

Many eggs, many baskets

by [Vanessa Farnsworth](#)

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Project participant Gail Elder planting a row of trial potatoes complete with markers for each variety. Potato variety in foreground is the Ozette-Nootka. Photo: Valerie Huff.

With climate change impacting everything from bird migration patterns to wildfire severity, it's not surprising that Canadian researchers are taking a hard look at the challenges farmers are going to encounter growing crops in the face of increasing climatic instability.

“Thinking about how rapidly things are changing, we are setting ourselves up for failure because we have a very narrow crop base and a narrow way of doing things,” says Richard Hebda, retired curator of botany and earth history at the Royal BC Museum. “We cannot depend on Chile or Argentina or Australia or anywhere else. We have to depend on our own food.”

Hebda notes that average global temperatures have increased by roughly a degree over the past century with the greatest increases occurring in the north. Over the coming decades, rising temperatures will translate into the northern regions of Canada becoming increasingly hospitable to agricultural crops while much of the south, where we have traditionally grown our food, threatens

to become less so. Climate instability is also predicted to cause a tenfold increase in extreme weather events such as heat waves, droughts and flooding.

“All of these things create a risk to the food supply that will (increase)...because food exists on climate and climate is becoming less stable,” says Hebda, who grew up on a small family farm in southern Ontario. “The conditions for growing things in general are changing as is the occurrence of extremes, which means that some years you’ll be okay and some years you won’t and that some places will be okay and other places won’t.”

Crop-Climate Project - a ground-breaking research program

But it’s not all gloom and doom. His concern over the risk climate change poses to Canada’s food supply drove Hebda to help found the Crop-Climate Project, a ground breaking research program that sees organic farmers from diverse regions across Canada growing heritage potatoes in concert with in-field monitoring equipment that records critical weather measurements such as temperature and relative humidity.

“It’s a fairly intense little monitoring program for farmers,” says Valerie Huff, a restoration ecologist who coordinates the Crop-Climate Project. “They’re doing on-farm research that requires them to monitor every three or four days.”

It’s the correlation of concise weather data with potato growth characteristics that makes this project valuable and not just to the researchers who are concerned that conventional potato varieties may not fare well in destabilized climatic conditions. It’s also valuable to participating farmers who appreciate the insights that scientific measurements have brought to their operations.

“Farming is about millions of variables and the only ones you have control over are when you put something in the ground and when you take it back out. Everything else is a crapshoot,” says Chris Wooding of Ironwood Organics who operates a 170-acre organic farm in eastern Ontario and has participated in the project from its beginning. “All my farming experience was observational and trying crazy things and seeing if they worked. I had no measuring stick to start removing some of the variables so this project was my first introduction to that and I was absolutely hooked. I continue today to take daily weather station readings and it’s a big part of the farm.”

Three years of field trials

During the three years of field trials from 2014 to 2016, participating farmers were located in such varied climates as Vancouver Island, the Prairies, the Maritimes, southeastern Ontario and even the Yukon. In addition to those farmers involved in the core research program, the Crop-Climate Project also distributed potatoes to anyone who expressed an interest in participating and was willing to record their observations on a less formal basis, a strategy that resulted in anecdotal reports being submitted from across Canada.

“We put potatoes into the hands of the growers, gardeners, anybody, just to get them into the community and to get people interested in experimentation and in understanding that they can save the seed, produce the crop and settle on a potato that is best for their tastes, cooking practices and climatic conditions,” Hebda says. “By so doing, they develop the idea that they can do their own adaptations and develop their own regional or local variety and establish their own food security.”

Hebda believes that growing diverse potato varieties in a variety of locations and in different ways, something he calls the “many eggs, many baskets” approach, will help guard against the crop failures and high food prices that could very well be our collective future if the current generation of farmers fails to adapt agricultural practices to increasing climate instability. And he’s not alone.

“We’ve got to get on with it because the world is not in a good place and it’s getting worse by the year,” says Wooding, who has embraced the “many eggs” principle on his own farm. “From a strategic sense, it’s better for us to grow 30 different varieties. Every year, we have three miserable failures and every year we have 10 that are okay and eight that are absolutely stellar, but it’s never the same two varieties back to back year after year after year.”

