

host resistance and pest suppression by natural enemies.

The high levels of parasitism observed in the more susceptible paspalums, in addition to earlier observations of significant predation, suggest potential candidates for conservation biological control efforts that target the specific parasitoids and predators that occur in abundance in these grasses.

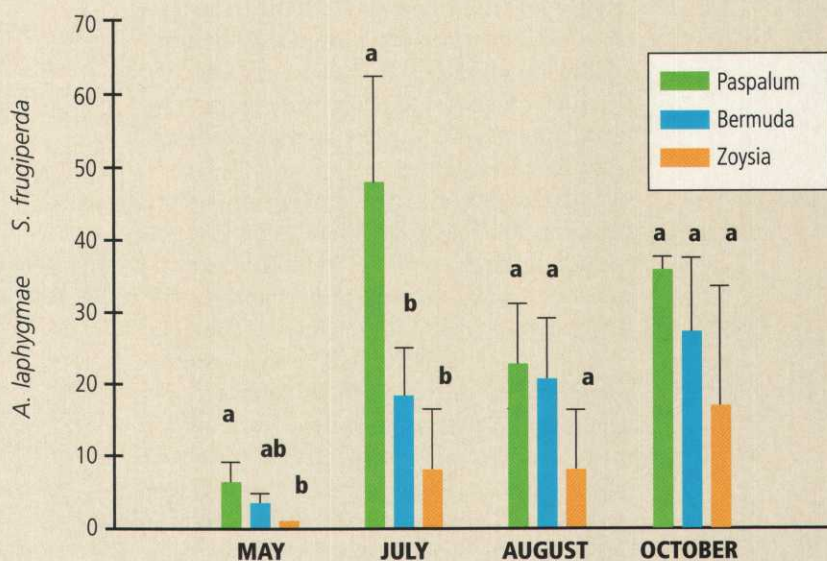
Chemical control

The effect of insecticides on pests also varies with turf types and resistance status in ways that may enhance the activity of the pesticide. The residual activity of six concentrations of chlorpyrifos (Chlorpyrifos Pro 2), spinosad (Conserve), and halofenozide (Mach 2) on fall armyworm, as mediated by five different turfgrass cultivars expressing varying levels of resistance, was evaluated in greenhouse trials.

Similarly, varying concentrations of halofenozide were applied to six turfgrass cultivars in the field and mortality of neonate (newly hatched) and third instar (mid stage) fall armyworms was assessed. Reduced rates of chlorpyrifos resulted in lower fall armyworm survival on resistant zoysiagrass cultivars relative to that on bermuda or paspalum.

In a separate trial, survival on the same zoysiagrasses following spinosad treatment was equal to or greater than the more susceptible bermuda or paspalum. In another greenhouse trial, reduced rates of halofenozide resulted in lower survival on resistant zoysiagrasses at some concentrations at seven days exposure but not at 14 days compared to more susceptible grasses. In the field, at the full labeled rate, 100-percent mortality was observed regardless of turfgrass cultivar. Larval survival on the most susceptible turf, TifEagle, was higher than that on the remaining turf cultivars at the intermediate rate applied. Larvae exposed to treated turf as third instars displayed a trend toward greater survival at intermediate rates on the two paspalums, Sea Isle 1 and 561-79, while a trend toward lower survival was observed on Palisades

FIGURE 2



and Cavalier zoysiagrasses.

The three insecticides that our lab evaluated have very different modes of action and activity spectrums. Chlorpyrifos is an organophosphate insecticide and an acetylcholinesterase inhibitor involving phosphorylation of the enzyme. It kills by both contact and ingestion. Chlorpyrifos has certainly been one of the most widely used insecticides in turf insect control. As a broad-spectrum insecticide, it can be harmful to natural enemies. As a result of the Food Quality Protection Act review process, it has been removed from use on residential turf, although commercial and production uses are still permitted. Spinosad and halofenozide are alternatives for fall armyworm suppression that have a narrower spectrum of activity and demonstrated improved margin of safety to many beneficial insects. Spinosad is a naturalyte, derived from a soil-dwelling actinomycetes bacteria, *Saccharopolyspora spinosa*. It is a mixture of the two metabolites, spinosyn A and D, produced by the bacteria.

The unique mode of action involves excitation of the insect nervous system by affecting the nicotinic acetylcholine receptors and also affects the GABA (gamma-aminobutyric acid) receptor function. Spinosad acts as a contact

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and stomach poison. Halofenozide is a diacylhydrazine molting accelerator that acts as an agonist of the insect steroidal hormone 20-hydroxyecdysone required for the molting process. Ingestion causes larvae to attempt a premature, lethal molt. It also has some systemic and considerable residual activity.

