CANADIAN AGRISCIENCE CLUSTER FOR HORTICULTURE 4

Fruit and Vegetable Growers of Canada's Canadian AgriScience Cluster for Horticulture 4

Update to Industry – March 2025

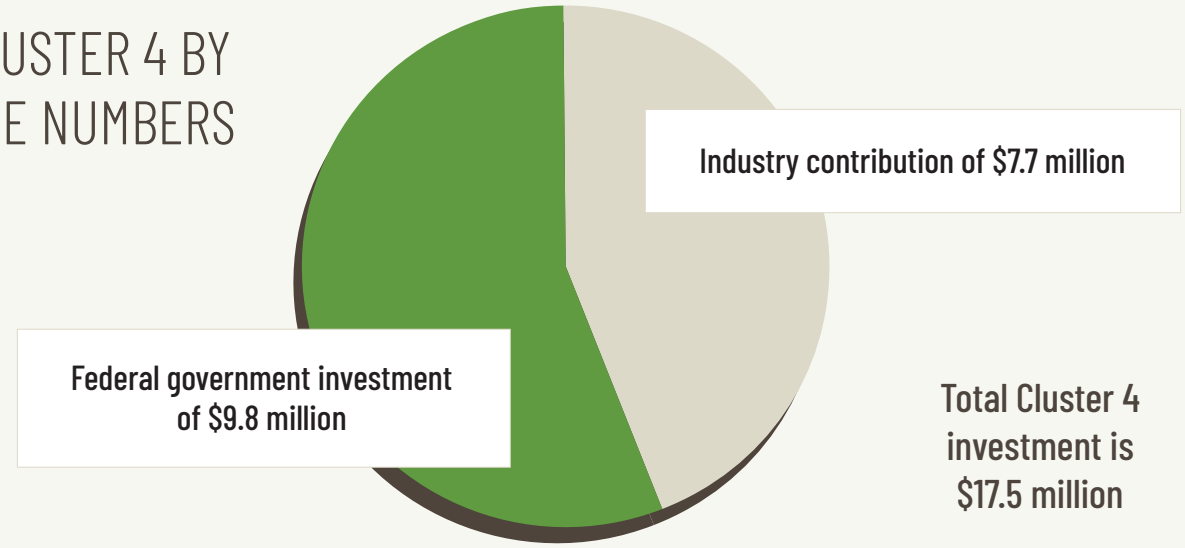
The Canadian AgriScience Cluster for Horticulture Cluster 4 is moving into its third year and is preparing for another productive year of research. The Cluster spans from 2023 to 2028.

Cluster 4 is addressing key challenges in the Canadian horticulture industry facing the production of apples, berries, field vegetables, greenhouse vegetables and potatoes. Through the 10 research activities, researchers are investigating ways to improve operational efficiency and sustainability for growers, reduce on-farm chemical use, improve soil health and identify more sustainable fruit and vegetable varieties for growers across the country.

This project is generously funded through the Canadian AgriScience Cluster for Horticulture 4, in cooperation with Agriculture and Agri-Food Canada's AgriScience Program, a Sustainable Canadian Agricultural Partnership initiative, the Fruit and Vegetable Growers of Canada (FVGC), and industry contributors.

Researchers are using the winter to analyze samples and make plans for the 2025 field season. Some of the preliminary results of these investigations are very promising. As detailed in this report.

CLUSTER 4 BY THE NUMBERS



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Apple Research Activities

The apple sector has two research activities with the Canadian AgriScience Cluster for Horticulture Cluster 4. These two activities are focused on helping apple growers across Canada protect their orchards and be more productive and sustainable.

THE CLUSTER 4 APPLE RESEARCH ACTIVITIES ARE:

ACTIVITY 4

Reducing losses from apple pests with alternative control strategies

LEAD RESEARCHER – Suzanne Blatt, research scientist in entomology with Agriculture and Agri-Food Canada at the Kentville Research and Development Centre

ACTIVITY 5

Apple crop load management: enhancing thinning predictability and tree response through advancements in modelling and new precision thinning products, strategies and technology

LEAD RESEARCHER – John A. Cline, professor of tree fruit physiology at the University of Guelph

This project is generously funded through the Canadian AgriScience Cluster for Horticulture 4, in cooperation with Agriculture and Agri-Food Canada's AgriScience Program, a Sustainable Canadian Agricultural Partnership initiative, the Fruit and Vegetable Growers of Canada (FVGC), and industry contributors.

