

BioJect Follow-Up 'How Is It Going?'

Tim Anderson,
Assistant Superintendent,
Naperville C.C.

This month's installment of "Ask the Expert" is a follow-up article to last month's article on biological disease control. There has been a rising interest within the turfgrass industry regarding the use of biologicals and specifically the BioJect System. Currently, there are 12 BioJect Systems in use in the Chicagoland area. To find out more about this system, I spoke with four local superintendents who are using the system for the first time this season. They include:

Tony Kalina,
Prairie Landing Golf Club

David Blomquist, C.G.C.S.,
Naperville Country Club

Kurt Galisdorfer,
Exmoor Country Club

Scott Witte,
Cantigny Golf Club

I would like to thank all these superintendents for their time. As expected, there is a lot of information to be gained from their experiences. While reading this article, keep in mind that it was written on July 31 and that weather conditions this year have been atypical. Also keep in mind that there are many factors which influence disease development including: local climate, microclimate, grass species, fertility, degree of disease pressure, and cultural management techniques. As I spoke with each superintendent, I tried to learn what they expected to gain through the use of the BioJect System, how they envisioned it fitting into their overall fungicide program, and what their results had been up to this point in the season.

Prairie Landing Golf Club

At Prairie Landing Golf Club, Tony's goal was to achieve a level of disease suppression such that he could save two curative and one preventative fungicide application on greens, tees, and fairways. In addition, he also looks at the system as a public relations tool so that he can promote the idea of using innovative technology to act in an environmentally sensitive manner. Tony used money out of his fungicide budget to cover the cost of \$17,000 to lease the BioJect System. He projects that by saving two curative and one preventative spray, he will save \$25,000 on chemical fungicides this year.

Prairie Landing Fungicide Summary Through 7-31-96

	DATE	PRODUCT	RATE	DAYS	NOTES
Tees	Last week of July	Sentenal	.16 oz/M	14-21	All tees
Fairways	Last week of July	Sentenal	.25 oz/M	21-28	All fairways

Prairie Landing experienced an outbreak of Dollar Spot in early May prior to their use of the BioJect. Tony applied a high rate of a contact fungicide to check the disease. He started injecting with the BioJect on Memorial Day weekend. Tony's original fungicide plan called for spraying fairways the last week of July with Sentenal at .33 oz/M. He left this preventative application of Sentenal in his program to carry him from the end of July to the last week of August. He did back off to a .25 oz/M rate because he had no incidence of disease. Tony admits this has been a difficult year to evaluate the results of the BioJect System because of low disease pressure and, in particular, because of the cool nights. At this time, he credits the use of the BioJect System with saving him one curative application and allowing him to back down the rate on his preventative fairway application. Tony estimated that this translates into a savings of \$12,000 to \$14,000. Since the initial outbreak of Dollar Spot, which occurred prior to the use of the BioJect System, Tony has not observed any additional disease activity.

Naperville Country Club

At Naperville Country Club, Dave's goal was to control Dollar Spot on tees and fairways. Money saved in chemical applications to prevent Dollar Spot on tees and fairways would be used to offset the cost of leasing the BioJect System. In previous years, greens and tees were treated on preventative programs, while fairways were treated on a curative program using systemic fungicides. This year, the greens will stay on their regular preventative program. With the addition of the BioJect System, the tees and fairways will then both be treated on a curative basis only using predominantly contact fungicides. Dave would like to go through the summer with one systemic application on the tees and a total of three or four tanks spot-sprayed as needed throughout the season in fairways.

