

TENDING Tomorrow's Turf





grass

What will disease management be like in 2025? Insiders offer their views

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PHOTOS BY: MARY CORCORAN (TOP); MIKE KLEMM (FAR LEFT); STUART BUCK

It's as crystal clear a picture as a clean, freshwater stream: The environment will have the biggest impact on how golf course superintendents manage turfgrass disease in the future.

In an evolving industry, superintendents can expect a different market in 15 years compared to the one they're operating in now. Environmental restrictions, product availability and type, water use, disease pressures, resistance and funding will be the main drivers of change.

"We'll be experiencing warmer climates in the United States, which will contribute to water shortages and increased pressure on cool-season turfgrass species," says Tom Rufty, Ph.D., a plant physiologist and distinguished professor of environmental plant biology at North Carolina State University. "Diseases and insects will respond to higher temperatures, so pest pressures will become more volatile."

While climate is an aspect of the environment, regulations and restrictions are a result of it changing. Bruce Clarke, Ph.D., a professor and vice chair in the department of plant biology and pathology at Rutgers' School of Environmental

and Biological Sciences, says there will be a continuation of increased restrictiveness on pesticide use.

"The writing is on the wall if you look at Canada, New York and California," he says. "I doubt you'll have complete bans, but there will be more requirements for documenting why turf managers spray pesticides. You won't be able to apply pesticides just because you want to. Asking people to justify why they're using pesticides [will be] justified."

California and New York, as well as places such as Cape Cod, Mass., and New York's Long Island that have sandy soils and a high potential for leaching, are on the fast track for scrutinizing what superintendents apply to turf. Control of pesticide use will become much tighter.

"Golf is the big, bad guy, but we're educated about chemistries, whereas some in the landscape industry, for example, aren't as aware of those things," says Bryan Barrington, golf course superintendent and general manager at The Golf Club at Oxford Greens in New Haven, Conn. "We'll have more checks and balances throughout the year."

Legislators are under a lot of pressure from the public, which

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reacts to its concerns and what it sees in the media.

“The public isn’t dumb; people just don’t have the time to investigate issues and then make decisions without all the facts,” Clarke says. “Many people seem to have a general mistrust of science, and that’s a shame because sound science should be the basis for making decisions.”

That reaction often results

in piecemeal regulations from town to town. Currently, the landscape industry is having trouble with that scenario.

“When it starts to get out of hand, as it is now in New Jersey with local fertilizer regulations, the state needs to step in to make sense of it,” Clarke says. “It makes more sense to have a state-wide standard.”

If the stricter-regulation trend continues, superin-

tendents’ jobs will be more difficult. To help counter the trend, the Golf Course Superintendents Association of America is researching what and how much inputs superintendents are applying to golf courses. When the research is complete, it will deliver a positive environmental message to the public.

Researchers aren’t entirely sure if there will be fewer pesticide products to choose from in 2025. There were similar thoughts in the 1980s, and the industry ended up using more products. The U.S. Environmental Protection Agency removed the older, more toxic materials from the market. They were replaced by lower-risk products, such as the strobilurins and other materials with lower-use rates.

“Products that have less environmental impact and low-use rates are the keys,” Clarke says. “With fungi-

cides, we’re seeing new broad-spectrum and very targeted products that are less toxic than their predecessors.”

More-targeted pesticides will challenge superintendents. For example, if the products don’t last as long as their predecessors, superintendents will have to know more about the strengths and weaknesses of the products they apply.

“Mercury fungicides killed a lot of turf pathogens and beneficial organisms in the soil, so you didn’t have to be as good a turfgrass manager/diagnostician,” Clarke says about the days when more toxic pesticides were used. “It was a shotgun approach to turf disease management.”

