Biologicals Gaining Steam in Mainstream Use

Biological Product Industry Meet in Orlando

By Patrick Cavanaugh, Editor

A biological products committee meeting discussing regulations

Nearly 200 individuals from the worldwide biological products industry were in Orlando in October for the Fall 2017 semi-annual meeting of the Biological Products Industry Alliance (BPIA). The two-day meeting featured experts from the EPA, USDA, universities, as well as others involved in the biological products industry.

BPIA is made up of manufacturers of bio-pesticides, and also bio-stimulants that control pests and diseases and boost the natural defense of plants in the agricultural industry. "We're also marketers, distributors, service providers – anyone who touches the biological industry as we define it. We define it as bio-stimulants and bio-pesticides," noted Keith Jones, Executive Director of the BPIA.

"There has been tremendous growth in the association. When I came on board two years ago we had 85 member companies. As I sit here today, we have 122 member companies on board, which range from very small, sole proprietors (a couple of folks at some innovative, new technologies), all the way up to the largest agrochemical companies in the world," Jones said.

Some biological products, such as B.t.s have been around for more than 50 years while others along with bio-stimulants, are very new and innovative. Some aren't even on the market yet, but headed that direction.

"There are two big drivers for biological," said Jones. "One is consumer demand, and really if you look to Europe, they're about five years ahead of us. In Europe, people really care about not only what's on their food, but also what their children and pets are being exposed to. The other driver is increased regulatory pressure. Europe is ahead of us there too, ratcheting down on a lot of the traditional tools that were available to growers. Those tools are going away in Europe. I think here in the U.S., you may see some of that too with EPA."

Jones noted that the BPIA is a big believer in integrated pest management (IPM). "We never say that biologicals are the silver bullet – they're not. They're most effective when they're

Keith Jones, Executive Director of the BPIA.

used in conjunction with traditional chemistries," Jones said. "The worst time to start a biological is when you're having a major problem. The best time is to start early as a preventative. They are really good in tank mixes, used in combination, because they will extend the life of traditional chemicals," he explained.

Most biologicals have multiple modes of action, so they help with pest resistance. "They don't build up the resistance in the same way that they might to a traditional, but by using them together, you can extend the life of that traditional chemistry," he said.

Biologicals Getting Mainstream

Oliver Gernsheimer, BASF Functional Crop Care, based in Research Triangle Park, North Carolina, noted that they are incorporating biologicals into their overall crop protection program and have one particular product know as Serifel coming out soon.

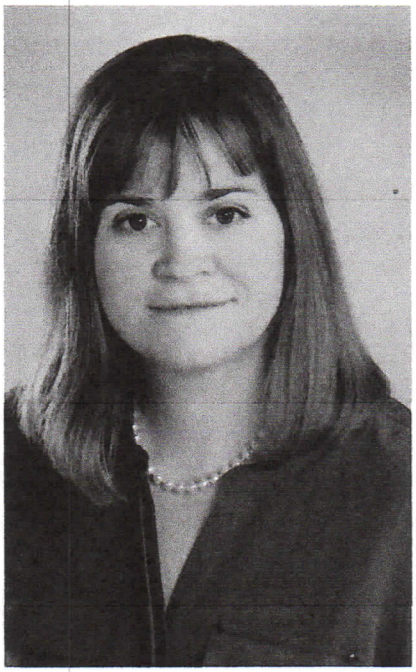
Bacillus subtillis is a widely used class of bacterial in biological products, with certain strains allowing different targets. The unique strain for Serifel is MBI 600. "We are looking at a broad range of crops for this Serifel. We are looking at a whole range of vegetables and fruits including strawberries, lettuce, grapes, and spinach," said Gernsheimer. It is a preventive product as most of the biologicals are. The product is also unique because it works with a highly concentrated formulation, at a very low use rate.

"It's impressive when you look at it as there are about 1 trillion spores that cover the leaf, and those spores form a protective shield around the leaf, protecting it from pathogens," Gernsheimer added. The product is for foliar and soil application. Currently it has not been approved for soil use in California, but it is in the process. The product offers protection from Powdery Mildew, botrytis and other commonly known diseases.

Sarah Reiter is the US marketing head for the Stockton Group, the registrant for Temorex Gold, a biofungicide with the active ingredient plant extract, Melaleuca alternifolia (a tea tree oil). This product is commercially available across the US, except for California growers where it is currently pending. "We have been selling outside of California into the fruit and vegetable markets for the control of mildews, and Botrytis, Sclerotinia, Monilinia, Anthracnose and Alternaria," she said.