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Reducing Losses from Apple Pests with Alternative Control Strategies

LEAD RESEARCHER

Suzanne Blatt
Research entomologist with Agriculture and Agri-Food Canada at the Kentville Research and Development Centre

This research aims to reduce apple crops losses from pests such as apple maggot and ambrosia beetles and other leafroller pests. The research team is investigating a protocol for sterile insect release for control of apple maggot (SIR for AM) to determine the potential for this strategy as a viable option for management of apple maggot. Ambrosia beetles are being identified in apple orchard agroecosystems, along with new methods to manage the pest. Researchers are also working to find a sustainable non-pesticide tool for management of leafroller pests.

The research team is evaluating the ratio of sterile to wild flies needed to stop apple maggots from stinging apples. The team is developing an artificial diet to raise large numbers of apple maggot flies for sterilization. Laboratory and sleeve cages on apple tree branches in field studies have been done with different ratios of sterile to wild flies. Several artificial diets for maggots have been tested. An artificial substrate to collect eggs is in development. Results from the field and laboratory ratio studies are being analyzed. This year the in-field ratio experiments will continue with a possible scaling up to whole-tree treatment.

Researchers are identifying captured ambrosia beetles and analyzing data to understand what makes an orchard more susceptible to an attack. Dying apple trees from some orchards and adjacent woodlots were collected in 2024 to count and identify emerging ambrosia beetles. Researchers have attempted rearing some ambrosia beetle species for future studies. Plans for the growing season will be based on data analysis.

Release devices for a biocontrol agent are being tested to ensure the device allows for the survival of parasitic wasps but is forceful enough to provide full tree coverage against leafroller pests. Researchers found that the device is easier than expected to attach to growers' sprayer setups. Researchers are hoping this will lead to faster adoption by growers.

KEY TAKEAWAYS:

- Evaluation of the ratio of sterile to wild flies needed to stop apple maggot from stinging apples is underway.
- Artificial diets to raise large numbers of apple maggot flies for sterilization are in development and are being tested.
- Researchers are identifying captured ambrosia beetles and analyzing data to understand what makes an orchard more susceptible to an attack.
- It is easier than expected to attach a device to growers' spray set ups to protect apple trees against leafroller pests. Researchers are hoping this will lead to faster adoption by growers.

FAR LEFT: A BugDorm where sterile flies emerge from sand post-sterilization in preparation for use in laboratory or field studies.
LEFT: A BugDorm containing 10 pairs of sterile flies and one pair of non-sterile flies in order to determine the ratio of sterile to non-sterile to prevent stings on apples.
Photos: Suzanne Blatt

Apple Crop Load Management: Enhancing Thinning Predictability and Tree Response Through Advancements in Modelling and New Precision Thinning Products, Strategies and Technology

LEAD RESEARCHER

John A. Cline
Professor of tree fruit physiology
at the University of Guelph

This research activity is aimed at thinning flowers or fruits on overloaded apple trees using new chemical thinners and technologies. Researchers are working to develop and use decision support systems to improve the management of apple crop loads. Researchers are also looking at artificial intelligent-based computer vision systems to aid in managing and measuring the response to crop load decisions.

At the Ontario Crops Research Centre in Simcoe, Ont., the research team conducted a thinning experiment using metamitron and Accede. The team investigated crop vision technologies and worked with thinning prediction models, including the fruit growth model and carbohydrate model. The researchers experimented with using the RIMPro weather carbohydrate model. Data analysis and report writing is ongoing and planning for the 2025 growing season is underway.

At Walsh Farms in Berwick, N.S. two thinning experiments were completed over the first field season by using new thinners and industry-standard thinners while also investigating the RIMPro carbohydrate model. Analysis of crop load and fruit quality is ongoing to produce an annual report. For the 2025 field season, the researchers plan to replicate the research activities with different weather conditions to observe changes in treatment effects and comment on the accuracy of predictive modelling.

Michelle Cortens discusses the influence of the fruit thinning products and strategies in a Honeycrisp orchard with Jeff Walsh of Walsh Farms in Berwick, N.S. Photo: Perennia, Nova Scotia

Jeff and Courtney Walsh of Walsh Farms in Berwick, N.S. evaluate the crop load on Honeycrisp trees after implementation of fruit thinning products and strategies. Photo: Perennia, Nova Scotia

Michelle Cortens evaluates Gala apples at the end of August 2024 to compare the efficacy of products and strategies at Walsh Farms in Berwick, N.S. Photo: Perennia, Nova Scotia

Following treatments with fruit thinning products and strategies, the Nova Scotia team counts fruit set and calculates crop load to determine efficacy. Photo: Perennia, Nova Scotia

KEY TAKEAWAYS:

- In 2024, researchers have conducted several in-field apple thinning experiments using metamitron and Accede.
- Researchers investigated crop vision technologies and worked with thinning prediction models including the fruit growth model and carbohydrate model.
- Analysis of crop load and fruit quality will be used to compare the treatments and suggest the accuracy of predictive modelling.

