

## Biologicals take maintenance to a new level of control

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every other week, he had little success, he said. "But, when we put it out every other day, we started getting disease control."

"You brew your own cultures in your pump station during the day and inject them when you irrigate at night," vouched Dan Dinelli, superintendent at North Shore Country Club in Glenview, Ill.

Dinelli, who began using BioJect in 1995, said: "We're excited because we saw good results last year, and last year was no party. We had the worst summer in history. It was unbelievable high humidity and heat that Chicago had never experienced. People were dying from the heat in the city, and yet we were expected to maintain greens at 120/1000ths of an inch. It was crazy."

"I've gotten tremendous results with this [BioJect]. This is the wave of the future. It's the only thing saving my greens," said superintendent Ken Schwark whose putting surfaces at Tony Lema Golf Course in Pittsburg, Calif., are built largely on cinder sand.

Adding that salt-laden bay dredgings were used for the soil on part of his course, Schwark said those spots "would not sustain life — weeds or anything. But since I've injected [the irrigation system] the last year-and-a-half, those microbes have transformed that inch-and-a-half layer enough to support life. About 70 percent of those areas are filled in."

Explaining that the BioJect is "a delivery mechanism for beneficial organisms," EcoSoil Vice President of Product Development John Doyle said: "This system is not only set to deliver daily, but going through the irrigation system is an ideal situation. It's a great place for them to live. It delivers them onto the golf course, which minimizes the application cost. And the timing is ideal as well, since most courses apply irrigation at night and that avoids the effects of UV [ultra-violet] light."

Bacteria are the life force of the system. A high bacterial count is "a good strong backbone" for healthy turf, Dinelli said.

In the case of *Pseudomonas*, it secretes a material which inhibits fungal protein syntheses in pathogenic fungi. This holds the fungi in check. Bacteria can also inhibit fungi growth by competing for the same nutrients in the soil, thus weakening the fungi and making it more susceptible to the antibiotics the bacteria secrete.

At 27-hole Tony Lema GC, Schwark said he has "living proof" the BioJect technology works. Because his root zone is cinder sand, it percolates at .22 inches per hour, meaning that it almost doesn't drain at all. Plus, his water from the East Bay is heavy with salt.

"My way to manage greens is totally different," Schwark said. "I can't get rid of the salt and I have to find a way to grow with it. That way has been microbes."

When a water pump connected to the BioJect went down for three months, turf on the non-injected holes turned yellow, he said, while the others lived. Data from a tissue test run on the greens "was absolutely phenomenal."

The test showed greens not being injected with *Pseudomonas* had 1,600 parts

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— Dan Dinelli  
North Shore CC

per million salt while the injected greens had 125 parts per million salt.

Estimating that more than 200 BioJect units are in the field worldwide, Doyle said EcoSoil asks superintendents to evaluate their units, comparing fungicide-treated versus untreated areas, or modifying their fungicide program, "so we have experiences to draw off in that region."

EcoSoil has found success, he said, through superintendents from the previous year sharing their findings.

"It falls short of a replicated field trial that would be performed at a university, but it does answer some of the questions," Doyle said.

To add to the anecdotal evidence, EcoSoil is working with researchers at the University of Maryland, Michigan State University and the University of California-Riverside.

"But at some point," Doyle added, "you can research this into oblivion versus getting something out there that superintendents can use."

"We know it works," said Dinelli. "This year we're looking at the finances. We want to know what kind of savings we can benefit from this. And we're applying it everywhere."

Vargas said savings will depend on the golf course and the year. "If we're talking dollars and cents, golf courses irrigate tees, greens, fairways... On a square-foot basis it's a pretty cheap way to get treatment. When we used it, for the first time, the banks around the greens didn't die. The roughs won't die if they're sprayed."

"Payback period?" Schwark asked. "How much money is your sanity worth, knowing you can go to bed at night and your greens will be there in the morning? What dollar figure can you put on peace of mind?"

Saying the cost of his system — treating 27 holes with two pumps — is \$15,000 per year, Schwark said it is saving him \$5,000 to \$10,000 a year.

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One caveat Schwark shared is that some superintendents in California are reporting little impact from their BioJect systems.

"But these people are on choice courses," he said. "They're looking at getting their soils exactly perfect, and to be that close they already have plenty of micro-organisms. My course is on a landfill with a poor growing medium."

## Dinelli adds organics and composts to biological mix

By MARK LESLIE

GLENVIEW, N.Y. — Using a multidimensional approach featuring biological-control agents, organic fertilizers and composts, North Shore Country Club superintendent Dan Dinelli hopes to reduce fungicide use by 40 percent this year.

"We're trying to bring several factors together as one to collectively suppress disease," Dinelli said.

While last year he began using the BioJect system, irrigating his course with the *Pseudomonas aureofaciens* bacteria, has jumped full-fledged into the biological-control arena. Late last year he started using a hybridized strain of *Trichoderma harzianum*, called Bio-Trek 22G, developed by Cornell University Drs. Gary Harman and Eric Nelson. A fungus applied dormant in dry granular form, *Trichoderma harzianum* reportedly establishes itself in the rhizosphere and gives season-long protection against soil-borne fungal pathogens with, in most cases, only two applications.

And that is only half the story,

Dinelli said: "Another thing we're trying this year is using a lot of organic fertilizers that are spiked with microbes," he said, "and we're top dressing fairways with compost. And all this is in hopes that we improve microbial activity, stimulate antagonists in the soil that may already be present, and, in the case of the BioJect and *Trichoderma*, actually implement known antagonists by applying them out in the field."

Each angle, he said, has weaknesses and strengths. But "hopefully, in time, as scientists figure out more and more of this, there will come a day where we'll be able to fine-tune these approaches."

Saying he has no interest in selling the biological-control products, Dinelli added: "I have a big interest in hoping that this direction continues to be explored. Yes, we have a lot more to learn with these pioneers — BioJect and *Trichoderma* — about their shortcomings and how to use them. But, that's all in the growing pains."

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