

Today's Biological Products Show Efficacy, Promise and Acceptance

You're not alone if you think a new biological is introduced as regularly as the weekly radio farm market recap. As their use becomes widely accepted, suppliers deliver potential biological solutions as fast as the market will bear. Plus, growers are eager to learn about them.



Ronald Geis (pictured at left), Market Development Specialist, Corteva Agriscience, puts the seeming avalanche of new biologicals in perspective.

"Biologicals are relatively new in the United States, but they've been used worldwide for decades," he says. "They're important in many areas, particularly

in countries where regulations on synthesized fertilizers have required farmers to move to biologicals to get crop response and production."

The biologicals market is noteworthy.

The current world market for biological products is approximately \$9 billion annually. There are an untold number of sellers, too. Geis says the most recent data he reviewed showed the dominant manufacturer having only a 7% share of the market. The market may not be mature, but it's not trivial, either.

"Sales of biologicals are nearing those of the insecticide market," Geis says. "I don't think anyone would say that segment is a trial-basis market."

Biological categories defined

Put simply, a biological is an agriculture solution derived from natural materials. Understanding what biologicals are and can do is relatively straightforward. Geis uses a comparison of chemistry and biology to illustrate how they're unlike conventional products.

There are three categories of biologicals: biocontrol products, biostimulants and pheromones:

- **Biocontrol products blend nature and science to help provide the plant protection from insects and diseases.**
- **Biostimulants enhance plant resilience and growth by improving plant vitality and vigor.**
- **Pheromones offer tailored applications to manage targeted pests.**



"Biologicals include biofungicides, bioinsecticides and biostimulants," says Michael Moechnig (pictured at left), Biology Team Leader for Biostimulant Field Research, Corteva Agriscience.

"We put biostimulants into three categories. One, some products focus on improving nutrient efficiency.

"Chemistry gets to the atomic level and makes new things that didn't exist. With biologicals, we tap into a source's existing, natural benefits. Then, we figure out how to synthesize, or make more of it, to get the benefits of a biological on a broad basis."

—Ron Geis

Second, other products focus on improving metabolic processes. Last, some products provide stress mitigation or improve the ability of a crop to tolerate environmental stresses, such as drought."

Stabilizers are not in any biologicals category as they're a synthetic chemistry. However, Moechnig says one can complement the other.

"The primary function of a stabilizer is to suppress enzymes or specific bacteria in the soil that contribute to nitrogen loss," he says. "A biological is generally intended to increase the populations of bacteria that may increase nitrogen availability to the plant. So, while the two work very differently, they can work together well. In many of our field trials, we see additive yield increases from biologicals and stabilizers when they're both used on the same crop."

Corteva biological offerings

Corteva Agriscience's U.S. product pipeline has an extensive lineup with new developments and products already on the ground working. Navigating the pipeline is a purposely arduous process for any of these products before getting released for marketing.

"Our research is broad in that we have chemists and microbiologists working in labs evaluating products and conducting related testing," Moechnig says. "These product concepts eventually go to the field where field scientists work in small plot research-type environments followed by field strip trials using standard production practices. We have people all over the U.S. testing these products.

"Plus, we're testing in more than crop environments, but also in turf, pasture and range," he adds. "We're engaging a wide range of people in these evaluations, including retailers. This helps us provide support to growers and perhaps even the peace of mind that these products are extensively evaluated before being marketed."



Currently there are four Corteva biologicals available for corn and soybean crops in the U.S.:

Biocontrol product:

Hearken® biological insecticide is a virus that targets Heliothine species, such as corn earworm, tobacco budworm and the Old World bollworm. Used as a foliar application, Hearken is safe for beneficial and non-target organisms and complements traditional chemistries to easily fit within integrated pest management programs.

"Hearken controls one of the top pests in seed corn production, does it naturally and has a very soft footprint on anything that's not an earworm," Geis says. "If we can increase the production of our seed corn by managing one pest and do it in a natural way, it's a new way to control the pest so resistance doesn't build up. It's a good rotation or good supplement to how we're already using synthetic chemistries."

