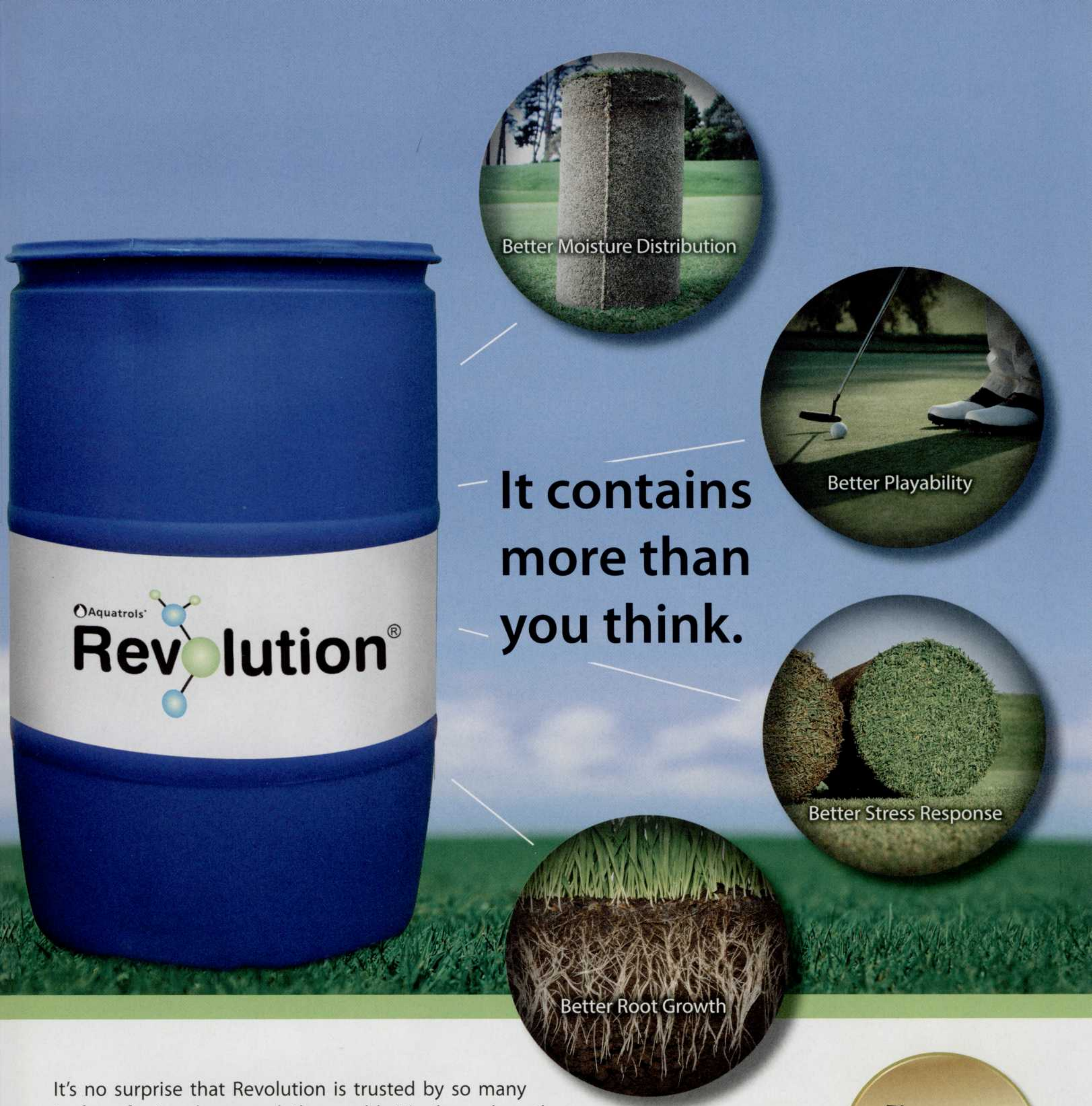

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TURF EXORCISM

BY CARMEN MAGRO

The power of cultural practices compels you! A sound management program is the best strategy to cast out the demon possessing your *Poa* greens – ANTHRACNOSE.

s a golf course superintendent, I battled forms of anthracnose that I believed were the work of the Devil – out to make sure that my turf suffered and to ensure my life was a living hell.