Factors potentially contributing to the variation in responses that we observed include different modes of action of insecticides, host plant resistance mechanisms, differential foliar consumption rates and insecticide dose in relation to body weight. Development of management guidelines for pest management practitioners in the future must address the complexity of potential interactions and may require case-by-case evaluation. There is no better substitute for building your own Integrated Pest Management data base that draws on individual experience

with turf types that you grow and the pests (and beneficials) common to your area.

S. Kristine Braman (Griffin) is a professor of entomology with the University of Georgia Station. Recent research emphases include the dynamics of pest and beneficial arthropods in managed turf, and damage impact relations among species of mole crickets, white grubs, spittlebugs and fall armyworms and their turfgrass host plants.

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Playing the Right Amount of Golf

The course of tomorrow should be designed to help time-conscious golfers

By Bill Deegan

Lower the time commitment. Or raise the value. That's the conclusion of a study presented at the Golf 20/20 conference last fall at the World Golf Village. The analysis, performed by DYG Inc. and titled "The Time Crunch Convergence," indicates today's society prefers to stay busy, likes variety and wants to derive maximum enjoyment from the time it invests in any activity — including golf.

An interesting report it would seem, especially at a time when the PGA is promoting the game through its "Play Golf America" program and the World Golf Foundation is extending this outreach to small children with its National School Golf Program. Based on the findings of this study, it appears that the real job at hand might be in trying to keep these new players engaged once they've been introduced to the game.

Can the game of golf meet this challenge? Most course management personnel would say that the promotion of faster play has never been greater. Course marshals are out in ever-increasing numbers to cajole, coax or coerce a faster pace from slower players who, in many cases, have paid a substantial amount of money to make their ways around golf courses. These same marshals correctly point out that skill level and the ability to keep things moving are critical variables in the process, and that there are too many people out there on the course today, especially those new golfers, who fall short in both categories.

The real challenge becomes the task of driving these players just hard enough to play at about a four-hour pace, but not so hard that you drive them completely away from the game.

But there other ways, too, and it's time to take a hard look at them. How about if we just make it easier to play a little less golf — give players the opportunity to comfortably play an abbreviated round. You're right; they can do that now by just playing nine, but let's just suppose that nine holes isn't the right amount of golf. Suppose that these time-challenged players would be even happier if they were able to play about three quarters of a round, something that could be accomplished in three hours or less, even at a slow pace.

What if there are enough people out there who think that 12 or 13 holes is the right amount of golf? That can also be done now, but we all know that it's not that easy, especially on a crowded course from a hole that is a good distance from the clubhouse. No matter how careful players are, the play of others will be interrupted as they weave their ways back to the clubhouse.

Now, before all of the purists get in an uproar, let's get one thing straight: Golf is a game of 18 holes. That will not and should not change. Time and tradition has made the number sacrosanct. And we still have that tradition, not to mention a professional structure and a handicap system that involves millions of people. The truth is, regardless of how they came up with the number 18, that's a full round, and it's not about to change.

That said, we still are left facing a golfing



One way to quicken play is to design three sets of six contiguous holes with the first and last holes in each group originating and ending at the clubhouse.

DIGITAL STOCK

population that is growing and evolving. We now know that many of today's golfers expect to play a round within a constrained schedule and thoroughly enjoy the experience while they are out there. How do you do all of that when the pace is slow? There is no single answer, especially for most existing courses, but it's time to inject course design into the process — start building courses with a flow of holes that brings players back to the clubhouse somewhere in the vicinity of the 12th or 13th holes.

A symmetrical approach would result in what could be called the “three-six” golf course — three sets of six contiguous holes with the first and last holes in each group originating and terminating at the clubhouse. This offers either a

12- or 18-hole round or, for that matter, a six-hole option for those after-work players seeking a “little bit of golf” — the quick six. If a nine-hole option is essential, then a 9-3-6 or 9-4-5 layout will achieve much the same end. Obviously, the critical factor is the hole that returns to the clubhouse that offers the “more than nine but less than 18” termination point. With such a layout, if things are moving slowly golfers can easily exit the course at the ninth hole or decide to play the next three or four more holes that will also end the round at the clubhouse.

