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CIRCLE NO. 125

Combination Treatments for Fairy Ring Prove Effective

By Mike Fidanza

Wilted or necrotic turfgrass associated with type I fairy ring is the direct result of the basidiomycete fungus colonizing in soil organic matter. Affected areas can become water-repellent, causing severe drought stress and turf injury. Treating the symptoms and the cause is often the best approach.

Fairy ring refers to circles of mushrooms or rapidly growing, lush-green circular bands of grass observed in established turf areas (Couch, 1995; Shantz and Piemeisel, 1917). Fairy ring occurs worldwide in all cultivated turfgrasses and is frequently observed on greens, fairways, tees and roughs (Fidanza et al., 2000). Fairy ring symptoms have been observed in areas where soil pH ranged from about five to eight and is attributed to over 50 species of soil inhabiting basidiomycete or "mushroom" fungi (Couch, 1995; Smiley et al., 1992; Smith et al., 1989; Vargas, 1994; Watschke et al., 1995).

In turfgrass ecosystems, the fungal mycelium primarily colonize the thatch and organic matter components in soil and typically does not directly infect turfgrass roots and shoots. As a result, above ground symptoms in turfgrass

can include dead or wilted or damaged turf, dark, lush-green growing grass or the formation of mushrooms. Fairy ring symptoms in turfgrass are classified into three distinct groups: type I, type II or type III.

Couch (1995) further describes fairy ring as either lectophillic or edaphic. Lectophillic fairy ring refers to symptoms produced by fungi that primarily colonize the thatch and mat, while edaphic fairy rings are attributed to symptoms produced by fungi that primarily inhabit the soil. Both lectophillic and edaphic fairy rings can develop all three symptom types.

Type I fairy ring and localized dry spot

Fairy ring symptoms in turf are often ignored in hopes that they will go away. In many cases, symptoms seem to disappear, but actually they are masked by healthy, vigorously growing turfgrass. On golf courses, fairy ring symptoms can persist and become a visual nuisance. Among all three symptom groups, type I fairy rings are the most destructive in turfgrass and especially on putting greens. Fairy ring fungi decompose organic matter and contribute to organic coatings on sand and soil particles, and mycelium can prevent the movement and root uptake of water

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TABLE 1

Test for soil water repellency from the type I fairy ring site

Location within symptom area ¹	Soil sampling depth				
	0 cm	1 cm	2 cm	3 cm	4 cm
outside area	6.8 b ³	4.2 b	1.0 a	1.0 a	1.0 a
ring area	239.2 a	63.8 a	1.4 a	1.0 a	1.0 a

¹ Soil cores removed from outside the affected ring area and from within the actual ring area.

² Soil water repellency was determined from the water drop penetration test (King, 1981; Kostka et al., 1997). Five soil cores were removed at random from each area on Aug. 2, 2002. Soil cores were allowed to air dry on a laboratory benchtop for two weeks. Afterward, a single drop of water (approximately 35 micrograms per liter) was placed at 0 (thatch/soil interface), 1, 2, 3 and 4 cm increments to determine the amount of time required for the water drop to penetrate into the soil core. Time of < 5 seconds indicates non-water repellent, 5 to 60 seconds is moderate, 60 to 300 seconds is severe, and > 300 seconds indicates extremely water repellent soil.

³ Analysis of variance determined with Statistical Analysis Software (SAS, 1985). Data are means of five replications and means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to Fisher's protected least significant different test.

TABLE 2**Test for soil water repellency from the type I fairy ring site**

Location within symptom area ¹	Soil sampling depth				
	0 cm	1 cm	2 cm	3 cm	4 cm
outside area	46.5 b ³	6.7 a	4.5 a	2.3 a	1.5 a
ring area	155.3 a	19.5 a	9.0 a	4.8 a	3.0 a
inside area	58.2 b	13.3 b	3.5 a	1.5 a	2.5 a

¹ Soil cores removed from outside the affected ring area and from within the actual ring area.

² Soil water repellency was determined from the water drop penetration test (King, 1981; Kostka et al., 1997). Five soil cores were removed at random from each area on Aug. 14, 2002. Soil cores were allowed to air dry on a laboratory benchtop for two weeks. Afterward, a single drop of water (approximately 35 micrograms per liter) was placed at 0 (thatch/soil interface), 1, 2, 3, and 4 cm increments to determine the amount of time required for the water drop to penetrate into the soil core. Time of < 5 seconds indicates nonwater repellent, 5 to 60 seconds is moderate, 60 to 300 seconds is severe, and > 300 seconds indicates extremely water repellent soil.