Anthracnose is a common scourge on the minds of many superintendents. As we enter a new spring in the northern hemisphere, there are many things to consider so we can limit the chances of this disease showing up. Note that anthracnose is primarily a disease affecting *Poa annua* and creeping bentgrass – both cool-season grasses – putting greens in particular although incidents of warm-season hosts being affected are being identified. Many genetic enhancements, primarily to creeping bentgrass, have made the turf plant more resistant to anthracnose pressure. However, the facts support a sound management program is the best defense against this disease.

It was early in my career and, like many others, clueless as to how to handle it most effectively since the reports from academia were conflicting, to say the least. Some of us tried every mode-of-action pesticide we could to get a handle on the disease because the reports were saying if you have it, you have to treat it…period. Inheriting a slew of

pesticide technologies, my course hadn't seen the likes of anthracnose due to the residual effects of some very potent pesticides formulated decades ago. All of these I gladly gave up to the EPA amnesty collection program. We had no desire to use outdated or past pesticides that were no longer being made or were proven harmful to the environment. That one decision led to new ailments my turf hadn't seen when environmental stresses heightened early in my career. But with regard to knowing how to handle anthracnose, how things have changed.

Anthracnose basically has two forms. One is the not so lethal foliar form that discolors turf, but can be treated fairly effectively with fungicides labeled for its control. The other, basal rot anthracnose, hollows out all life in the plant down through the crown and at the key junction where lower plant stems meet the crown. If anthracnose has matured to this level in your turf, control is typically not a viable option on the affected plants, and most efforts are more effectively aimed insuring the surrounding turf does not get infected. Since anthracnose attacks *Poa annua* more severely than other common species, particularly on putting greens, many will over-seed with creeping bentgrass or simply perform cultural practices that allow *Poa annua* to establish from its viable seed bank in the soil. If I had a nickel for every course that believed they were making progress through over-seeding efforts where *Poa annua* was primarily coming in… One good thing about *Poa* is you can always expect it to return if you do the right thing to insure it does. Overseeding is typically pretty effective despite the fact that we are not seeding *Poa*.

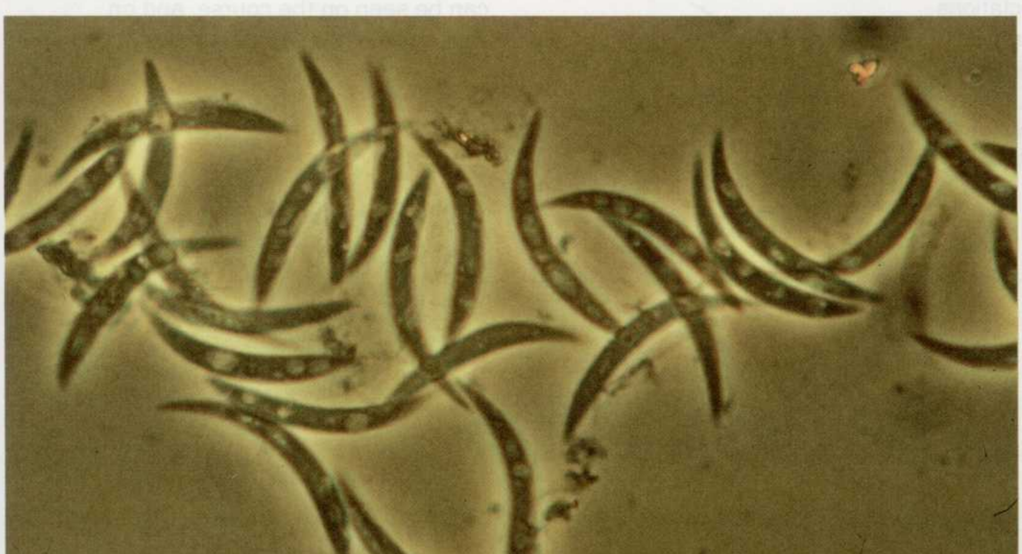
In early turfgrass courses, we learn that a committed program to sound practices beginning with the proper turf species and sound irrigation, cultural and fertilization practices is the best defense against ailing stresses on our turf. Of all the diseases, this statement is not as important as it is with the control of anthracnose. It is controllable through sound practices, especially those affecting the nutritional uptake and movement through the turf plant. In nearly every anthracnose episode, there is some tie to a condition that is limiting the delivery, availability and movement of nutrients into the plant. I've seen again and again how not-so-sound practices affected the movement of water, air and nutrients through the soil, and this almost always leads to increased episodes of disease. At the very least, it always leads to a lack of desired turf performance.

