By ANDREW OVERBECK

While biological control products have gained a significant foothold in the U.S. turfgrass market, the young industry continues to redefine itself with new products, technologies and techniques almost daily.

"When you are talking biologicals you are talking about the soil ecosystem which is a new frontier that we are learning more about every day," said Rick Geise, brand manager for Nature Safe. "We are just scratching the surface right now."

Universities and companies are conducting research to determine methods to improve microbial efficacy, sustain microbial populations, identify specific beneficial micro-organisms, lengthen the shelf-life of products and combine products with traditional chemical applications.

**BIOSTIMULANTS**

Through a variety of delivery mechanisms, activities and organisms, biostimulants, generally, encourage healthy turf growth, increased root mass and improve soil quality to help turf survive weather- and disease-related stress.

**Bio-control research surges, new products abound**

By ANDREW OVERBECK

However, new research and products are showing that some biostimulants have disease-suppressive qualities as well.

**New Products**

For instance, Sybron Biochemical's TurfVigor microbial product line concentrates on feeding beneficial microbes in the soil to enable turf to fight disease more effectively by increasing the plant's ability to absorb nutrients and develop a larger root mass.

"It allows the plant to turn on 'defense' genes. By inputting precursors to certain phytohormones, we can allow the plant to choose to turn on the genes to protect itself," said Dr. Dave Drahos, research and development group leader at Sybron. "At an application rate of every two weeks, they will have a benefit at helping the plant at certain growing points in the season that allow the plant to do much better at laying down a more branched root system that will take heat stress more efficiently and be more resistant to diseases like dollar spot."

Also new to the market is Plant Health Care's Colonize biostimulant that contains mycorrhizal fungi to stimulate the rapid colonization of turfgrass roots.

"Colonize stimulates what is already there," said President Wayne Wall. "There is often some mycorrhizal fungi on greens, but not enough to provide a benefit because it is constantly being suppressed." According to Wall, research has shown that greens with an abundance of the fungi are much healthier, produce more chlorophyll, absorb nutrients and are more resistant to drought.

Floratine Products Group's Floradox system includes various soils, biological and turf-related products that work together to enhance the activity of pathogens, biocontrol products, and soil properties.
New Bio-control research and products abound

Continued from page 21

William Byrnes. "That is the basis of good health. Control is an adjunct. We want to help the plant win the war itself through good soil and plant management. Depending upon the golf course, any list of products can go into that."

Being added to the Floradex line this year is Proteox, a liquid organic complex that conserves plant energy and directly improves its photosynthetic efficiency by providing complete amino acids, proteins, and carbohydrates which are needed by turfgrass that is under stress and intensive use. Photosyn, a compost tea formulation, works in concert with Proteox to improve the health of stressed soils.

"There have been good results in California and Florida against nematodes, fairy ring in Texas and take-all patch in Scotland," said Byrnes. "We don't pretend that it is a fail-safe device, but along with good fertilization, water and air management and cultural practices, it is an effective tool to move down the line towards reduced reliance on chemicals."

According to Geise, Nature Safe products have also demonstrated the ability to manage disease and pest outbreaks.

"We don't claim that it is a disease suppressant, but we claim that it can aid in disease management," he said. "We have done studies with dollar spot where the efficacy was increased and less fungicide was used. Nature Safe also is doing an ongoing study on nematode suppression.

University Research

While the disease- and pest-fighting qualities of composts and biostimulants are apparent, work is being done to identify which specific microbial organisms in composts are leading the way.

For the past five years, Dr. Eric Nelson at Cornell University has been screening organisms in composts that had suppressive qualities to identify which organisms were responsible.

"We have plots of fescue and we have been applying compost on them and some have been suppressive, some have not and some were suppressive but aren't anymore," said Nelson.

By inoculating the plots with Pythium and then monitoring which plots fight the disease, Nelson hopes to identify the suppressive activity and the microorganisms.

However, this has proved difficult. "It is like finding a needle in a haystack," he said. "We can only isolate and study less than one-tenth of one percent of the microorganisms that you can see in the soil."

Using new molecular methods to study the organisms may assist Nelson and he hopes eventually to be able to create more predictably suppressive materials.

In the meantime, he is looking at the influence of cultivars on the activity of micro-organisms. "We are going to look at what the differences are when you put them out on A-4 versus Penncross bentgrass," he said. "In agricultural crops this has made a huge difference in efficacy."

Efficacy, however, can be improved immediately by sticking to some rather simple application rules, said Nelson and Michigan State University's Dr. Joe Vargas.

"You must apply them properly," said Nelson. "You can't use the fungicide paradigm and apply them every two weeks and expect to have activity. You have to apply them frequently to maintain population levels."

According to Vargas, applying micro-organisms after dark will improve efficacy. "The organisms are damaged by ultraviolet light and desiccation."

Here's some Food for Thought...Remember High School health class? You learned the basics of nutrition. Eating right is the foundation to staying healthy and looking great! Turf and soil management is no different.

Providing a nutritional foundation for your turf management program is the cornerstone of Nature Safe's philosophy. Formulated from the highest quality animal and plant proteins, yeast, sugars, carbohydrates and humus, Nature Safe conditions the soil, stimulating microbial activity and delivering a predictable, slow release feed to the plant. The result, healthy turf that can improve the efficacy of an overall IPM program.

Nature Safe's extensive product line is validated by over 20 university research studies. Exciting new formulations like 20-1-5 and 13-0-11 (with Polyon), as well as 15-2-8 (with Meth-Ex 401) have been added, providing unparalleled options for turf managers.

Find out why superintendents around the country are making Nature Safe their natural choice for optimum soil and plant nutrition.

For a distributor near you, FREE video, research and product information, call (800) 253-4727 and visit our website at www.naturesafe.com

The Breakfast of ChampionShip Quality Turf

15-2-8 (with Meth-Ex 401) have been added, providing unparalleled options for turf managers. Find out why superintendents around the country are making Nature Safe their natural choice for optimum soil and plant nutrition.

For a distributor near you, FREE video, research and product information, call (800) 253-4727 and visit our website at www.naturesafe.com

Continued on next page
Bio-controls
Continued from previous page
said. "By applying it as close to dark as possible, you eliminate those problems."

BIOFUNGICIDES AND BIOINSECTICIDES
Biofungicides and insecticides are also continually applied to provide a constant supply of microbes to the turf. Since live microbe populations must be maintained, product development has focused on delivery methods and product stability.

"The challenges are having it produced at the right times, in the right quantities, the right temperatures and conditions," said Max Gelwix, president and chief operating officer of Eco Soil.

Eco Soil's BioJect system, which is being used on 384 courses nationwide, provides on-demand readiness for the production of biologicals that improve soil and turf health and provide preventative disease and pest control. Last year it introduced the Fresh Pack system, a concentrated mixture of biologicals that is shipped to courses overnight to be used within 48 hours, thus eliminating shelf-life issues. The system is ideal for smaller applications and is being used by more than 1,000 courses.

Eco Soil is also concentrating on cataloging and determining the value of the more than 2,500 microbes that it acquired from the purchase of Agrium last summer. "We will learn which bugs have beneficial aspects in terms of growth promotion and biological controls," said Gelwix.

Stability and consistency were the major concerns for Growth Products when developing its new biofungicide Companion.

"When we started looking at biological control, we looked more at the solution because stability was the most impor-