³ Analysis of variance determined with Statistical Analysis Software (SAS, 1985). Data are means of five replications and means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to Fisher's protected least significant different test.

in soil (Couch, 1995). The result is drought-stressed and wilted turfgrass due to hydrophobic or water-repellent soil.

There is often a misunderstanding between fairy ring and localized dry spot (LDS). While water-repellent soil is a condition associated with type I fairy ring, not every LDS situation is caused by fairy ring fungi. Researchers currently agree that water-repellent soil conditions associated with LDS are most likely attributed to organic coatings on soil particles that have originated from living or decomposing plants and micro-organisms in the soil (Karnok and Tucker, 2002a; Tucker et al., 1990). Course-textured sandy soils may develop water-repellent conditions over time as a result of those organic deposits on the surface of the soil particles (Karnok and Tucker, 2002a). Also, soil water repellency tends to decrease during the winter months but is more noticeable and severe during the summer (Karnok and Tucker, 2002a). Long, hot, dry periods are most conducive to the formation of water-repellent soils (Karnok and Tucker, 2002b), as well as fairy ring symptoms in turf (Fidanza et al., 2000).

Type I fairy ring and recent field observations

How hydrophobic is the soil under turfgrass affected by type I fairy ring? During the recent hot and dry weather in the Mid-Atlantic region during August 2002, type I fairy ring symptoms were observed in a stand of Kentucky bluegrass on a golf course in Wilmington, Del. Wilted

and damaged turfgrass appeared as a large semicircle towards the top of the slope. Soil cores were removed from inside the ring as well as the outside area to determine the water-repellent nature of the soil below. Results from this test site are listed in Table 1. Soil within the ring was severely hydrophobic at the 0 to .39 inches depth as measured by the amount of time required for water to penetrate into the dried soil sample. Soil outside the ring area was not water-repellent at 0 to .39 inches. Hydrophobic soils are typically the most water-repellent at the thatch-soil interface (Kostka et al., 1997). The thatch measured < .2 inches thick at this site. Soil from both the ring and outside areas were not water-repellent at the .78 inches to 1.6 inches depth.

Type I fairy ring symptoms also were observed on a creeping bentgrass putting green on a golf course in southeastern Pennsylvania during August 2002. Again, soil cores were removed to evaluate the level of water repellency that existed at that site. Soil cores were tested from the unaffected inside and outside areas, and from the actual necrotic ring area. Results are listed in Table 2. At the thatch-soil interface, severe water-repellent conditions existed in the ring area, while moderate water-repellent conditions were observed from the inside and outside areas. Soil from the ring was moderately water-repellent down to the 1.2 inches depth, while soil from both inside and outside areas were moderately repellent at only the .39 inches

depth. At this site, creeping bentgrass in the affected rings began to recover shortly after the putting green was aerified, topdressed, overseeded, fertilized and irrigated.

Type I fairy ring and control opportunities

Soil wetting agents can be used effectively in combination with sound cultural practices to alleviate water repellency in soil (Karnok and Tucker, 2002b). If a putting green is affected by LDS caused by something other than fairy ring, the application of a fungicide will not alleviate the water-repellent soil conditions. For example, Karnok and Tucker (2001) described how one soil wetting agent reduced soil water repellency, but a fungicide applied alone at that same test site had no effect on soil hydrophobicity. In that same study, tank-mix combinations of the chemicals were also effective at reducing soil water repellency.

Water-repellent conditions observed with type I fairy ring are the direct cause of wilted or dead turfgrass. The prudent superintendent has

to first alleviate the wilted and drought-stressed turfgrass and rewet the soil. In addition to agronomic inputs to help turf recovery efforts, it is often necessary to use a fungicide targeted toward the basidiomycete fungus. Treating both the symptoms and cause may be the best way to control type I fairy ring in turf.

Fidanza is an assistant professor of horticulture, specializing in turfgrass ecology, at the Berks Campus of the Pennsylvania State University in Reading, Pa.