Biostimulant products:

Utrisha® N nutrient efficiency optimizer improves plant vitality for a healthy harvest by fixing nitrogen from the atmosphere and converting it to ammonium. It supplies nitrogen throughout the crop cycle in an effective and controlled way.

"Utrisha N is a living bacteria applied as a foliar spray and once it gets inside the plant, it colonizes and reproduces there. Once colonized, it will take waste material from the photosynthesis process and convert it into nitrogen. So, we're able to fix the atmospheric nitrogen that surrounds us," Geis explains.

Sosdia™ Stress abiotic stress mitigator helps reduce yield loss in corn and soybeans associated with environmentally stressful conditions such as drought, heat, salinity and ultraviolet light. Sosdia Stress contains proline, a natural amino acid, and potassium to protect plant cells, reduce water loss and improve stomata function.

Utrisha® P phosphorous efficiency optimizer works with a variety of crops to improve below-ground phosphorus availability for invigorated plant growth and resiliency. This microbial solution can help you build a more well-rounded, sustainable nutrient management plan for optimized yield potential.

Address grower and consumer needs

"These and other biologicals are delivering for growers' crops across the country. From a late-season nitrogen boost to mitigating heat stress and needs in between, there is likely a quality biological product available to help. This addresses grower and consumer needs," Geis says.

"Biologicals are natural. So, if they can fill a need, or needs, for Corteva customers and increase production, or control pests, growers win," he adds. "Food consumers who prefer natural or environmentally friendly practices win because a fresh food or ingredients are produced the way they want."

"This is important because the non-farming public and companies that buy our crops will have increasing input on how we raise crops. Both audiences are generally comfortable with the benefits that biologicals and other natural products deliver," Geis notes.

Geis adds this input varies by region and crop makeup, but understanding the influence of non-farm input is worth considering when making input and production choices.

Ensuring efficacy and ROI

Getting optimal efficacy and ROI from biologicals starts with proper planning and research before deciding what products to incorporate into your nutrient management and pest control plans.

"The more information you can get on a product, the better," Moechnig says. "Third-party data is certainly useful. You also want to look for data that includes results over multiple locations.

"Another thing to consider is that you may be choosing a biological because of a location-specific situation. If so, you might see a stronger benefit depending on conditions. Take a product like Sosdia Stress, for example. It will be more beneficial during environmentally stressful conditions than less stressful ones. It's important to identify trends over locations and years to fully appreciate a product's efficacy."

Moechnig notes that biologicals are like fertilizers in that each field responds differently to them just as they do to nitrogen, phosphorous and potassium. Remember, biologicals are another tool to improve nutrient management programs or to help mitigate stressors.



Paulo Pagliari (pictured at left), University of Minnesota Associate Professor, agrees. "Once products are known to work for a specific soil, then they can be used in a nutrient plan. For example, if a product can consistently supply 25 pounds of nitrogen, then that amount of N can be removed from the amount needed for optimum yield. Farmers will have to test products

on their operations to see how well they work for them and then determine how they will improve nutrient management plans."

A new resource about biologicals is nearly here. A team with The Fertilizer Institute (TFI) and its Biostimulants

Council has developed a certification program to help ensure the overall quality of biological products.

"We've been working two years on a conformance standard guideline to develop our certification program," Ed Thomas, Vice President of Governmental Affairs with TFI, says. "The program is an attempt to get at least 80% to 90% of the products in the market highlighted. The biggest component of the program is efficacy, which is documented by data and the reasoning supporting it provided by biologicals manufacturers.

"Secondly, we want to make sure products won't harm the environment and are safe for workers to handle, so we have recommendations for testing protocols. The last component is composition. This ensures that if a manufacturer claims there are X number of organisms in a container, that number of organisms is present," Thomas continues.

"Our goal is that the labeling of these products makes it clear to growers what a product is, when and where it works and what its limitations are."

The certification program has completed a pilot and beta testing. It launched in late June 2023 during TFI's InfoAg conference.

"Biologicals bring exciting opportunities to growers and consumers. We're always willing to share product data with customers," Geis says. "Corteva's history, strong seed and chemistry businesses and long research pipeline ensure our biologicals are backed by sound science and real-world experiences. This gives our customers the power of nature."

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