Who are these short-course players? Let's start with couples, especially time-challenged couples, and those who enjoy playing together but must also manage busy schedules. Trying to squeeze in a more than four-hour round of golf in between the gymnastics practice and the soccer game might be a tough proposition. Such a course would offer both partners the opportunity to play an abbreviated round (12 holes) or yet another option for one to play the full 18 while the other is able to conveniently terminate at the clubhouse after 12 holes to have lunch, spend more time getting refreshed in the locker room/health club or simply attend to other matters.

That's just one example — this approach would also offer the same flexibility to a variety of course customers. Some more mature players would be another group that might take advantage of an abbreviated round or even that “little bit of golf” option (six holes) available on a three-six track. As many of us know, hard as we try, the body isn't always as tough as it used to be and some rounds can simply turn into a test of staying power.

On some days, 12 or 13 holes feels just right. This would also apply to a mixed-aged grouping — younger adults playing with their parents who are not suffering from pain but simply get tired. Again, in the case of the three-six layout, beginners in the family could join in for six holes with the rest of the family to develop a taste for the game during those frustrating, first few rounds of golf.

When you think about it, such a course design has especially positive implications for a resort golf operation. For the most part, every category of golfer described in the previous paragraphs can be found frequenting a resort venue — men, women, older golfers, young adults, teenagers, kids, couples (young and old), beginners, good and bad golfers — all of whom can be found playing together. The course of tomorrow should be designed to help these time-conscious vacationers on their daily mission to achieve the optimum mix of recreation and not decide to skip golf “because it takes too long.”

Given the opportunity to play and pay for the “right amount of golf,” we can expect to see more people coming out to play less golf more often. Why? It's simple, really — where many of today's potential golfers are concerned, lowering the time commitment in itself will raise the value of the experience. ■

Deegan is an avid golfer and freelance writer from San Antonio, Texas.

Fenway's Facelift

Golf course builder rolls out new green carpet for World Series champs

Story and Photography
By Anthony Pioppi,
Contributing Editor



T

o many, Fenway Park is the crown jewel of baseball stadiums, a time machine that transports its inhabitants to the early 1900s.

Now it is home to the world champion Boston Red Sox, a phrase thought by many never to be uttered in a thousand lifetimes.

But to Jerry Deemer, Fenway Park is simpler than that.

"It's like a big putting green," he says on an unseasonably warm November day as he stands along the right-field warning track in front of the visitor's bullpen.

It's not that Deemer is callous to the historic ballpark. It's just that he has built, restored or renovated 120 golf courses as owner of Country Golf Inc., based in Traverse City, Mich. Shortly after the World Series, Deemer was hired to renovate Fenway's turf according to a plan by Roger Bossard, a baseball field construction guru whose company has built the playing field portion for eight of the last 12 Major League ballparks constructed.

On this day, with drain lines in various states of installation, the hallowed ground does in fact look like a putting green

Soon after the Red Sox won the World Series, the field at the club's historic stadium was renovated by Jerry Deemer, a golf course builder from Traverse City, Mich.

under construction. The fact remains that the installation of drainage and irrigation in Fenway is remarkably similar to a golf course.

Bossard, a graduate of Purdue with an agronomics degree, is also a United States Golf Association consultant. Under Bossard's patented construction plan, 6,000 cubic yards of topsoil was first removed at Fenway. The only thing remaining was the warning track, which the Fenway grounds crew will most likely build in late winter. The track was used as a road for the heavy equipment.

Then drainage was laid but on a larger scale than what Deemer was accustomed to on some of the world's great layouts. Six-inch tiles spaced 15 feet apart were connected into 8-inch mains.

Fabric was first put down in the trenches, followed by a 1-inch layer of stone and the drain tile. The lines were then filled with crushed stone and the field — except for the base paths,

pitching mound and warning track — was covered in 4 inches of stone. That same area was capped with 8 inches of straight sand.

Because the subgrade at Fenway is not level, Deemer attempted to rectify the situation as much as he could. Instead of laser-leveling Fenway into three sections, as he would normally do, he broke it down into 10. According to Deemer, Fenway is highest in center field and drops off to right and left fields with up to 4 inches of change. That has been reduced down to about 2 inches. The pitch should not be noticeable to players.

A bluegrass mix made up of four varieties specific to athletic fields was the final step. The new irrigation system is by The Toro Co. A sub-air system was also installed.

The entire project was done in slightly more than two weeks, lowering the field by about 2 inches. Shortly after completion, Fenway was hit with two rainstorms within just a few days that dumped a considerable amount of water on the field. Unlike in the past when those events would have surely led to flooding, not so this time. "Everything went off without a hitch, and we're excited about next year," Deemer says.

A third-generation big-league groundskeeper, Bossard has been building or rebuilding fields for more than 15 years since redoing Yankee Stadium at George Steinbrenner's request.

