

# role in turf maintenance

...while biostimulants turn supers', researchers' heads

The world of biostimulants has taken the giant step from snake oil-type doubt to science-supported legitimacy.

While testimonials are still coming in, golf course superintendents are cashing in on the years of research done on biostimulants to improve or accelerate plant growth.

"It's another tool that if golf courses aren't using nowadays they'd better, or the person in charge is behind times," said Melvin B. Lucas Jr., former president of the Golf Course Superintendents Association of America.

"You can do a lot more with biostimulants than you can with just putting out fertilizer..." said Lucas, who operates Round Hill in South Dartmouth, Mass., after 25 years at two Long Island golf courses. "You have fairly good control of your growth of turf. You never seem to get a flush as you will with nitrogen fertilizers. You can maintain a nice even quality of turf with any of these biostimulants."

Superintendent Dean Graves, of Bethesda (Md.) Country Club, site of the Mazda PGA Championship, said he has used biostimulants to encourage root growth and develop a stronger plant for three years.

At the same time, Graves said, the biostimulants green up turf, making it aesthetically pleasing for the tournament cameras.

Unlike nitrogen or fertilizer, it gives a green color but not a flush of growth, he added.

Dr. Michael Goatley, an assistant professor of agronomy researching Roots biostimulant at Mississippi State University in Starkville, said golf courses where superintendents are managing sand-based greens, are a good "fit" for biostimulant use.

"In this situation, biostimulants could be a valuable management tool during stressful times of year, as in the case of severe drought, because of stronger, more developed root systems," said Goatley, who is testing Roots

Root Growth Enhancer and PGR IV.

"There are testimonials from a lot of people," said Dr. Richard E. Schmidt of Virginia Tech in Blacksburg, who has researched biostimulants for more than a decade. "I think a lot of people see what they want to see. But it's there. It's for real... It's like an insurance policy.

"We're now trying to get them into the 90th percentile, so that when you apply them, 90 percent of the time they will have positive results."

The word "biostimulant" itself has brought debate. According to Schmidt, "Biostimulators stimulate growth biologically.

"A lot of people want to call them 'growth regulators,' but growth regulators can either enhance or inhibit growth."

Schmidt said his research shows biostimulant use "can be a good insurance policy. If a turf manager gets in an adverse situation caused by moisture, heat or cold stress, the treatment might help him through."

Biostimulants are not a cure-all, Schmidt warned. "Our research has shown that these materials work well under some conditions," he said. "We know we can stimulate growth — especially roots — with some materials, and we are also getting better tillering and initiating of buds.

"However, under certain conditions results of our research infers that growth stimulation with biostimulants is not necessarily associated with nutrient uptake."

Dr. Eliot C. Roberts, director of The Lawn Institute in Pleasant Hill, Tenn., said: "We have to do something to help build more stress-resistance within the plant other than simply watering practices and trying to control the rate of nutrient release within the plant so they don't get oversucculent.

"These growth substances do this. They

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— Melvin B. Lucas Jr.  
Round Hill operator

help to regulate cell division so that it slows down growth. They also help to control cell elongation. And growth is either a function of cell division or elongation, or a combination of both. When you apply fertilizers ... more nutrients mean more cell division and cell elongation, more hydrated cells, and thus they are more sensitive to stress environment.

"If you can control this growth in a way that will make the plant hardy, you have a turf that will withstand more play on golf courses, more traffic on greens, more soil compaction, and withstand the adverse high summer temperatures. When you try to put bentgrasses in the South, anything you can do to make it more hardy during the summer the easier you're going to make it on the superintendent."

Lucas, who designed and built Round Hill, said he gained state Conservation Commission approval largely because of his promise to use biostimulants.

"The No. 1 consideration here was that the course was being built in and around wetlands," Lucas said. He said the commission was "highly receptive and openly taken by the abilities of biostimulants ... in providing many nutrients without an overuse of fertilizers.

"This was a selling point that I had to have. Indeed we have not eliminated fertilizers,

but we have indicated the continued use of biostimulants would reduce our nitrogen use on the areas near and in wetlands."

Lucas said for many years he applied iron to bentgrass greens and tees as a "dormant feed" and got "tremendous results."

"Now there are new products coming out," he said. "I've used all of them. They all produce very good end results. Coming into the spring the root density and depth are far greater than the check points (areas not treated).

"More and more people are realizing these products can enhance and make a better turf than just relying on nitrogens. They're finding these are very qualitative materials. They do what they say. They will enhance root growth, maybe help in soil formation to some extent."

Dr. Hans Helmprecht, president of Chemical Consulting of Babylon, N.Y., agrees.

"Customers (using biostimulants) report better root systems and more vigorous growth of grasses such as bentgrass and general turf mixtures of bluegrass and fescue," he said. "In terms of consistency of results, a biostimulant, when used in a uniform approach, results in vigorous growth of young plants. Once roots are stimulated by a biostimulant, the rate of fertilizer usage and nutrient uptake increases."