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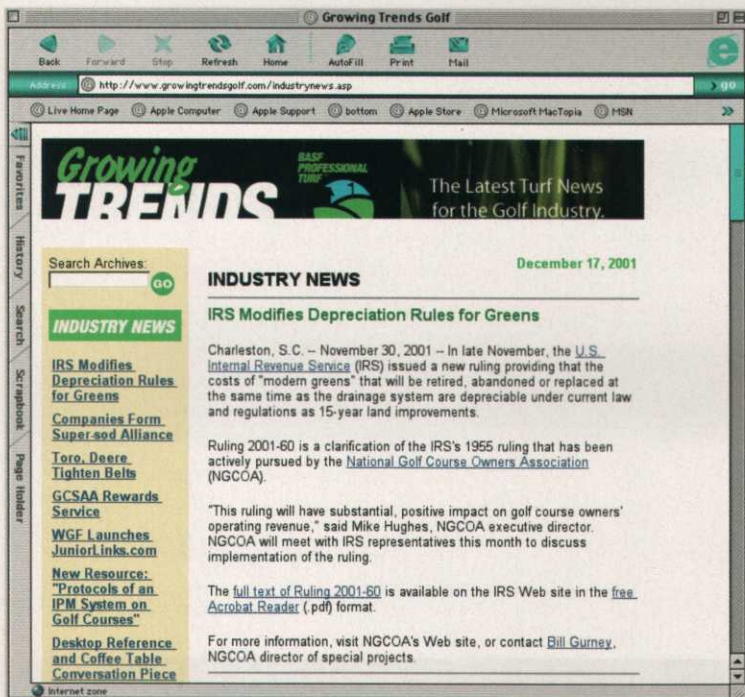
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Keepers of the Green

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Keeping Tradition Alive

Golfdom and Floratine Products team up to honor professionals with a special commitment to mentoring

The tradition of apprenticeship is as old as the profession of greenkeeping itself. It's a time-honored way to share the knowledge gained from decades of experience with a young person who wants to follow in your footsteps. But, in these times of nearly mandatory college degrees and fast-tracks to head superintendent jobs, this tradition seems imperiled. Is mentoring on the endangered species list? Not if we can help it.

Golfdom is extremely proud to introduce the first four winners of the "Keepers of the Green" award, a new program sponsored by Floratine Products. Our winners come from diverse backgrounds and different types of courses around the nation, but they share one thing in common: an extraordinary commitment to identifying and nurturing talented young people with an interest in our business. Their stories are on the following pages.

A few thanks are in order for bringing this all together. First, I want to express our appreciation to Floratine Products and its president, Bill Byrnes. As the financial sponsor of the program, they enabled us to take a nice idea and put some teeth into it. Because of them, the winners enjoyed an expenses-paid trip for two to New York and other goodies. As Byrnes put it, they received a "reward to go with their award." Floratine will also be highlighting the winners in a series of ads you'll see each month in *Golfdom* throughout the rest of the year. This is a remarkable commitment from a remarkable company.

Second, I want to thank our panel of independent judges: Matt Shaffer, Merion GC, Ardmore, Pa., chief judge; Michelle Frazier, certified superintendent, Boston Hills GC, Hudson, Ohio; Willie Lopez, certified superintendent, Landmark GC, Indio, Calif.; and Jim Husting, certified superintendent, Woodbridge (Calif.) G&CC. These individuals, great professionals in their own right, faced the daunting task of reviewing two dozen outstanding candidates and ranking them. Thanks for a job well done.

Finally, I want to personally thank our winners for the wonderful example they provide to everyone in the profession. Because of you, the tradition embodied in the phrase "Keepers of the Green" is alive and well.

— Pat Jones, Publisher

THE 2003 WINNERS

- **Fred Biggers** PAGE 68
Certified superintendent
of Wintergreen (Va.) Resort
- **Brian Darrock** PAGE 70
Superintendent
of Fairbanks Ranch CC in
Rancho Santa Fe, Calif.
- **Kurt Thuemmel** PAGE 72
Certified superintendent
of Walnut Hills CC
in East Lansing, Mich.
- **Mike Wooten** PAGE 74
Certified superintendent
of Cedar Ridge CC
in Broken Arrow, Okla.

He Teaches People to Treat Others with Respect

BY MARK LESLIE

Team building, along with advanced detailed planning of course maintenance, are keystones to the learning curve for assistants working for Fred Biggers, the certified superintendent at 45-hole Wintergreen (Va.) Resort.