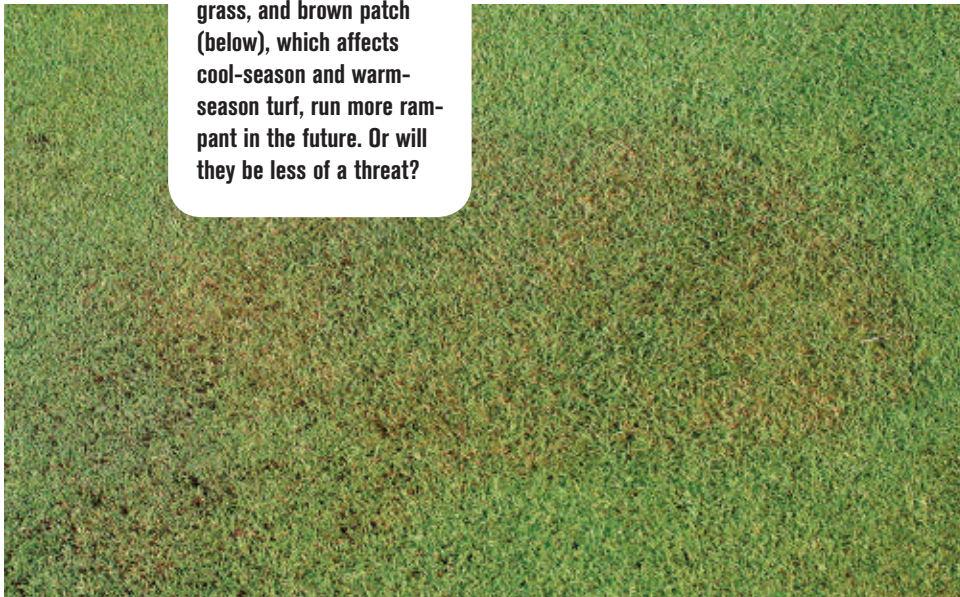
The industry is moving down a path of using fewer contact fungicides and more systemics, says Mike Boehm, Ph.D., professor and chair of the plant pathology department at Ohio State University.

“Broad-spectrum fungicides — going back to mercury compounds — yes, they were great, but they were biocides and, rightfully so, their use was regulated and eliminated,” Boehm says. “Now chlorothalonil and others are being scrutinized.”

The Food Quality Protection Act, economics and the court of public opinion are the three main drivers limiting conventional fungicides, Boehm says. Those three drivers will propel change of pesticide use on turf and new products. Driven by human and animal health, the FQPA,



Will diseases such as spring dead spot (above), which affects bermudagrass, and brown patch (below), which affects cool-season and warm-season turf, run more rampant in the future. Or will they be less of a threat?



which has had an incredible impact on decisions at high levels within chemical companies, has affected the availability and use patterns of pesticides, such as caps on active ingredients that can be sold.

The economic driver forces superintendents to figure out where they need to spend money, and putting greens are their first priority.

“We’ll see more superintendents — for economic reasons, their own environmental philosophies or other market drivers — figure out creative ways to use less product, which starts in the rough,” Boehm says. “They’re already experimenting.”

The water factor

Superintendents can’t apply fungicides without water, which is becoming more important particularly in the Southwest. Hence, the need for greater efficient water use, which can lead to plant stress, which can lead to disease.

But efficiency isn’t the only water-related issue impacting superintendents. A lot of effluent water is being directed for use on golf courses, and that can be a positive, especially in the West. But the problem with effluent use on golf courses, especially on the East Coast, is every time effluent water is used the turf is being fertilized.

“When you do that, you create an unknown situation that can cause susceptibility to pathogens,” Ruffy says. “We’re seeing higher disease pressure on bentgrass greens



“Many people seem to have a general mistrust of science. That’s a shame because sound science should be the basis for making decisions.” **BRUCE CLARKE**

in the Southeast with effluent water use, which increases pest and insect pressures. It’s out of the control of superintendents and is potentially a big deal. Effluent water use can be a positive for the industry because it can play a role in sustainability. But if it’s not handled correctly, it can be a big problem for managing turf. It’s a mixed blessing.”

Greater precision

Amid the talk of environmental concerns regulating pesticide use, the opportuni-

ties to manipulate and tweak management practices to reduce disease severity are tremendous, Clarke says. Superintendents can reduce the need for fungicides to control disease via adjusting cultural practices, such as height of cut, rolling and topdressing.

“They all can help reduce the severity of the disease,” Clarke says. “The general axiom is if you maintain healthy turf, you’ll have less disease, but superintendents are asking for specifics.” (Visit www.turf.rutgers.edu for

more information about best management practices.)