Bossard's portfolio includes fields in Milwaukee, Arizona, Seattle, Detroit and St. Louis. His talent has also taken him to Saudi Arabia, where he has built athletic fields, the first in that nation, for the royal family.

At Fenway, Bossard also became a bit of an archeologist. His crew uncovered old soda and perfume bottles as well as the goal post supports from the days Fenway hosted college and pro football games.

Dave Mellor, Fenway's director of grounds, says the old field was a clay/loam mix that drained poorly and was severely crowned. He and his staff also had to water by hand. "We were the only team in the majors not to have an automatic irrigation system," Mellor says.

Fenway was Deemer's second ball field. He also was involved with the building of a park in Manchester, N.H., that is home to the New Hampshire Fisher Cats, the AA Eastern League affiliate of the Toronto Blue Jays.

"I'm so used to working without anything



permanent," Deemer says, noting that he's more accustomed to the openness on golf courses and not working within structures. Glancing up at the fabled Green Monster, Deemer says, "This is so cut and dry."

Bossard will also have Deemer as subcontractor when his company rebuilds RFK Stadium for the inaugural season of the Washington Nationals.

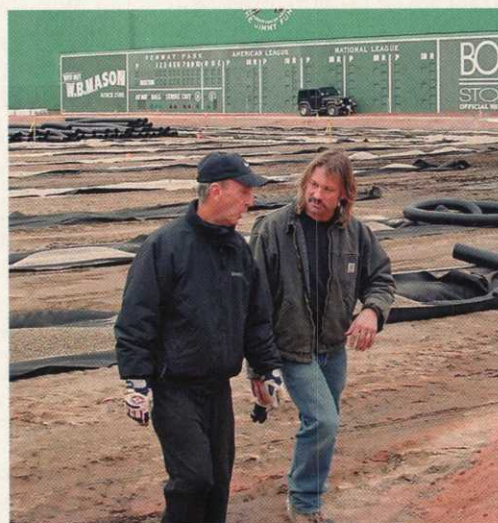
Deemer was obviously enjoying the Fenway project, even though he has worked on a number of courses that hosted men's and women's major tournaments.

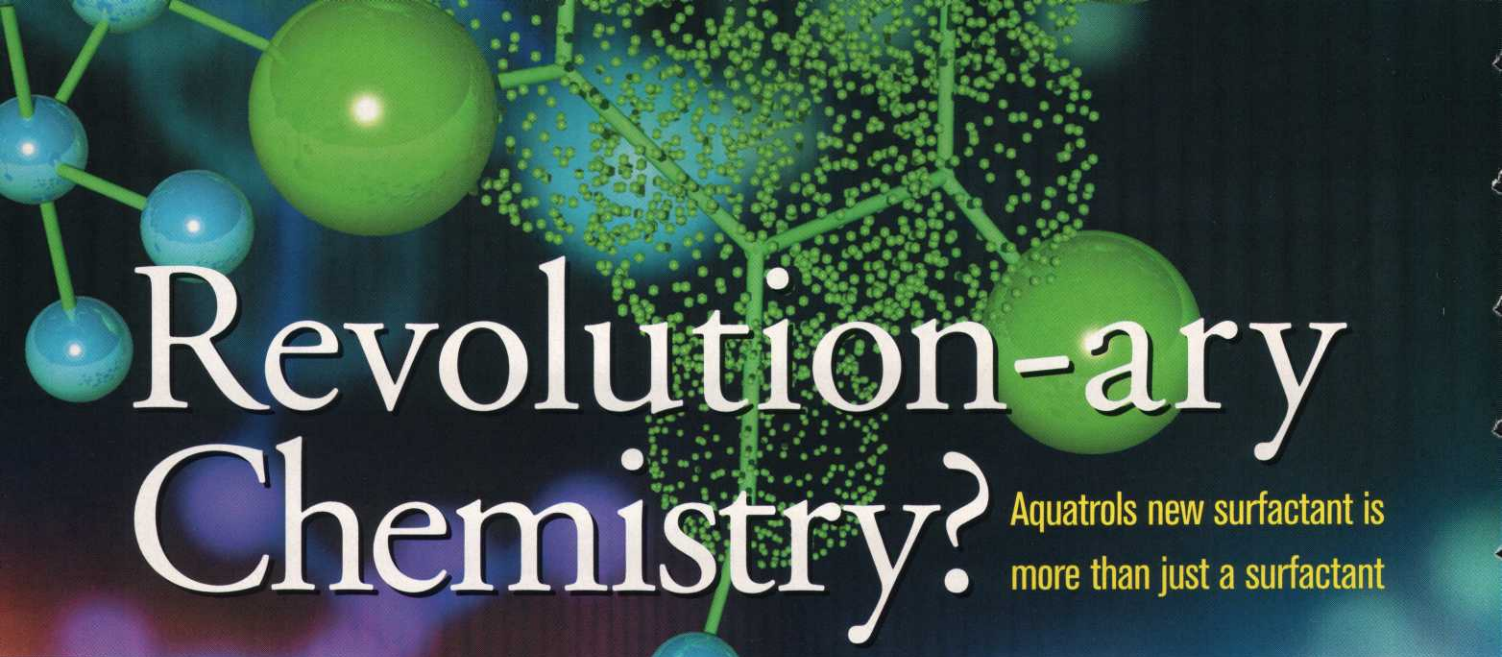
"After more than 100 golf courses, it's hard for me to find a course to get excited about, but everyone knows Fenway Park," he says.