But some of his former pupils, more than a dozen who are head superintendents at their own courses now, would say that caring for employees as people more than workers is a subject of crucial significance that they learned from working with the 24-year veteran.

"Whenever I spoke with Fred, he always asked about my family, my children and me," says David Smallridge, certified superintendent of Sourwood Forest GC in Snow Camp, N.C. "This is where Fred holds my greatest respect."

"He made you feel as if you were an integral player," says Jim Matthews, superintendent of Greenville (S.C.) CC's Chanticleer Course, where he worked for Biggers. "He taught me to treat everyone as an individual and with respect, and to try to bring out the best from within each person, whether [that person] is an assistant superintendent or on the crew."

Because of his influence, Biggers is a recipient of *Golfdom's* Keepers of the Green Award, sponsored by Floratine Products, for being one of the nation's best superintendents/mentors. He was nominated for the award by Bill Appel, president of Growth Enhancer, a Floratine distributor in Roanoke, Va.

Biggers says he wants employees who have integrity and a positive attitude, and who are friendly and respect their co-workers. "Employees are all valuable people, and if you are not treating them like that, you are not doing your profession justice," he says.

At the same time, Matthews, Smallridge and the others who worked with Biggers at the 36-hole Greenville CC from 1988 to

April 1999 or at Wintergreen Resort since then have received a master tutorial in the management end of golf course maintenance.

"A lot of guys get out of school, and they think they know everything they need to know," says Biggers, a Clemson University graduate who has served as president of the Carolinas GCSA and South Carolina Turfgrass Foundation, and as vice president of the Virginia Turfgrass Foundation since 2001. "They learn they know a little bit and that it's totally different when the rubber meets the road. They realize they are the ones who have to drive the backhoes out there, dig up the leaks and fix them."

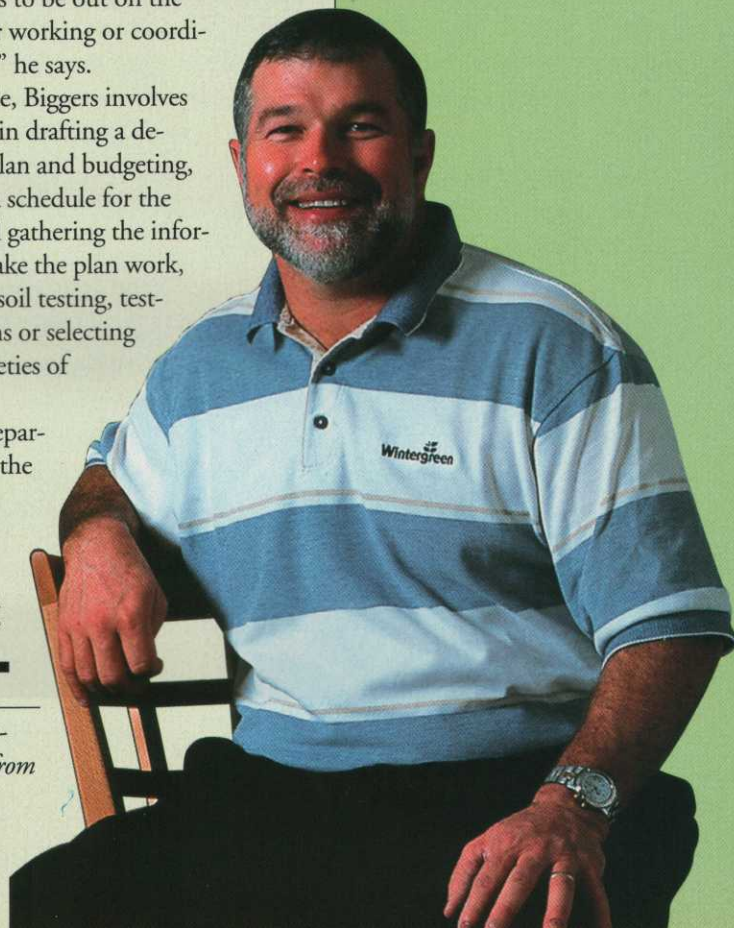
Since his current and previous jobs were at multiple-course facilities, Biggers has found himself in a position to mentor others. What does he teach? Work ethic, organization and planning. "I want my superintendents to be out on the course, either working or coordinating work," he says.

