate had vanished.

Bottom line: Leaching produced the desired effect of not only lowering soil salts in all areas of the green, but of also removing the variability in salt accumulation caused by variable precipitation rates.

Principal investigators: Bruce Williams, CGCS and Patty Reedy, The Los Angeles Country Club, Los Angeles, CA.

The full print version of this report is available to the public on the PACE Turf Super Journal web site (www.paceturf.org)

Caterpillar control gets unexpected help

When doing research trials on black cutworm control about 10 years ago, we were frustrated by the fact that the black cutworm caterpillars kept disappearing before we could count them. And in a seemingly unrelated event, we noticed swarms of yellow jackets (*Vespula*) hovering, at ground level, all around our test plots.

Black cutworm being devoured by a yellow jacket wasp.

We found out that the two observations were actually very much connected, and that the wasps were voraciously feasting upon "our" black cutworms, as shown in the photo to the right. Apparently the yellow jackets, which are known to be predators of other insects, were attracted to the high numbers of cutworms that we had brought to the turf surface with our soap flushes.

Now, Dr. David Held, turf entomologist at Auburn University in Alabama, has observed a similar interaction between paper wasps (*Polistes*) and the fall armyworm caterpillar. Held and colleagues showed that high numbers of fall armyworm larvae led to high numbers of wasps in their test plots. Unfortunately, though, the wasps were ferocious attackers of the armyworm larvae, they did not kill enough of them to provide acceptable control.

So, wasps are not the greatest control strategy for caterpillars, a finding that probably elicited great relief among those of you who do not relish being stung multiple times, all in the name of biocontrol. Wasps are, however, a great indicator that you've got a sizable caterpillar infestation on your hands, and that it's time to examine your greens more closely for signs of feeding damage or by using a soap flush. So, the next time you get complaints about wasps on greens, say a quick "thank you" to them for their early warning that caterpillars may be afoot. And then, give them a good swat if you want.

Keep an eye out for brown patch

In warmer climates, brown patch (caused by the fungus *Rhizoctonia*) can cause serious damage during the winter rainy season. As long as average air temperatures remain above 60F (15.5C), and conditions are rainy or overcast, this disease can strike on bermudagrass, paspalum and kikuyugrass fairways, as well as cool season greens.

If you have a history of wintertime problems with "cool season" brown patch, be prepared to treat at the first signs of yellowing or chlorotic patches. Products that have performed well in university testing include:

- **strobilurin fungicides: azoxystrobin (Heritage), pyraclostrobin (Insignia), trifloxystrobin (Compass), fluoxastrobin (Disarm)**
- **flutolanil (Prostar)**
- **propiconazole (Banner)**
- chlorothalonil (Daconil)/thiophanate-methyl (Cleary's 3336) combinations
- iprodione (Chipco 26GT)
- fludioxonil (Medallion)
- polyoxin-D (Endorse)

Application: Fungicide products should be applied in 1 - 2 gallon of water/1000 sq ft. Use flat fan or air induction nozzles for the best coverage of the foliage. It may take up to three applications of fungicide, made every two weeks, for the infestation to subside.

Watering in: Systemic products (**shown in blue** above) should be lightly watered in. All other products should not be watered in.

Cultural practices: avoid excessive nitrogen in the soil (keep it below 20 ppm total nitrogen) and manage moisture so that overly wet soils are avoided.