Remember, managing stresses and diseases or any other non-desirable influence on turfgrass performance is simply a checks-and-balances system. If the ailment or stress outweighs the plant's ability to tolerate it, then we will see non-desired results. This will lead to the need for increased pesticide applications, some of which may be very costly as the interval and rates typically increase when we have unexpected outbreaks of disease pressure.

Keeping in mind the needs of the turf and considering those needs to adjust your fertility, irrigation and soil management practices appropriately in a timely manner will in fact greatly reduce your chances of anthracnose.

So how do we limit the need for unexpected pesticide applications? Better yet, how do we improve the performance of our turf and limit the chances for anthracnose showing up? A sound program has never been more important than it is with the control of Anthracnose. This is particularly the case as the spring season progresses. Last year, many experienced anthracnose outbreaks, and the industry rumor was that anthracnose "strains" were getting stronger. That was not the case. As many experienced unusual weather patterns that basically led to early spring growth activity – some areas experiencing spring growth in later winter – the plant's biological clock started earlier than usual. In nearly every situation where the management of the turf did not meet the early growth, there was a void left in the plant, particularly a nutritional void.

Two things should always match the growth of turf. One includes cultural practices like topdressing and irrigation management where we match the organic deposits of turf by diluting with sand (or removing with cultivation alternatives) or replace water that is being removed by plant activity. The other includes nutritional inputs. Turfgrass has an internal clock that does not operate by the calendar. Root growth begins



Colletotrichum graminicola (400X), causal agent of anthracnose diseases.

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when the soil starts to climb just above freezing in the north (about 10 degree F warmer for warm-season grasses), then the need for nutrition exponentially gets greater with each passing day. Since turfgrass is typically grown in high-sand environments – on putting greens in particular – there is not a huge buffer of nutrients waiting to be picked up from the soil. In addition, the roots are not overly extensive early on and therefore do not cover a lot of soil area to pick up necessary nutrients that are present.

Therefore, more damage can be done to both cool- and warm-season grasses early in the growing season than many imagine. This damage can lead to disease issues later on, especially anthracnose (again primarily on cool-season turf), which is just waiting to thrive as soon as the turf is injured in some way (like cultivation practices or poor mowing practices).

While foliar anthracnose typically shows up in summer months, basal rot anthracnose can be found in any season of the year and has even been found to be active underneath snow cover. Much work has been done and proven in recent years to support what we have seen in the field around the world…that anthracnose is directly related to nitrogen and other nutrient availability in the turf, as well as the overall conditioning of the turf. In other words, if your nutritional program is limiting or primarily depending on uptake from soil reserves of key nutrients like nitrogen, or if you have injured turf from dull mowers, mechanical or other physical damages, you could be a prime candidate for an anthracnose outbreak. On the flip side, if you have a nutritional delivery system that meets the day-to-day needs of turf and you have a sound system that insures sharp mowers and limited physical damage to the turf plant, you greatly reduce anthracnose outbreaks.

