Biocontrol for blight in blueberries promising

Commercialization possible in four to five years

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VANCOUVER – Researchers are working to develop a natural product so that blueberry producers have a biocontrol option to fight bacterial blight in their crops.

Pseudomonas syringae bacteria is a decades-old scourge of Fraser Valley blueberry fields, but UBC associate professor Siyun Wang and Agriculture and Agri-Food Canada research scientist Karen Fong have teamed up to tackle the foe.

The research team will design, test and validate a novel bacteriophage formulation to treat the blight the bacteria causes and begin steps towards commercialization of the solution.

"What this pathogen does is it … contaminates the crops early in the springtime and as a result, berry crops that are affected by this pathogen … will no longer be able to yield fruit," Wang says. "It affects a lot of blueberry crops across the entire province of BC."

Currently, producers apply copper-based formulations to control the pathogen, but *P. syringae* has developed resistance to the treatment.

"There is a real need and a real push to actually come up with alternative solutions that are not only ecofriendly, but also will help to mitigate antimicrobial resistance," Fong says.

The industry is looking to biological control using bacteriophages. The phages are naturally occurring viruses that can infect and kill bacteria. They're appealing to industry because they're sustainably sourced from the environment, non-toxic to humans, plants and animals and suitable for organic production.

Moreover, unlike chemical interventions, bacteriophages can evolve with the target bacteria. If *P. syringae* begins to develop resistance to a phage-based treatment, the viruses would adapt to continue its killing ways.

To add to the treatment's robustness, the researchers will assess persistent *P. syringae* strains of concern in blueberries using comparative genetics to create a "phage cocktail," Fong says.

"That's using three or more bacteriophages together in combination to really try to suppress resistance or delay the onset of resistance as much as possible," she says.

The team will also look to assemble a bacteriophage library that could contain more than 50 bacteriophages with diverse features, Wang says.

"[If] because of climate change or other factors, *Pseudomonas syringae* is actually able to evolve and develop resistance, then we will still have a solution to this problem," she says.

Spring launch

The project launched in April 2023 with a budget of $243,199 funded through the province's Genomic Innovation for Regenerative Agriculture, Food and Fisheries (GIRAFF) program.

Work is ongoing to determine the best application method, considering effectiveness and feasibility.

"I think a spray is definitely one of the ideas in the pipeline, and would probably be the easiest," Fong says.

The team aims to have a prototype of a phage treatment ready by the end of 2024, allowing trials on producers' fields in 2025.

"Regarding eventually having it being commercially available, we also have to obtain approvals for [use in] blueberry plants," Wang says. "We're hopeful that in the next four or five years, we can actually see such a product being available commercially for the growers."

Craig Seale of Blueberry Junction in Abbotsford says producers need to take cost, return on investment, application timing and equipment into account before embracing any new crop protection tool. He would be willing to participate in trials when the time comes.

The blight caused by *P. syringae* is a small concern in his blueberry crops right now compared to scorch.

"I'm getting nailed to the wall by scorch," Seale says.

He would be all ears for green biocontrol options for scorch or mummy berry, which he feels deserve significant attention from researchers.

Funding partners

This bacteriophage as a biocontrol method is one of eight new projects that received a combined $1.84 million in funding from the GIRAFF program, which is a partnership between Genome BC, Investment Agriculture Foundation of BC and the BC Ministry of Agriculture and Food funded by the federal and provincial governments.

UBC associate professor Siyun Wang is working with AAFC research scientist Karen Fong to develop a green treatment for bacterial blight in blueberries. *UBC FACULTY OF LAND AND FOOD SYSTEMS*