Nonetheless, superintendents will need to work toward greater precision of pesticide applications, which will require a better identification of a problem, Ruffy says. It’s a similar move American farmers have had to make with precision agriculture.

“Superintendents will need to scout better to identify diseases early,” he says. “They’ll localize more applications and soil test more often.”

Price pressures will drive a lot of how superintendents change their approach to disease management, which is always tied to continuing education. Superintendents need to fine-tune their skills to stay current with pest infestations. They need to be more attentive, and skilled labor will be required, but not necessarily in terms of more people, Ruffy says.

Kinder, gentler products

Barrington foresees using fewer but more environmentally friendly fungicides in the future.

“I see chlorothalonil as a hot-button issue,” says Barrington, who uses minimum rates and doesn’t apply more than what’s needed. “We don’t use a lot of products on the hot list, but if chlorothalonil became more restricted, we’d use other products and more nitrogen in spots that are prone to dollar spot.”

Barrington recently
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switched to a reduced-risk insecticide for cutworm and grub control. He applies it once for season-long control where in the past he used a different product three or four times a year. He says more environmentally friendly products like it will hit the market.

Biofungicides could play more of a role as the restrictions on synthetics become more intense. But if current fungicide restrictions remain as is, biofungicides will play a smaller role, Clarke says.

"Biofungicides need to be applied preventively," he says. "But when disease pressure really picks up, they usually don't work that well. Synthetics will still be needed."

Barrington uses biofungicides in rotation with synthetics because he's always looking at more effective and efficient ways to control pathogens.

Here today, gone tomorrow

Researchers aren't sure if old diseases will go away in the future, but using the past 30 years as a guide, new disease will pop up.

Old diseases could become more severe and some less severe. Bentgrass dead spot, for example, is relatively new and came out of nowhere in the late 1990s with greens construction, Clarke says. Now it's not a major problem. Brown ring patch has been around for a while, but has become more apparent of late.

Barrington isn't sure

any disease will go away, citing dollar spot as one that's been around forever. He says there's talk of new strands of pythium in the New York-Connecticut area. Ultimately, he foresees new diseases making their way up the East Coast.

Out West and in other parts of the world, turf managers are planting creeping bentgrass, which is a water hog. As a result, they're ending up with salt-water infusion because of water restrictions.

"We might end up with diseases we didn't know about," Boehm says. "Maybe we'll see less dollar spot."

Can you resist?

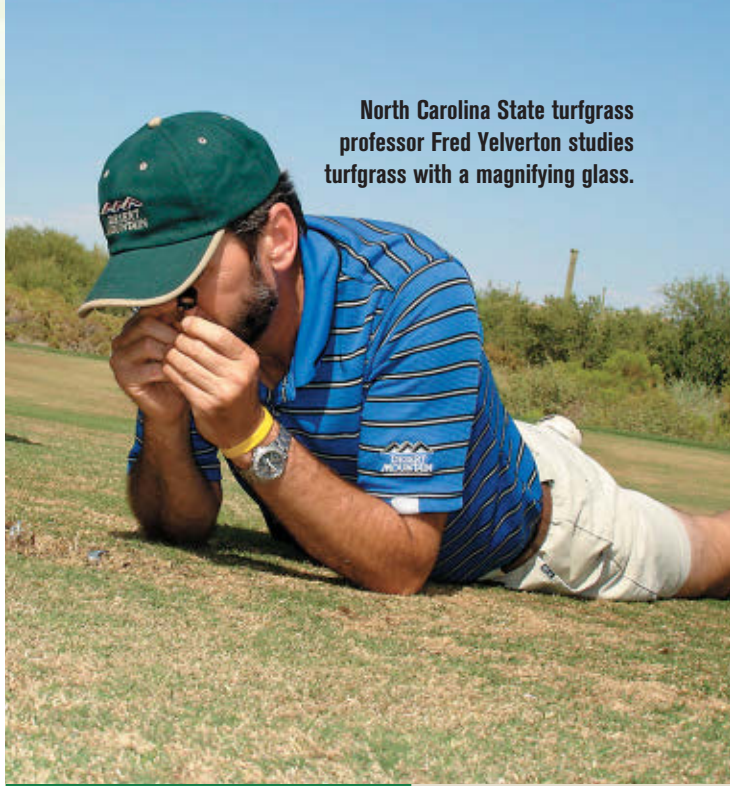
The biggest factor for superintendents in the future will be how to slow fungicide resistance because it's becoming more costly to develop pesticides to combat disease.