Basal rot hollows out all life in the plant down through the crown and at the key junction where lower plant stems meet the crown.

Like many diseases, anthracnose thrives in extended moist conditions, particularly those that exceed 10 hours of moisture a day where the canopy remains wet. Insuring that thatch and soil conditions conducive for water control and movement through the profile exists greatly reduces the chances for anthracnose outbreak, as well. So don't skip that cultural practice designed to keep the profile performing well and be mindful of irrigation inputs to insure the water is always targeted to just beneath the root tips.

(**ANTHRACNOSE** *continues on page 94*)

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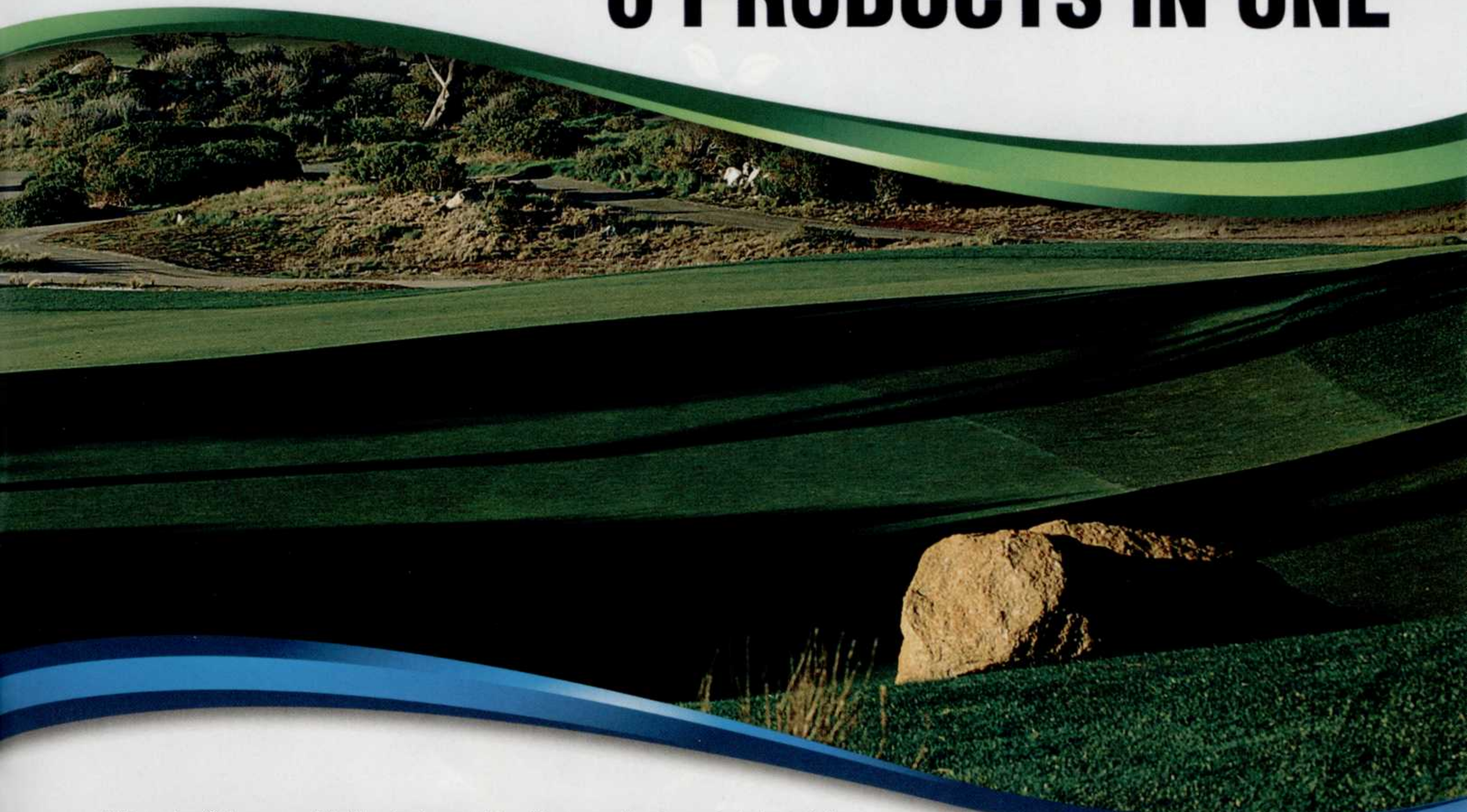