Naperville Country Club Fungicide Summary Through 7-31-96

	DATE	PRODUCT	RATE	DAYS	NOTES
Tees	6-20	Sentenal	.16 oz/M	14-21	Half of tees treated
	6-21	Sentenal	.16 oz/M	14-21	Other half of tees treated
Fairways	6-19 to 6-20	Daconil	2 oz/M	7-10	All fairways
	7-19	Daconil	2 oz/M	7-10	Spot-sprayed one tank
		Subdue	1 oz/M	10-14	
7-23	Daconil	2 oz/M	7-10	Spot-sprayed two tanks	

On 6-11 and 6-16, slight outbreaks of Dollar Spot were found while scouting for disease. These areas were monitored to see if the BioJect System would provide adequate disease suppression. On 6-19, half of the fairways

(continued on page 30)

had active Dollar Spot, so the first application of Daconil was made. The goal was to knock the disease down and allow the *Pseudomonas aureofaceans* bacteria a chance to reestablish itself. On 6-20, half of the tees were sprayed prior to dark. The next morning, the untreated tees had active Dollar Spot, so they were treated with a chemical application. On 7-17, minor Dollar Spot activity was noted on some of the fairways. These areas were monitored for progression of the disease. Later that night, Naperville received 10 inches of rain. On 7-19, the fairways which had disease activity were sprayed. On 7-23, five additional fairways which had Dollar Spot were treated with a chemical application. Since the tees were sprayed with Sentenial, they have had virtually no disease activity. Only small isolated areas of very weakened Dollar Spot have occurred. These areas didn't require fungicide treatments. Dave has noticed a decrease in the amount of Dollar Spot affecting the irrigated Bluegrass surrounds. In addition, two areas of the course which were treated with a high rate application of Turfcide 400 in the spring have remained disease-free. Based on this, Dave is considering combining the use of the BioJect System with a high-rate spring application of either Turfcide 400 or Bayleton for the 1997 season.

While the BioJect System is definitely having an effect, the results haven't been as strong as Dave had expected. He believes that better calibration and timing of the system will yield an increase in the quality of disease control.

Exmoor Country Club

At Exmoor Country Club, Kurt is hoping to achieve overall disease suppression so that he can stretch out his spray intervals and omit chemical applications during periods of low disease pressure. Kurt used funds from within his fungicide budget to cover the cost of leasing the system. Money saved from omitting sprays and stretching intervals will go toward offsetting the cost of the lease.

Exmoor Fungicide Summary Through 7-31-96

	DATE	PRODUCT	RATE	DAYS	NOTES
Tees	6-27	Bayleton	2 oz/M	30	All tees
	7-16	Daconil	3 oz/M	14-21	Half of tees. Other half left as check
	7-29	Scott's Fluid Fungicide Terremec SP	1.6 oz/M 4 oz/M	10-14 5-7	All tees Spot-sprayed isolated areas
Fairways	6-20	Bayleton Daconil	1 oz/M 1.5 oz/M	30 7-10	All fairways
	7-14	Bayleton Daconil	1 oz/M 1.5 oz/M	30 7-10	All fairways except two par 3 approaches left as check plots
	7-29	Scott's Fluid Fungicide	1.6 oz/M	10-14	All fairways except check plots

On Sunday, 7-28, Kurt observed active Dollar Spot and isolated areas of *Pythium* on tees. On Monday, 7-29, he sprayed all tees and all fairways except for his two par 3 approaches. These areas served as check plots. Prior to this outbreak, his course had been clean. An upcoming member/guest tournament and the fact that frequent rains had kept him from running the BioJect on a nightly basis were both factors that played into his decision to spray tees and fairways on 7-29. His two check plots have not received any chemical applications since 6-20, and they are free of disease.

Cantigny Golf Club

During the first year of use at Cantigny Golf Club, Scott envisioned the BioJect System acting as a supplement to his current disease management program. Scott was looking to prolong his spray intervals by one or two weeks so as to realize a savings in fungicide dollars spent. Because of the large acreage at Cantigny (about 250 acres), EcoSoil Systems tried using two 110-gallon tanks which were controlled by a computer board. Ongoing problems with the computer board and pumps resulted in the system being only 50 percent functional from the end of June until mid July. The end of July, the dual tank system was replaced with a single 175-gallon tank. Since this time, the system has been 100 percent functional.

Even with only 50 percent capability early on, Scott believes that they did experience some residual effects from the bacteria. He was very consistent with his injection cycles. If he wasn't planning to run a regular irrigation cycle, then he ran a four-minute syringe cycle on greens, tees, and fairways so as to get the *Pseudomonas aureofaceans* out onto the golf course. He timed the syringe cycles so that they started at 9:30 p.m. right after dew formation.