"We might lose chemistry to regulation," Clarke says. "If so, resistance will be more of an issue. That will make superintendents think more carefully about timing, rates, tank mixing and program development. Future turfgrass management programs and will require more finesse on the superintendent's part. Continuing education will be critical."

Some superintendents with tight budgets might have to adjust their programs by applying more nitrogen to the plant to combat some of the lower-end diseases, such as anthracnose, Barrington says.

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North Carolina State turfgrass professor Fred Yelverton studies turfgrass with a magnifying glass.



LOOKING FOR SIGNS IN 2025

In 2025, turf disease management on golf courses may change, but some things will remain the same — like looking for signs of disease. In the book, "Integrated Pest Management: Identification and Management of Turfgrass Diseases," the authors say some signs of turf disease are visible to the naked eye while others must be observed with a hand lens or a compound microscope. Examples of signs are:

- **Mycelium** — Mass of fungal vegetative growth often visible to the naked eye.
- **Hyphae** — Individual strands that are the vegetative growth of the fungus.
- **Bulbils** — Hardened masses of fungal tissue that aid in survival during unfavorable conditions.
- **Fruiting bodies** — Spore-bearing structures of the fungi, which are variable in size, shape and type of spores produced.
- **Spores** — Reproductive units, which give rise to new individuals, are generally too small to be of value to the turfgrass manager in disease diagnosis. Plant pathologists use the size, shape, color and other characteristics of spores to aid in disease identification.

About the source: The authors of "Integrated Pest Management: Identification and Management of Turfgrass Diseases" are Barb Corwin, Ned Tisserat and Brad Fresenburg. The book was published by the University of Missouri.



Bryan Barrington believes that more environmentally friendly pesticides will be on the market soon.

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"In 2025, diseases will be easier to combat because of the choices but different because the amount of fungicide allowed to be used will be less," he says.

Boehm agrees that resistance will be a significant issue in the future. He says 50 percent of golf courses in Ohio are resistant to thiofanate-methyl, which came out 50 years ago.

"We're going to have to be better at fungicide resistance," he says. "It comes down to understanding the host (plant) and the pathogen (fungi) and how the fungi interacts with the plant. What are they doing when they're not attacking the plant? Is the pesticide inhibiting the growth and development of

the fungi, or is it protecting the plant? We need to enhance our understanding of these complex interactions moving forward. The more knowledge available, the more strategic we can be.

"The bottom line is that no company will take chemistry and develop new products without an understanding of host/fungal relationship," Boehm adds. "Otherwise, it's a shot in the dark."

Superintendents have relied so heavily on chemical management, they're going through a transition now, Boehm says. From the 1920s to late 1960s, superintendents relied on cultural practices. Then chemistry came along. The diseases that have crept in the past 40 years are a result of superintendents

pushing the turf system, such as lowering the height of cut as low as possible.

"Superintendents are finding there are limits," Boehm adds. "They're back peddling because they can't walk the razor's edge anymore."

Show me the money

Another big problem with disease management in the future is funding for basic research of turfgrass biology.

"If funding isn't available, then university researchers can't answer superintendents' questions, and we'll lose positions and be forced to work on other problems where there's money," Boehm says. "We need a funding source to work on the basics that lead to managing diseases."

Researchers are starting to band together for certain projects. For example, there are 24 researchers from throughout the United States working collaboratively on a new USDA regional grant focusing on dollar spot. A similar approach was recently used to enhance understanding of anthracnose.

"We'll go as a group to the manufacturing companies to ask them to fund the research," Boehm says, adding that millions of dollars are needed for turfgrass-related research. "We'll be accountable. We need to be strategic. This is the kind of change that will drive the future of research." ■

Walsh, a contributing editor for Golfdom, is based in Cleveland.