Berry Research Activities

There is one research activity from the berry sector for the Canadian AgriScience Cluster for Horticulture Cluster 4. This research activity is focused on finding new berry varieties for growers across Canada.

THE CLUSTER 4 BERRY RESEARCH ACTIVITY IS:

ACTIVITY 6

Canadian Berry Trial Network

LEAD RESEARCHER – Beatrice Amyotte, research scientist for small fruit germplasm development with Agriculture and Agri-Food Canada at the Kentville Research and Development Centre

This project is generously funded through the Canadian AgriScience Cluster for Horticulture 4, in cooperation with Agriculture and Agri-Food Canada's AgriScience Program, a Sustainable Canadian Agricultural Partnership initiative, the Fruit and Vegetable Growers of Canada (FVGC), and industry contributors.

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Canadian Berry Trial Network

LEAD RESEARCHER

Beatrice Amyotte
Research scientist for small fruit germplasm development with Agriculture and Agri-Food Canada at the Kentville Research and Development Centre

The purpose of the Canadian Berry Trial Network (CBTN) is to look into how new and established berry cultivars will perform in the typical berry growing regions of British Columbia, Ontario, Quebec and Nova Scotia. Fruit quality traits and yield potential are evaluated along with the economic competitiveness of new berry cultivars.

Preliminary results out of B.C. are showing that several test variety yields may outperform standard blueberry cultivars Duke and Draper. Results are being compared with data from Ontario, Quebec and Nova Scotia to find regional variations. Additional years of data collection are needed to determine if the yields are stable or fluctuate due to climate conditions, plant age, and/or pest and disease pressure. It is too early to recommend these new cultivars to growers until more data is collected.

The next blueberry trials will be established in 2026. The research team is currently in discussions with provincial industry associations, berry specialists and international colleagues to identify potential candidate varieties for trials. There are at least two promising advanced varieties from the B.C. Berry Breeding Program that are being considered, and new selections from U.S. breeding programs may be included.

The day-neutral strawberries in Ontario were harvested starting in fall 2024 with data collection continuing through to spring. The trials in Quebec, B.C. and Nova Scotia were not harvested in fall 2024 due to smaller plant size and instead will be picked starting in spring 2025. All June-bearing trials will be harvested in summer 2025.

There are no official strawberry trials planned for 2025. However, the researchers have decided to establish small trials in all four provinces to collect additional data on select promising varieties. The team is consulting with industry partners to identify four to six varieties of June-bearing and/or day-neutral strawberries to plant this spring. These trials will be harvested starting in the fall and maintained through the next growing season.

There were delays in developing testing agreements with Advanced Berry Breeding in the Netherlands to

Blueberry bush trials at the Agriculture and Agri-Food Canada Kentville Research and Development Centre in Nova Scotia. Photo: Beatrice Amyotte

trial five of their varieties including the new raspberry primocane cultivars Mapema and Malaika. Due to this, some of the 2024 raspberry trial plots were delayed and will be planted this spring. All raspberry trials will be given the full growing season to establish and will not be harvested until 2026.

KEY TAKEAWAYS:

- Preliminary results out of B.C. are showing several test varieties yields are outperforming standard blueberry cultivars Duke and Draper.
- The next blueberry trials will be established in 2026 with the research team currently identifying potential candidate varieties for trials.
- Day-neutral strawberries in Ontario were harvested starting in fall 2024 with data collection continuing through to spring.
- There are no official strawberry trials planned for 2025, but researchers have decided to establish small trials in all four provinces to collect additional data on select promising varieties.
- Delays in developing testing agreements with Advanced Berry Breeding in the Netherlands to trial five of their varieties mean these will be planted in the spring and harvested in 2026.

Calypso, a new blueberry with high yields in trials in British Columbia. Photo: Beatrice Amyotte

A flower on a strawberry plant at the Agriculture and Agri-Food Canada Kentville Research and Development Centre in Nova Scotia. Photo: Beatrice Amyotte

Strawberry field trials at the Agriculture and Agri-Food Canada Kentville Research and Development Centre in Nova Scotia. Photo: Beatrice Amyotte

Field Vegetable Research Activities

The field vegetable sector has two research activities with the Canadian AgriScience Cluster for Horticulture Cluster 4. These two activities are focused on making soil more resilient and protecting vegetable crops against pests.

