

## ***Biostimulants: changing technologies and perceptions***

*By Eric Schroder*

Biologicals are hardly new to grass, since the natural growth habit for all grasses has always involved partnerships with various beneficial soil microbes, says Michael J. Kernan, PhD, a scientist with Plant Health Care, Inc.

“The intense management practices used by some professionals, however, often involve harsh treatments, resulting in the complete disruption of natural ecological partnerships,” Dr. Kernan says. “This creates turf that is totally dependent on continued human management, and largely unable to endure normal environmental stresses like drought, disease pressure, and reduced fertility.

Consequently, the need for intense management increases along with labor and costs.”

“With the new generation of microbial products, there is movement away from a preoccupation with the numbers (counts) of organisms in a jug,” says Robert N. Ames, PhD, senior staff scientist for Advanced Microbial Solutions. “These new generation microbial products concentrate more on biochemistry and functional capability of a community of microorganisms. Less emphasis is placed on how many organisms can perform a specific task; and more on how many tasks can the product perform.”

Dr. Ames continues, “Soil microorganisms respond to biochemical signals that control cell division and many other functions. Just like people, bacteria raised in a confined, laboratory environment will function very differently than when they interact with a large and diverse community. Microbial community fermentation technologies have been developed that condition these microorganisms for functioning in a soil environment. When introduced into the soil, the organisms, along with their biochemical ‘bag of tools,’ are fully prepared to go to work.



Kyle Waters shows root depth and mass 30 days after resodding. He credits weekly biostimulant applications.



Fred Behnke, CGCS, displays a plug removed from a bentgrass putting green treated with a biological-based fertility product.

“Community fermentation products perform a variety of functions within the soil, including reducing compaction and salinity, improving soil structure and water holding capability, and improving plant nutrient availability,” says Dr. Ames. “Reducing compaction and speeding up the grow-in process for bare spots are significant needs in sports turf management. If the underlying cause of poor turf growth is soil compaction, then products that stimulate turf growth without addressing compaction do not provide a solution to the problem. Some fermentation products can reduce compaction by working within the soil to improve structure.

“Once the soil problems are alleviated, then rapid growth is needed to close in the turf. This growth process is not merely stimulation of shoot development, but must be complemented with improvements in soil structure and nutrient availability,” Dr. Ames says. “These soil improvements relate directly to strong root development, which relates directly to good shoot growth and coverage. Again, this is the basis behind newer fermentation products: improve the soil and plant growth responds accordingly.”

“Recent advances in science have led to the commercial development of biological products that provide many of the beneficial microorganisms that help grasses thrive under stressful conditions,” says Dr. Kernan. “Such products include mycorrhizal fungi and beneficial rhizosphere bacteria, which can significantly increase water and mineral absorption, provide sustainable soil fertility, improve soil texture, reduce thatch buildup, and in combination with a comprehensive program, can help reduce disease pressure.

“Furthermore, biological treatments can restore some of the natural growth characteristics of turf, and can provide noticeable resistance to various environmental stresses,” says Dr. Kernan. “This leads to a smoother transition between warm and cool season grasses and a reduced reliance on the more expensive fertility and pest management treatments. Of course, you will want to maintain your chemical fertility and pesticide treatments. But your turf will not be completely dependent on these inputs when it has biological partners to support its needs for water, minerals, and stress defense.

“Grasses associate symbiotically with the most common group of mycorrhizal fungi, called ‘VAM’ fungi,” Dr. Kernan says. “These fungi significantly improve water and mineral uptake for their host plants. Additionally, various beneficial soil bacteria colonize the root zone of grasses, where they perform various fertility-enhancing functions. In turf settings under intensive management programs, VAM fungi and beneficial bacteria tend to be scarce. As a result, such turf is quickly undermined by stressful conditions and requires a lot of care. A few simple treatments can reverse this trend, changing a wimpy, stress-intolerant turf into a hardy, stress-resistant turf.”

## **How to incorporate**

There are many different types of microbial products, but not every product will fit comfortably into a sports turf management program,” says Dr. Ames. “Products that need special handling, mixing, or other conditions for use would be less desirable than products with fewer restrictions. High quality fermentation products will often have a very long shelf life and they do not require special refrigeration or mixing with other ingredients. They can be mixed with herbicides and most fertilizers. Compatibility with fertilizers makes these products much easier to combine with existing management practices.”