Oliver Gernsheimer, BASF Functional Crop Care

Temorex, an oil-based concentrate, is registered on strawberries, tomatoes, peppers, leafy vegetables, tree fruit, tree nuts and vines. Reiter noted that when testing Temorex, the company would not compare it to other biological products. "It has been tested against conventional products, because it performs like a conventional, and is very consistent," she added.



Sarah Reiter the US marketing head for the Stockton Group

The product has a very advanced formulation, so there is excellent bioavailability of the active ingredient. It is effective at low doses, usually 14 to 21 ounces per acre, which is a similar rate as conventional products.

The application strategies for Temorex Gold are always in alternation. "Like all fungicides, we want it alternated with the best chemical chemistry if a grower is producing conventionally; and if a grower is trying to produce at one of he organic certifications, then we want it alternated with the best organic tools," she noted. Once registered in California, the product will be available through their Simplot representatives.

Stockton Group is also offering another biofungicide known as AVIV, a patented strain of Bacillus subtilis. It's from a Spanish company that we are partnering with Seipasa S.A., which has had the technology in other countries but they are excited to launch it in the U.S.

AVIV is different than other Bacillus subtilis products in that when its formulated, it goes through a process thereby making the Bacillus far more bioavailable. This enables the product to be used at low rates around 20 ounces per acre, where other competitor Bacillus products are applied up to 10 times that rate.

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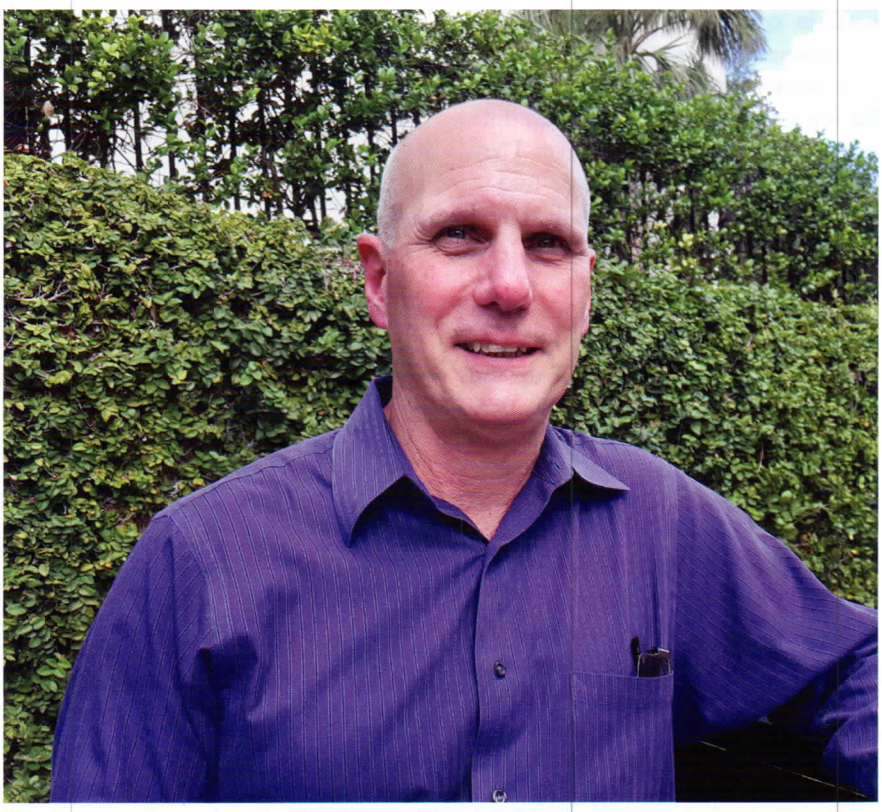
The target crops of AVIV are the same as Timorex, however it's a powdery mildew specialist. "We see a nice fit in grapes, berries, pome and stone fruit," she said. "Since it is a Bacillus subtilis and will colonize the roots and prevent infection by soil diseases, it has a nice fit in potatoes and carrots as well." AVIV is not currently registered in California.

Bill Foster is president and CEO of BioWorks who makes a biological product called RootShield Plus. This is a beneficial fungi that grows on the roots of plants, shielding them from damaging fungi in vegetables, such as Pythium, Phytophthora, Rhizoctonia, Fusarium and other pathogens.

RootShield Plus is BioWorks' key product and used widely in the U.S. Canada and Mexico. "The beneficial fungicide on the plant roots shield the roots from the damaging fungicides, which cause the damping off diseases," said Foster. "It doesn't kill the damaging fungi, rather it shields it from damaging the roots."