Potatoes selected as test crop

Of all the crops the Crop-Climate Project could have selected by for its field trials, potatoes came up the winner because anyone can grow them, they’re easy to process and they form part of the staple diet in this country. And when it comes to food security, a crop anyone can grow anywhere without specialized knowledge is key. Of the 12 potato varieties selected for the trials the majority were heirloom, in large part because of their diverse genetic characteristics which can one day be used to engineer potato varieties that have been optimized for Canada’s disparate growing regions. The selected varieties included Banana, Chieftain, Congo, Corne de Mouton, Likely, Mrs. Moehrle’s Yellow Fleshed, Ozette-Nootka, Pugh’s Purple, Russian Blue, Siberian, Sieglinde and Slovenian Crescent. However, with literally thousands of heritage potato varieties in the world, growers were also encouraged to submit data on any other type of potato they were growing during the trial period.

Not surprisingly, results varied across regions, years and varieties.

Corne de Mouton, for instance, performed well in locations and during years when droughts dominated, while Likely proved to be a cold-climate adapted variety suitable for growing in northern regions, or possibly for overwintering, although its consistently low yields limit its commercial potential. But that may be beside the point.

“Heritage varieties are a source of diversity that absolutely needs to be conserved and preserved for the future,” says Huff. “It may be that Likely isn’t useful in and of itself but it can be used for crosses with more productive varieties in the future.”

Of the potato varieties that were trialed, one stood head and shoulders above the rest.

Ozette Nootka outperforms

“The one that we keep talking about is Ozette-Nootka,” Hebda says.

Ozette-Nootka is a heritage potato that was brought to Vancouver Island in the late 1700s by Spanish settlers and is thought to be Canada’s first potato variety. In field trials, this late maturing, yellow-fleshed fingerling produced high yields and showed little susceptibility to insects or disease. More importantly, it grew well across a wide range of climatic conditions.



“The Ozette-Nootka performed well even in the Yukon, which is surprising. It’s a very long season potato. If I plant it here (in Nelson, BC), I can plant it in April and it will grow until frost in October,” says Huff who, like her colleagues, didn’t know what to expect when they distributed this potato variety to growers across Canada. “It had never been grown anywhere except on the West Coast so we had no idea if it would perform well elsewhere. It certainly did.”

The Crop-Climate Project may have completed its field trial phase but that’s not the end of the project. It will continue for at least a few more years during which time it will expand to involve more small farmers, gardeners and other like-minded growers. Each participant will be asked to grow 10 to 15 potatoes of three different varieties and submit their observations to the project coordinator.

Anyone interested in participating in the Crop-Climate Project can go to its website (heritagepotato.ca) where you can request heritage seed potatoes, download observation forms and review the results for each potato variety included in the field trials. Hebda is particularly interested in encouraging participation by small farmers. He strongly believes they play a crucial role in contributing to our shared knowledge of which crops grow best and where.

Small farm participation critical

“The small farm is extremely important for the future because that’s where adaptation and experimentation happens. That’s how we got the food varieties that we have and how we learned to grow everything,” Hebda says. “Farmers are really the first plant ecologists because they are basically testing the ecology of everything they’re harvesting and growing every year.”

Farmers who participate in the project will have the opportunity to grow potato varieties that were a part of the field trials or they can elect to grow varieties they’ve been cultivating for many years. Hebda is especially interested in learning about any heritage varieties that farmers are maintaining.

“We may discover – and I can practically guarantee that we will discover – other Canadian heritage varieties that are very well suited to their regions. And if they’re well suited in place X then they may be well suited in place Y which has similar conditions,” Hebda says, adding, “We want to see diversification. We want to see people experimenting as widely as possible across Canada. It doesn’t take much – just a tiny corner of your field. But you’re contributing to data that will be available to everybody. So you’re not only doing it for yourself and your community, you’re helping everybody, not only in Canada but in the world.”

– *Vanessa Farnsworth*

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