“Many people are under the common misperception that using biologicals necessitates the abandonment of a chemical management program,” says Dr. Kernan. “This is not correct. Biologicals represent new management tools that can be incorporated into an existing fertility program based on chemistry. Good chemistry and good biology can work together, hand in hand. While there are some chemical and biological treatments that are incompatible if mixed in the same tank (like fungicides and mycorrhizal fungi inoculants), both such treatments can be used with care and proper timing.”

“Biostimulants, and microbial products in particular, should not be broadly grouped as all functioning the same,” says Dr. Ames. “University data should be available to support claims of improved soil conditions and turf growth, despite the claims of some ‘experts’ that no value is provided. Manufacturers of microbial products, or any type of biostimulant, should be able to provide data to support product claims as well as provide guidance for product evaluation.”

### **User comments**

Philip Boutwell, a parks and rec supervisor for Lee County, FL (Ft. Myers) and an STMA member, has used both Focus and Launch biostimulants from PBI/Gordon once a month for nearly 4 years. “Both help with stress recovery and green-up,” says Boutwell. “Focus especially helps keep the green color going during dry conditions though we’re finally getting some rain after a very dry winter.”

Water restrictions add to his dry conditions. Boutwell says his community is now under permanent water restriction and has been for more than a year.

Boutwell uses the biostimulants mostly for his infield and sidelines at the Lee County Sports Complex, home to the Gulf Coast League’s Twins (Rookie League), and only occasionally in the outfield.

Dan Oschner, head groundskeeper for the Single A Dayton Dragons, uses both liquid and granular form biostimulants, all of them from ROOTS. “I have seen good results with other products but when I came to Dayton last year the ROOTS program was being used and I liked the results,” he says. Products include TurfVigor, KCS, Fe8, Turf Food, and EndoRoots.

“I like to use these products every 10-14 days if possible, based on the schedule,” Oschner says. “Reality doesn’t allow that so we get them down, although not always together, whenever we can. We double up the application around home plate and other high traffic areas, especially of the KCS product.”

Again, at this level, budget restrictions are not an issue. "Within reason, my budget provides for all my wants and needs," says Oschner.

"I use many Floratine products for my turfgrass and even on my flowers," says Kyle Waters, director of sports turf and grounds at the Home Depot Center in Carson, CA. "I apply Astron, Perkup, Protesyn and, in the summer months following the X-Games resodding. I use Per-4-Max weekly on the stadium field along with my foliar N, P and K program.

"I especially like using these products before and after concert dates to help with stress caused by covering the field for days at a time," Waters says. "After using them for 3 years now I see a huge benefit in the health and strength of the turf following weekends where we have as many as 4-5 soccer games or covering the field for 14 days, which happened last summer. The pre-and-post-concert plan involves Perkup for calcium, Protesyn, Turgor, and lots of potassium from FG-20 and PK Fight.

"On the eight practice fields out front I use Largo 3000 each month with my Primo applications every 30-45 days," he says. "I have seen a huge increase in root length and mass on the stadium field since using Astron and Per-4 Max. Last year after the new sod was laid for X-Games we were able to achieve good depth and mass in only 30 days from weekly Per-4-Max applications. After I overseed in the fall I switch over to Astron for the cool season and saw similar results in my ryegrass.

"I was very skeptical in the beginning about the benefits but after using them for 3 years I would not ever take them out of my turf and water management programs," Waters says.

Mark Clay, a 25-year turf veteran and now the sports field manager for Alltel Stadium in Jacksonville, also uses biostimulants. "I've tried all the products and they all have pros and cons," Clay says. "You need to find one that works for you in your area. It takes trial and error and using test plots.

"If you ask 10 guys what works for them you'll get 10 different responses," says Clay. "It takes more than one season to find out what benefits you're getting from some products."

"Last summer we started using Focus and Launch as recommended by George Toma. We had resodded our field at Alltel and had received sod that was right off the farm and not really sportsturf sod," Clay says. "We really had to beat up that grass through verticutting, mowing low, and brushing it to get the grain out, and the bio products we used throughout the process to help the turf recover."

Clay says initially he used Focus at a rate of 8 ounces per 1,000 square feet every 14 days for 2 months then cut back to that amount once a month during the season. "To stimulate the roots, we used Launch at 7 pounds per 1,000 square feet once a month after we sodded," he says. "We don't use any of these products in the offseason."