Meanwhile, Biggers involves his assistants in drafting a detailed work plan and budgeting, establishing a schedule for the next year and gathering the information to make the plan work, whether it is soil testing, testing the roughs or selecting different varieties of grass to use.

"We're preparing them for the job they will have to do when they get their own golf courses," Biggers says. ■

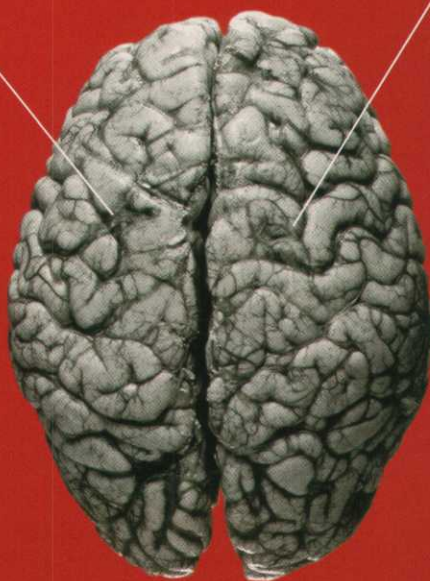
Leslie is a freelance writer from Monmouth, Maine.

Fred Biggers
Certified superintendent
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Focused on Educating The Next Generation

BY FRANK H. ANDORKA JR., Managing Editor

One of the first things you hear when you talk to people about Brian Darrock is his commitment to education for himself and for those who work for him.

"Brian likes teaching," says David Kovack, sales representative for the Floratine Products Group of Southwest Turf Management, an independent distributor located in Palm Desert, Calif. "Brian feels it's his duty to train and supervise his assistants and interns so they can go on to bigger and better positions."

"He's a good, solid neighbor," says Mike Hathaway, certified superintendent and director of operations at The Bridges at Rancho Santa Fe (Calif.) GC. "He's the first to be there with ideas and gives freely of his time whenever a colleague needs help.

For his commitment to education and to helping his colleagues, Darrock is a recipient of *Golfdom's* Keepers of the Green Award, sponsored by Floratine Products, for being one of the nation's best superintendents/mentors.

Darrock, superintendent of Fairbanks Ranch CC in Rancho Santa Fe, Calif., likes education so much that he spent two years teaching classes at the San Diego Golf Academy to future golf professionals to help them better understand what superintendents do for a living. In fact, he would still be doing it today if the academy hadn't moved its headquarters farther from Fairbanks, which made it impossible for him to keep teaching. Darrock already commutes one hour daily from Murrieta, Calif., to his course, and he decided he couldn't continue to teach because it would add to the time he spends away from his wife and three children.

"It was a good experience for me and — hopefully — for my students as well," Darrock says. "Older golf professionals always thought of superintendents as Carl Spackler from *Caddyshack*. They're becoming more

familiar with what we do, and I was happy to contribute in whatever small way I could to that effort."

"I have to credit my father with raising me to have the attitude that you always want to help other people," Darrock says. "I've always thought that it's my obligation to give back to this industry, and that's what I try to do."

Kovack, who nominated Darrock for the award, says he knew what kind of person Darrock was when the superintendent was the president of the board of directors for the San Diego GCSA and established a benevolent fund to help golf course maintenance employees through difficult times, whether because of injuries or an illnesses. Darrock's commitment to the fund stemmed from his own experience when one of his crew members was injured. Darrock solicited donations from his colleagues to help the employee feed his family.

Brian Sandland, superintendent of Escondido CC in Escondido, Calif., worked for Darrock for six years, the last four as his assistant. He says Darrock was invaluable in helping him advance to his current position.

"I had the pleasure of being Brian's assistant for four years, and it was an experience I wouldn't trade for anything," Sandland says. "I would never have achieved [my current position] without the mentoring I received from him."

Darrock's efforts leave a lasting impression on those who work with him, even if it's only for a short time. Just ask Thad Kintigh, superintendent of the PGA of Southern California in Calimesa, Calif. Kintigh interned with Darrock in 1993 and credits him with helping him decide to enter the industry.

"I was only there for six months, but Brian opened my eyes to the possibilities of this profession," Kintigh says. "He taught me what separates a great course from a good course. He also makes you feel like you matter to him. ■

Brian Darrock

Superintendent of
Fairbanks Ranch CC
in Rancho Santa Fe, Calif.

