

Bio-stimulants: new management tools

According to research under way at several major universities, bio-stimulants can greatly improve root growth and stress tolerance. In addition, proper use of these compounds could address environmental problems associated with groundwater contamination, especially from excessive nitrates.

Bio-stimulants are mostly natural products that improve, accelerate and have a positive effect on plant growth. Some of these materials are natural with no added chemicals or hormones, while others contain synthetic plant-altering or growth-altering ingredients.

Dr. Michael Goatley, assistant professor of agronomy at Mississippi State University, is studying the effects of bio-stimulant use on warm season turfgrasses such as bermudagrass, St. Augustine and zoysiagrass. Two significant indications, he says, are that bio-stimulant use enhances root growth and helps turf hold up under stress situations.

"Theoretically, bio-stimulants might be useful for golf course superintendents who manage sand-based greens composed of bermudagrass or bentgrass," Goatley explains. "Because of stronger, more developed root systems, turf would better endure stress caused by, say, a severe drought."

Apply before dormancy

The most measurable response of warm-season turf grown under suitable moisture and fertility conditions to bio-stimulant application comes when the material is applied in late September or early October as turf begins to prepare for winter dormancy, the researcher says.

"When a bio-stimulant is applied at this time, we see more enhanced root development late in the growing season," Goatley continues. "This could result in better carbohydrate storage and preparation of plants for winter."

The primary bio-stimulant material that Goatley is examining in his research is a mixture of humic acids derived from peat moss, kelp and seaweed extracts, chelating agents, natural soil chemicals, co-enzymes and micronutrients like iron, manganese and boron. This formulation is sold under the trade name of Roots' Root

Growth Enhancer.

The product's manufacturer, Roots, Inc. in New Haven, Connecticut, has also recently developed a biostimulant formulation containing chelated iron specifically for use in turf. The new product is called ironRoots.

Goatley says that use of bio-stimulant combined with iron could also enhance spring green-up as temperatures warm

sod greens and have them putted on in a few weeks' time when bio-stimulants are used."

Use of bio-stimulants might also help solve problems associated with groundwater contamination by nitrates. By combining bio-stimulants with nitrogen, fertilizer rates might be reduced because uptake efficiency would be increased.

"Of course, you'd never substitute a bio-stimulant for an essential plant nutrient such as nitrogen," Schmidt stresses.

Researchers still have much to learn about bio-stimulants, but these materials are already starting to find their way into the commercial mainstream.

To date, bio-stimulant compounds have been used commercially on golf courses, in parks, nurseries and cemeteries, and for sod production. In many cases, they have been used with noticeable results.

"People should not anticipate bio-stimulant use as being a cure-all," Schmidt cautions. "Based on my research thus far, I would say that bio-stimulant use can be a good insurance policy."

Another university scientist who finds bio-stimulant research encouraging is Dr. Raymond Poincelot at Fairfield University in Connecticut. Much of Poincelot's research involves plants such as marigolds, petunias, azaleas, rhododendrons, poinsettias and chrysanthemums.

Horticultural research

With chrysanthemums, for example, Poincelot has observed improved flowering when the Roots bio-stimulant is applied to the plant. "This species usually flowers only at the top of the plant, but some of my experiments have greatly increased lateral flowering," says the researcher, who is author of four books on horticultural topics and writes extensively for *The New York Times* and other publications.

Poincelot is also examining bio-stimulant use on cacti and citrus-species that are difficult to propagate.

"Based on what we've seen so far, there is a definite, positive effect on rooting of cuttings and germination of seed," he says. "But, this effect varies greatly depending on plant species." **LM**



Dr. Raymond Poincelot of Fairfield University is testing bio-stimulant effects on a wide variety of plant species.

and spring dormancy breaks.

"The biggest advantage of using a bio-stimulant such as Roots with added iron would be an immediate color response that wouldn't be associated with a resulting flush of shoot growth," Goatley explains.

The researcher says that lush turf growth following early, heavy applications of nitrogen often leave turf especially vulnerable to injury from late-season frost.

Sod applications

Dr. R.E. Schmidt, professor of agronomy and a turf ecology and physiology specialist at Virginia Polytechnic Institute in Blacksburg, is also studying several bio-stimulant compounds on a variety of turf species, including warm and cool-season grasses.

"Production of bentgrass sod for golf greens is on the increase, and we're seeing more demand that producers treat with bio-stimulants before shipping to this market," says Schmidt, whose research focuses primarily on sod production.

"Some golf courses are now able to