Dr. Graeme Berlyn of the Yale University School of Forestry and Environmental Studies in New Haven, Conn., reported that in one experiment, perennial ryegrass treated with a biostimulant had twice the chlorophyll content of untreated grass over a seven-week period.

"Even two weeks after mowing, the treated grass was much larger than the untreated. The residual effect of the biostimulant was

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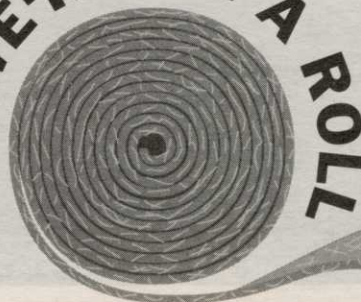
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## Biostimulants

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very impressive," Berlyn said.

He added that the material seems to work best in sandier soils because they are so permeable.

"The biostimulant promotes rapid uptake of nutrients and other beneficial compounds before they have a chance to leach out of the soil," he said.

Goatley found different responses to biostimulants between warm- and cool-season grasses.

He said warm-season varieties respond most under stress conditions. Cool-season grasses, he said, have a measurable response regardless of growing conditions.

Goatley recommended applications for warm-season grasses in early fall, "as turf begins to prepare for winter dormancy. In this situation, we see more enhanced root development late in the growing season, which could result in better carbohydrate storage and preparation of plants for winter. There is also evidence that biostimulants could enhance spring green-up as temperatures warm up and spring dormancy breaks."

"When a biostimulant ... has iron added to it, the biggest advantage would be an immediate color response that wouldn't be associated with a resulting flush of shoot growth. This could be very advantageous to turf managers in the spring when everyone is trying to get their grass to green up without promoting shoot growth at the expense of root growth."

"The lush growth of turf following an early-season nitrogen application is very susceptible to injury from late frosts."

Graves applies biostimulants in March, April and September.

And Lucas agreed they should be applied "from mid-fall to spring, when the roots are growing like crazy — March, April, May. If you've got these materials available, you create and enhance a root system that is tenfold better than your normal dormant feeding of milorganites or sulfur-coated ureas, which are somewhat of a norm these days."

He added current research has revealed that minute amounts of the sulfur-coated ureas are getting "somewhat of a flushing effect" in dormant feeding. "You're losing a very small percentage, but a percentage that could basically be used by the plant at a more optimum growing period," he said.

Virginia Tech's Schmidt added that biostimulant use might improve salt tolerance.

He said in one experiment he irrigated a turfgrass plot heavily with salt water trying to create an artificial drought.

"Salts hold back turf," Schmidt said, "but we're offsetting it. We're actually stimulating these roots with biostimulants whether we're irrigating with salt water or not."

Schmidt said he believes enzymes in biostimulants "are doing something to the plant so that it can take water up that is normally not available to it. Normally when the water gets that low, the plant wilts.

But we are still seeing it grow.

"We think it has something to do with the fatty acids and we're investigating that; but it's a story that will have to be told later."

Among the biostimulants on the market are Roots and ironRoots, made by Roots, Inc., 25 Science Park, New Haven, Conn. 06511, telephone 203-786-5295; Panacea, produced by Emerald Isle, Ltd., 2153 Newport Road, of Ann Arbor, Mich. 48103, telephone 313-662-2727; and Bovamura, made by PBI/Gordon Corp., 1217 W. 12th St., Kansas City, Mo. 64101, telephone 816-421-4070. *This story was prepared with assistance from the people at Roots, Inc., of New Haven, Conn.*

## Danger ahead without organization — Roberts

Legitimate biostimulant manufacturers must address ways to regulate the industry or see charlatans enter the marketplace, according to The Lawn Institute director.

"Research interest in biostimulants is keen and will continue, and will be competitive. But the bottom line is, ultimately, this industry is going to have to look at policing itself through regulation and controls, just like the seed and fertilizer and pesticide industries," said Dr. Eliot C. Roberts.

"The companies that really have legitimate products have to agree

among themselves on procedures they can follow for analytical purposes so they can label products and then advertise based on the label," he said.

Roberts said the fledgling biostimulant industry is not regulated, posing a threat to companies financing university research.

"A company forms and advertises its product. How do you know what's in that product?" Roberts asked. "There's not much information on the label that helps you know if it contains cytokinin, or gibberellin, or some other growth substance.

And there's not much that tells you how much there is of these.

"In time ... there will be a better means of identifying and describing contents, just as we now have procedures to identify pesticides, their active ingredient, amount, et cetera.

"In the long haul we are going to have to have state and federal agencies involved. Of course, any industry hates to be controlled. But there isn't enough (law) at the present time so that any company has to meet any criteria in the marketing process."



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