In the past, Scott's philosophy has been to use a blended program of preventative sprays combined with proper integrated pest management. With the BioJect System, he will hold to the same philosophy. He plans to use more contact fungicides based around his applications of Banner and Sentenial. He feels like he can be a little more lax because he knows that if he has any spray skips or localized disease areas, he can run an extra syringe on them in the morning to remove the guttation water and, hopefully, at the same time get some of the residual benefits from the bacteria left in the irrigation system from the previous night's irrigation cycle.

(continued on page 32)

BioJect Follow-Up 'How Is It Going?'

(continued from page 30)

Cantigny Golf Club Fungicide Summary Through 7-31-96

	DATE	PRODUCT	RATE	DAYS	NOTES
Tees	6-12	Rubigan	1.5 oz/M	14-28	All tees
	7-2	Banner GL Daconil	1 pack/26,660 sq. ft. 2 oz/M	14-28 7-14	All tees
	7-30	Curlan	1 oz/M	21-28	All tees
Fairways	6-13	Banner GL Daconil	1 pack/20,500 sq. ft. 4 oz/M	14-28 14-21	Spot-sprayed ten fairways
	7-16	Daconil Sentenial	4 oz/M .25 oz/M	14-21 21-28	Half of all fairways treated prior to 8" of rain
	7-19	Daconil	4 oz/M	14-21	Treated other half of fairways
	7-31	Sentenial	.25 oz/M	21-28	Treated fairways sprayed with Daconil on 7-19

Cantigny had a localized outbreak of Dollar Spot during the second week of June. At this time, their BioJect System was only 50 percent functional. Scott blanket-treated all the tees and spot-sprayed the fairways. He followed this up with a chemical application to tees on 7-2. His tees have been free of disease since then. He made a preventative application of Curlan on 7-30 to keep his tees clean.

The fairways had Dollar Spot on 7-16, so he treated them with a systemic/contact mix. Only half of the fairways were treated prior to 8-1/2 inches of rain. The remaining fairways were treated with two subsequent applications following the rain. His fairways have been disease-free since 7-16.

Scott has been monitoring his fairways very closely to determine if the *Pseudomonas aureofaceans* are producing any residual or beneficial effects. He has noticed that this year, the Dollar Spot mycelium hasn't been as aggressive. It appears to be weakened. This would coincide with the idea that the Dollar Spot is being affected by the antibiotic properties of the PCA and that it is having to compete with the *Pseudomonas* for nutrients within the soil environment.

All the superintendents agreed that they were experiencing disease suppression from the use of the BioJect System. They added that they had experienced low disease pressure year to date mainly due to cool nighttime temperatures. When asked what areas they would like more information on, their first response was that they wanted some concrete means of quantifying the results they were achieving on their course. Currently, all the courses were waiting to receive tests results which would show the level of bacteria in their BioJect fermentation tank and in soil samples taken from the course. Several of the superintendents expressed a desire for EcoSoil Systems to develop a test kit which could be used in-house on a regular basis. They also expressed a desire for more information regarding the calibration of

the unit as well as application rates and timing.

For potential users, their advice was to get the BioJect System up and running as early in the season as possible. All four courses experienced delays in getting their systems on-line and working properly. In some cases,

problems with the operation of the BioJect System were found to correspond with dates of disease outbreaks on the golf course. Getting the system up and running early allows time to get the "bugs" worked out and to experiment with the calibration and timing of application. They also noted that it was important to inject the *Pseudomonas* on a nightly basis. They recommended running syringe cycles on nights when full irrigation cycles were not needed.

As with all new pieces of equipment, there is a learning process which must be completed in order to get optimum results. As one superintendent pointed out, there is more to this than what is initially indicated. Therefore, it is important to learn as much as possible about how the BioJect System works and the role that *Pseudomonas aureofaceans* plays in disease suppression within the soil environment. It seems that there are many factors involved, including proper oxygenation and temperature within the fermentation tank, availability of nutrients, proper calibration and timing, increased daily monitoring of the course for disease, and proper functioning of the entire irrigation system. All of these factors must be working properly and be synchronized in order to achieve good results. ■