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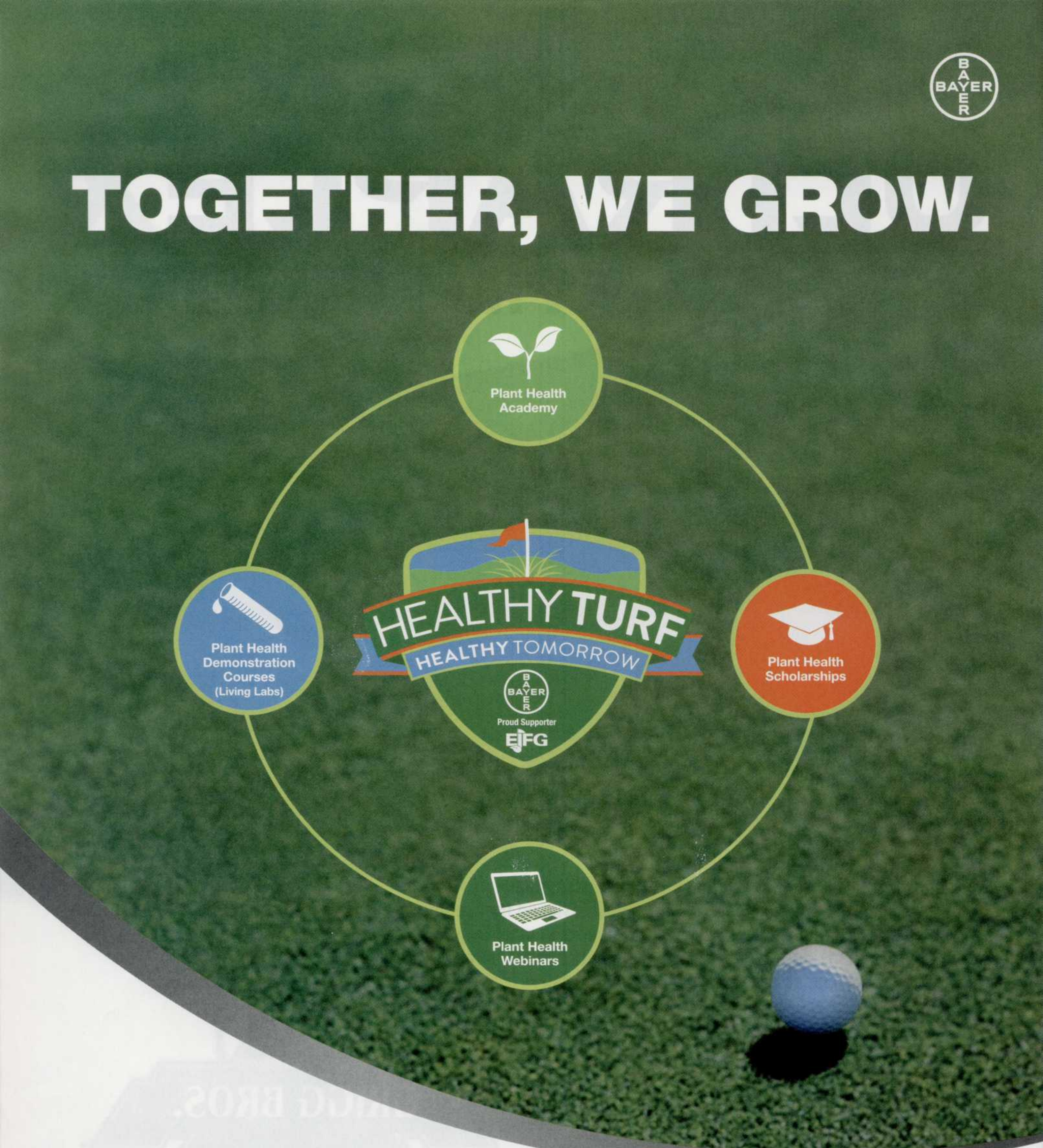
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BY CHRIS HARTWIGER