Deemer and his crew also got to enjoy the fruits of the Sox success. They had their photograph taken with the World Series Trophy and were in the background working while Barbara Walters interviewed Curt Schilling.

"That was cool," Deemer says. ■

Fenway Park might look in disarray in this photograph. But believe it or not, the renovation project took only a little more than two weeks to complete. Below, Roger Bossard (right) and Jerry Deemer confer about the project.





Revolution-ary Chemistry?

Aquatrols new surfactant is more than just a surfactant

BY ANTHONY PIOPP, CONTRIBUTING EDITOR

Aquatrols has a new product, but before you groan and say, "Not another surfactant," hold on a second.

According to the company, the product, called Revolution, has surprised even them. Revolution's chemical structure (specifically the methyl cap) radically alters how the molecule behaves in the soil, making it more than just a surfactant.

"We're seeing things with this chemistry that have never been seen with a surfactant before," Aquatrols Marketing Manager Colleen Clifford says.

Four years of testing at a number of universities in the United States and elsewhere, as well as 72 field trials in the United States, Scotland, the Netherlands, England, Wales and Japan, has produced results in turf such as better production of nonstructural carbs, elevated antioxidant activity, and overall increased plant resilience against environmental and cultural stresses, Clifford says.

One of the field trials took place at Nawshatuc Country Club in Concord, Mass. It was there that superintendent Paul Miller discovered that Revolution when combined with BASF's new fungicide, Insignia, helped with his long-time problem of fairy ring. Miller surmises the ability of Revolution to increase the percentage of moisture absorbed by the plant, making it more resistant to the disease. "I think it has fungicidal qualities," Miller adds.

Miller used Revolution on two greens in 2003, and last year he used it on all 18 greens, plus his practice green. He says he saw a marked reduction in fairy ring.

The key to Revolution, according to company literature, is the way the chemical structure produces hydration sites that are interlocked across the particle surface. As a result, better movement of water allows for better accessibility by the plant.

The company said adding a methyl cap to the block copolymer changes the orientation of the molecule as it leaves the water phase, allowing it to act better with soil and organic matter in the root zone.

According to Miller, Revolution may also have benefits the company did not realize. For one, he says water is absorbed into the soil quickly and thoroughly. As a result, less irrigation is needed to keep turf healthy. And because Revolution does not need to be watered in immediately after application like other surfactants, superintendents can utilize rain to wash in the product.

"Environmentally, they hit a home run," Miller says of Aquatrols.

Secondly, Miller said Revolution is so effective in moving water into the soil profile that there is no dew on his greens for up to a week after application. He points out that frost delays can cost courses thousands of dollars during the peak season of play in areas such as Myrtle Beach, S.C., and Hilton Head, S.C. But the lack of dew, even for a week, would all but eliminate frost on greens and subsequent frost delays. ■

Wetting Agents for Water Management

Surfactants and wetting agents do more than just prevent localized dry spot (LDS). They can help with overall water management. These days, with a possible water crisis looming, that's a huge advantage.

Precision Laboratories says superintendents have found that its product Cascade, a wetting agent used to prevent LDS and correct hydrophobic soil conditions, has helped utilize their courses' water supplies more efficiently.

"I have noticed a huge savings in irrigation run time to keep the upper profile moisture level where I like it," says one Florida superintendent, according to Precision Laboratories. "With this in mind, nutrients, amino acids and other products will less likely leach through the root zone."

"Cascade has helped me cut my water usage on greens and cut hand-watering in half," another superintendent from Oklahoma says.

DIGITAL VISION