

Ottawa researcher helps decode coffee's DNA

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University of Ottawa professor David Sankoff, along with researcher Chunfang Zheng, are part of the team that announced Thursday it has decoded the DNA of coffee.

Photograph by: Wayne Cuddington, Postmedia News, Postmedia News

One of the world's coffee experts - part of a team that announced Thursday it has decoded the DNA of coffee - has a cup at Tim Hortons each morning. He takes three creams and three sugars.

David Sankoff has a Canada Research Chair in mathematical genomics at the University of Ottawa.

His group's work now gives the world's coffee growers an important tool in improving their product and protecting it against agricultural pests. Published in the journal *Science*, the decoded genome, or full set of DNA in a species, "just opens up a whole enormous door into other work," Sankoff said.

"All these people (coffee researchers) are dying to get their hands on the coffee genome because it will just give everybody a boost. It's so much information there."

Sankoff is one of six core researchers on a team that combined about 15 labs in different countries.

So far it has decoded only the robusta variety of coffee's DNA, not the more popular arabica.

"The reason we did robusta is because arabica has a more complicated genome. It's made up of all

the chromosomes from robusta plus all the chromosomes from another species of coffee," Sankoff said.

His role was to study the evolutionary aspect of the genome, its relationship with other plant genomes.

It meant asking "what genes are present, and how many copies, and which ones have moved around and which ones have stayed there."

"When you boil down these questions, mathematical questions come out of it ... For me, as a mathematician, it's lots of fun to do this stuff."

Sankoff said he doesn't see the plants themselves.

"I don't even see the test tubes or anything. But I get the genomes and I work with the genomes. I like the idea that I'm working with grapes or tomatoes or coffee.

"Coffee is so important in everybody's life. Almost everybody drinks coffee. It's a big deal. I'm very proud to be involved."

About 2.25 billion cups of coffee are consumed globally each day.

Sankoff enjoyed teasing the French, Italians and Brazilians involved with the project. "I offered (an Italian scientist) a latte once and he looked at me, horrified, and said 'For me to drink a cup of coffee I have to put a spoon in first and see if it stands up by itself.'" There were no Colombians on the team. Rumour had it they weren't allowed to involve themselves with research on the robusta variety. Colombia prides itself on growing only arabica beans.

The next step is to study how and when each gene is expressed, or made active, in different coffee varieties. This will show the biological underpinnings of flavour and aroma.

But mysteries remain. "No one knows why coffee makes caffeine," Sankoff said. "What good is it? It's a dangerous chemical to DNA so why does coffee make it? Maybe it protects against some pest, or maybe it protected against a pest a million or 10 million years ago." The project showed that coffee evolved its ability to make caffeine independently from tea and cacao.

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