Made in the shade or mud in the shade?

Sunlight assessment is a key to success with ultradwarf Bermudagrasses.

Trees and turfgrass are like brothers. Give them ample space to grow and they get along just fine. Put them together in a small bedroom and the bigger one is going to dominate. Just like finding a proper distance between brothers is a key to harmony, trees and turf must have adequate space, too. If they are too close together, the trees will out compete turfgrass for growth-related resources like sunlight, water, and nutrients. Spaced appropriately, trees and turf will get along just fine, too. Ultimately, finding the proper distance to allow both trees and turf to flourish is an agronomic challenge on many golf courses.


Planting trees too close to a putting green can result, years later, in levels of shade that hinder turfgrass growth, particularly ultradwarf Bermudagrasses.

In the Southeast Region, most golf courses have identified and corrected shade problems through trial and error. This could be called "after the fact" or "reactive" shade management. It typically works this way. Certain putting greens on a given course develop poor turf quality over a period of years. Shade is identified as a limiting factor. Protests about protecting the trees ensue. The protesters eventually capitulate under the weight of factual evidence and the desire to have acceptable turf quality on the putting greens. Trees are removed, and turf quality on the putting greens improves. All in all, this model has worked well, and today many golf courses have dealt with their shade issues.

The recent trend in the Southeast to replace creeping bentgrass on putting greens with an ultradwarf Bermudagrass does not lend itself to an "after the fact" or "reactive" shade management program because ultradwarfs do not tolerate shade well. A "before the fact" or "proactive" shade management program is desired because officials at courses want to know if their putting greens receive enough sunlight to sustain an ultradwarf Bermudagrass.

This article will help golf courses assess shade levels on their putting greens prior to a conversion from bentgrass to an ultradwarf. Golf courses with an ultradwarf presently will be able to use this information in case there is a need to address existing shade problems. In this article, some basics of plant physiology are reviewed, and important terms that will be used during site assessment are defined. Practical tips for proactively addressing shade will be presented.

HOW PLANTS GROW. Plant growth is a highly complex and ordered process. Plant growth requires energy, and the source of that energy is the sun. Light is the mechanism for energy transfer from the sun to the plant. The term irradiance (radiant energy) refers to the energy received on a specified surface, or, in our case, on the plant's leaf (Beard, 2002). Turfgrass plants receive the sun's energy via tiny particles called photons. The plant converts the radiant energy it receives into chemical energy through the process of photosynthesis.

Turfgrass plants are selective about the type of light (solar radiation) they require for plant growth. They absorb the bulk of their energy in the visible light range (400 to 700 nm) of the electromagnetic spectrum. This range is referred to as photosynthetically active radiation (PAR). Plant pigments such as chlorophyll molecules each have optimum absorption ranges. PAR in the ranges of 400-500 nm (blue light) and 600-700 nm (red light) is the most important for plant growth. PAR in the range of 500-600 nm (green light) is basically inactive for plant growth (Bell, Danneberger, and McMahon, 2000). The human eye detects light best at about 550 nm. Therefore, the light the human eye is good at detecting is the light that has no value for plant growth. For a graphical look at ranges of light absorption for plants, refer to Figure 1.

