INNOVATIONS

David Bryla/USDA ARS

Oregon State University undergraduate student Chandler Sprueill in a greenhouse on the OSU campus is helping USDA Agricultural Research Service scientist David Bryla research use of biostimulants in blueberries.

USDA researcher studies biostimulants for blueberries

By MITCH LIES
For the Capital Press

Preliminary findings from research into the use of biostimulants in blueberries are proving positive.

In a study funded by the Oregon Blueberry Commission, David Bryla, a research horticulturalist with the USDA Agricultural Research Service in Corvallis, is evaluating the potential benefits of using different biostimulants in blueberries. At the moment, he is working with seaweed extract and organic (humic and fluvic) acids.

"It is very promising what we are seeing to date," Bryla said. "So far, both the seaweed extract and organic acids are improving plant growth relative to the well-fertilized control." And, he said, the best growth appears to be occurring in plants receiving a combination of biostimulants.

Bryla said the plan is to start in the greenhouse and then move to the field, where he will analyze how blueberry plants growing in large pots respond to biostimulants in different soil types over a period of two years.

Use of biostimulants has increased significantly in recent years. The Environmental Protection Agency, which put out a draft guidance for plant regulators earlier this year, describes them as naturally occurring substances and microbes that are used to stimulate plant growth, enhance resistance to plant pests and reduce abiotic stress.

"Their increasing popularity arises from their ability to enhance agriculture productivity by stimulating natural processes in the plant and in soil, using substances and microbes already present in the environment," the agency wrote in a March 21 release announcing the draft guidance.

"Biostimulants can improve soil health, optimize nutrient use and increase plant growth, vigor, yield and production," the release states. "They can promote greater water and nutrient use efficiency, but do not provide any nutritionally relevant fertilizer benefit to the plant."

One theory for the benefit they bring to plants is that they increase nutrient availability, according to Bryla. And, because biostimulants can increase root initiation and growth, some hypothesize they increase water availability for plants, which can be particularly important when irrigation is limited.

Ultimately, Bryla said, he would like to study the molecular aspects of biostimulants to better understand how they work. "We are looking to get a large grant to study the molecular response in the lab very carefully and test each product at different field locations," he said.

The research, he said, will help uncover optimum rate and application methods for biostimulants.

He added that other crops have shown a response curve when dosed with biostimulants. "You increase growth up to a point with a dosed rate, but eventually you can apply too much and lose production," Bryla said. "We want to figure out where that point is, so growers know exactly how much to apply."

Analyzing genomes to improve disease control in poultry

By SANDRA AVANT
USDA-ARS

Marek's disease — a highly contagious viral disease caused by a herpesvirus — is a constant threat to poultry worldwide.

It is also one of the most preventable diseases with vaccination.

However, while vaccines prevent poultry from becoming sick with symptoms of the virus, they do not prevent virus spread and mutation — considered the main reason for increased virus virulence, or severity, in field strains in U.S. commercial flocks.

To help improve the control of Marek's disease, veterinary medical officer John Dunn and his team at the Agricultural Research Service Avian Disease and Oncology Laboratory in East Lansing, Mich., analyzed Marek's disease genomes to find out which genes are mostly associated with virulence.

They sequenced DNA from 70 virus strains, collected over the years from across the U.S., and identified significant genetic variants — mutations — associated with Marek's disease virulence.

The study, published recently in the Journal of General Virology, also revealed that high virulence strains collected from the same farms in the last three years and in the 1990s were nearly identical.

This illustrates the ease with which virulent Marek's disease viruses can persist and spread between flocks as well as the difficulty in eradicating the disease from a farm once established, Dunn said.

Another finding worth noting was that new strains were no more virulent than older strains, which may suggest that current management and vaccine practices have slowed the ongoing evolution of the virus, according to Dunn.

Litter management to reduce viruses in the environment and optimize the microbial environment of the chickens is a critical component of bird health, even with good protection from vaccines.

USDA ARS

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What separates this research from other studies is the uniformity of how virus strains were phenotyped, Dunn said. Only U.S. strains were analyzed, which were all collected, isolated and phenotyped in the same inbred chicken lines and controlled conditions, using the same vaccines and control viruses. In addition, all strains were phenotyped by one of two ARS veterinarians.

The next step is to validate markers associated with virulence to determine if these markers may provide an alternative to live bird testing for evaluating virulence of new Marek's disease field strains.

The U.S. Poultry and Egg Association contributed to the funding of this research, according to Dunn.