BioWorks also has introduced BotryStop, a biofungicide to the U.S. The product, not registered in California, was developed specifically for the control of pathogens such as Botrytis, Sclerotinia and Monilinia on vegetables, grapes and small fruits.



Tim Damico, Executive Vice President of Certis USA

Tim Damico, Executive Vice President of Certis USA spoke about Double Nickel 55, broad-spectrum preventive biofungicide that controls or suppresses fungal and bacterial plant diseases. For use on fruit and vegetables crops, Double Nickel employs five modes of actions, all working together.

The target pests of Double Nickel are powdery mildew, Sclerotinia, Botrytis, Alternaria, Bacterial leaf spot, Bacterial spot and speck, Fire blight, Xanthomonas and Monilinia.

Bill Foster is president and CEO of BioWorks

Also, this year the company introduced a new biological product called LifeGard WG, a biological plant activator. "It's really the first biological activator, which induces resistance to pathogens," said Damico. "It doesn't control fungal and bacterial diseases directly. It's a triggering mechanism, which has a cascading affect on the plant, and consequently the plants defense mechanisms are boosted and the diseases are depressed, or controlled."

BioCeres is a new strain of the fungi Beauveria basiana discovered in Italy in 1815. There was a sharp decline in silkworm production and the entomologist back then, Antonio Basiana, discovered the fungi that were responsible for white muscarsdine disease causing the decline of silkworm production.

"The new strain, ANT-03, is different from commercially available strains in that it is more aggressive and resilient, lasting longer in the environment. And it's more pathogenic when it comes in contact with insects that you want to control," said Jay Sughroue, Ph.D. with BioSafe Systems about the new

BioCeres WP Biological Pesticide.

"Fast forward several decades, and now, we have commercially available products that are controlling very important agronomic pests, such as thrips, aphids and white flies," Sughroue said.

Sughroue noted that it's important to follow important application strategies. "You want to apply this prior to high population development," he said. "It's not a knockdown, so you want to be out there scouting fields. As soon as you start to see numbers that are indicative of causing damage, you want to start a spray program that contains BioCeres, and then after about 5 to 7 days, you'll start to see the pests decline in population."

The fungi spore germination is the key to the effectiveness. The spore lands onto an insect. It doesn't matter if it's an egg, a nymph, a larva or an adult. It starts to germinate, and through enzymatic activity and mechanical pressure, it grows inside the insect, and it will start to sporulate so the insects come down with a severe case of the flu. They stop feeding immediately. The product is best applied early before the disease manifests itself, and gets too far along in the process.

Other biologicals discussed at the meeting were Bayer Crop Science's Serenade ASO fungicide a tool designed to protect against the effects of soil and foliar bacterial and fungal diseases.

Applied at planting or through chemigation, Serenade quickly builds a disease-protection zone around the seed or transplant. Applied as a foliar spray, Serenade ASO protects crops against diseases; both applications result in higher yields. It has a wide crop registration in California including citrus, cucurbits, onions, potatoes, strawberries and tomatoes.

Marrone Bio Innovations, Inc, (MBI) recently received approval from the U.S. EPA on its newest biological fungicide, Stargus. This product is the sixth product commercialized by MBI in only 11 years.

The product is based on a new strain of Bacillus amyloliquefaciens discovered by MBI, targeted to downy mildews, white molds, Botrytis gray mold and bunch rot. The fungicide also controls pathogenic soil fungi, including diseases such as Fusarium and Rhizoctonia, as shown in field trials in the U.S., Canada and Europe. Stargus is the new brand name and will be focused on specialty crops such as grapes, and leafy greens. It will also be labeled for use on root and bulb vegetables such as potatoes, carrots and onions. MBI expects first sales when state registrations are granted.

Pam Marrone, MBI's Founder and CEO

This product is also complementary and additive to the broad spectrum of diseases covered by MBI's first biofungicide, Regalia, providing a solid one-two punch to a broad spectrum of plant pathogens. MBI and partners also are testing this Bacillus-based product for seed treatment applications.

"We knew that new solutions for downy mildews were badly needed, so our team of scientists set out to find one," said Dr. Pam Marrone, MBI's Founder and CEO. "Our screening platform tested more than 16,000 microbes against important plant pathogens and discovered this novel candidate with a broad spectrum of performance and stand-out activity against downy mildews, Botrytis gray mold/bunch rots and white molds," said Marrone.

Jay Sughroue, Ph.D. with BioSafe Systems