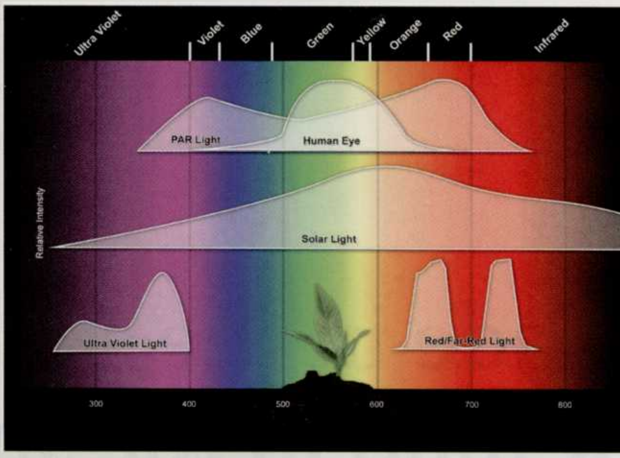

Figure 1: Ranges of light absorption for photosynthesis in plants. Note that the area where visible light for humans is greatest, it is of least value to plants. Therefore, light levels detected by the eye are not a good predictor of light levels used by plants for photosynthesis.

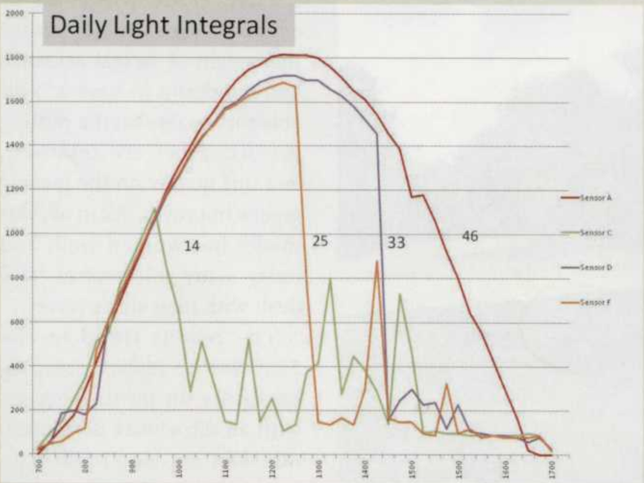

Figure 2: A DLI (daily light integral) is a measure of the total amount of photosynthetically active radiation (PAR) a given area receives in a single day. This graph shows the DLI measure by four different sensors. Note how each DLI curve changes throughout the day, with the highest levels achieved at solar noon. Sharp drop-offs or changes in the curve are caused by shade from trees.

LIGHT QUALITY. Light particles (photons) have different energy levels as determined by their individual wavelengths. Light quality refers to the spectral distribution of light, or the relative number of photons in each portion of the light spectrum (visible and invisible) emitted from a light source.

Outside, the different shade sources have different effects on light quality in terms of plant growth. Shade from clouds and shade cloths in research are considered to be spectrum-neutral. They filter out all wavelengths of light equally. Shade from trees is not spectrum-neutral, and it changes the ratio of blue light to red light, which can affect plant growth. There have been conflicting research data regarding differences to turfgrass growth between deciduous and conifer induced shade, but research on turfgrass at Ohio State University showed no difference in spectrum response between deciduous and coniferous trees (Bell, Danneberger, and McMahon, 2000). This article will not resolve this conflict, so for the purpose of this article, no distinction is made between different types of trees and their impact on light quality.

LIGHT QUANTITY. Given that trees are the most common means of shade on golf courses, the quantity of light becomes the most pressing question. It would be nice if shade could be evaluated strictly in terms of the number of hours of direct sunlight needed, but that would assume that in terms of plant growth, the PAR for one hour of sunlight is constant throughout the day. Practically speaking, this would imply that one hour of sunlight between 7 and 8 a.m. is equivalent to an hour between 12 and 1 p.m. Unfortunately, one hour of direct sun between 7 and 8 a.m. has much less PAR than an hour of sun between 12 and 1 p.m. Therefore, a method