

Working at the place where biology and chemistry meet

David Liscombe receives honourable mention for his work in horticultural metabolomics

By Luke Edwards

A scientist at Vineland Research and Innovation Centre has been honoured for his work in metabolomics.

Dr. David Liscombe received an honourable mention in the Research and Innovation Excellence category at the 2024 Excellence in Agriculture Award. Recipients were announced at the Royal Agricultural Winter Fair last month in Toronto.

"It's really exciting to be acknowledged by the province in this way," Liscombe said.

He shared an honourable mention with Croptracker, out of Kingston, while Brock University's Cool Climate Oenology and Viticulture Institute took home the top prize.

Liscombe works at the intersection of chemistry and biology, studying the chemicals that plants produce and how they affect certain biological traits. His work at Vineland mostly focuses on metabolomics, a relatively new approach in the horticultural and agricultural sector.

"It's widely applicable to understanding lots of different complex problems in horticulture, and agriculture more broadly," he said.

Chemicals and chemical production in plants can have huge and wide ranging effects on the plant and the fruit it produces. Liscombe's work takes him from studying disease resistance and response to environmental stresses all the way to flavour profiles.

Metabolomics itself isn't entirely new, but using it in the agricultural space is. That's partly the result of improving technology. When Liscombe was in university he'd have to send samples to Germany, where a mass spectrometer the size of a room would be used to analyze the samples.

Now, thanks in part to funding from groups such as the Canada Foundation for Innovation, VRIC has its own benchtop system that Liscombe can use.

One of the big benefits of using the metabolomics approach is that researchers can more



David Liscombe earned an honourable mention at the Excellence in Agriculture Awards last month. ~ VRIC photo

quickly determine what kind of effect something is having on a plant. As an example, Liscombe said a biostimulant or other treatment might not have a visible impact on a tree for a year or more. However, at the chemical level, researchers can find effects more quickly and determine any potential benefits, drawbacks or other changes.

"We can monitor those responses on the molecular level and look at how the chemistry of the plant changes," Liscombe said.

Liscombe said he loves having the chance to be presented with a challenge, and figuring out ways to address it, especially when many people might not realize the role chemistry can play in solving such questions.

It was a lesson Liscombe himself learned back at McMaster University, when his organic

chemistry teacher Paul Harrison took a chance on a young Liscombe, giving the then-biology student a summer job.

"He really opened my eyes to how important chemistry is in biology," Liscombe recalled.

Like many other sectors, Liscombe sees the future of metabolomics incorporating more data science and artificial intelligence to comb through the reams of data they collect. While researchers can uncover valuable information, human eyes can only do so much in samples that include many thousands of chemicals.

Enhanced data analysis will also help with another direction Liscombe believes his area of study will take.

"Considering it from more of an agri-ecosystem rather than just looking at single organisms," he said. 🌱

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