THE CLUSTER 4 FIELD VEGETABLE RESEARCH ACTIVITIES ARE:

ACTIVITY 7

Increasing field vegetable yield and resilience to abiotic and biotic stresses through soil microbial engineering

LEAD RESEARCHER – Herve Van Der Heyden, research scientist with Agriculture and Agri-Food Canada Saint-Jean-sur-Richelieu Research and Development Centre

ACTIVITY 8

Reduce risk strategies for cabbage maggot control

LEAD RESEARCHER – Renee Priya Prasad, associate professor and department head for agriculture at the University of the Fraser Valley

This project is generously funded through the Canadian AgriScience Cluster for Horticulture 4, in cooperation with Agriculture and Agri-Food Canada's AgriScience Program, a Sustainable Canadian Agricultural Partnership initiative, the Fruit and Vegetable Growers of Canada (FVGC), and industry contributors.

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Increasing Field Vegetable Yield and Resilience to Abiotic and Biotic Stresses Through Soil Microbial Engineering

LEAD RESEARCHER

Herve Van Der Heyden
Research scientist with Agriculture and Agri-Food Canada
Saint-Jean-sur-Richelieu Research and Development Centre

This research activity to working to develop, validate and implement bacterial inoculum to improve field vegetable yield and plant diseases while reducing fertilizer and pesticide inputs. Two proprietary bacterial strains, *Pseudomonas sp*. and *Bacillus sp*., from Agriculture and Agri-Food Canada (AAFC) have shown plant growth promotion and increased plant drought resistance capabilities. These bacterial strains will be used to fast-track microbial consortia development, field evaluation and validation for the research activity.

The research team is currently planning lab and greenhouse experiments. Only small-scale field experiments have been done to date. Field experiments were conducted to test the effect of the bacterial strains on lettuce growth in 2024. The bacterial strains were found to increase plant growth – specifically in the early stages of lettuce growth.

Researchers also found that among the 1,200 bacterial strains extracted from soil samples collected from organic fields in southern Quebec and at AAFC experimental farms, 45 strains are showing promising plant pathogen inhibitory potential (biocontrol). The strains have been tested against four plant pathogenic *Pythium* species and *Sclerotinia sclerotiorum*. Thirty-three of these strains showed deterrence effects and were further tested against the same five plant pathogens in vitro. Eighteen of these *Pseudomonas* strains have been shown to be effective against *Pythium* species, while 10 strains had an inhibitory effect on *S. sclerotiorum*.

KEY TAKEAWAYS:

- Two proprietary bacterial strains from AAFC have shown plant growth promotion and increased plant drought resistance capabilities. These are being used to fast-track microbial consortia development, field evaluation, and validation.
- Tests of the bacterial strains on lettuce growth found that the strains increased plant growth, specifically in the early stages of lettuce growth.
- Researchers have found that among the 1,200 bacterial strains extracted from soil samples collected, 45 strains are showing promising inhibitory potential.

Reduce Risk Strategies for Cabbage Maggot Control

LEAD RESEARCHER

Renee Priya Prasad
Associate professor and
department head for agriculture
at the University of the Fraser Valley

Crucifers (crops in the cabbage family) provide numerous opportunities for Canadian vegetable growers but are under attack by cabbage root maggots. In this research activity, the team is working to find new management tools – mainly insecticides – and strategies for how to use those insecticides with non-insecticide tools, so growers will see decreased crop losses from cabbage root maggot.

Over the winter, the research team at Agriculture and Agri-Food Canada Agassiz Research and Development Centre has been establishing a colony of *D. radicum* (cabbage root flies). Efficacy tests of different pesticides that are being evaluated in field trials will be used on the colony. The establishment of a *D. radicum* colony is challenging work. Last fall a colony was set up but crashed, requiring the research team to start over.

The research team is planning to start field trials in April depending on the weather.

KEY TAKEAWAYS:

- Researchers have been working to establishing a colony of *D. radicum*. This is challenging work as last fall a colony was set up but crashed, requiring the research team to start over.
- Efficacy tests of different pesticides, currently being evaluated in field trials, will be used on the *D. radicum* colony.
- The research team is planning to start field trials in April depending on the weather.

On June 19, 2024 a field session was held in Abbotsford, B.C. to examine the field plots of the cabbage root maggot insecticide efficacy trials. Photo: Thomas Johnston

Close up of cabbage maggots on Brussels sprout roots.
Photo: Thomas Johnston

Greenhouse Vegetable Research Activities

The greenhouse vegetable sector has two research activities with the Canadian AgriScience Cluster for Horticulture Cluster 4. These two activities are focused on protecting vegetables against pests and managing disease in tomatoes.

THE CLUSTER 4 GREENHOUSE VEGETABLE RESEARCH ACTIVITIES ARE:

ACTIVITY 9

Developing a systems approach to pest management on greenhouse vegetable crops: mirid predator selection

LEAD RESEARCHER – Roselyne Labbé, research scientist in greenhouse entomology with Agriculture and Agri-Food Canada at the Harrow Research and Development Centre

ACTIVITY 10

Novel approaches for the management of tomato brown rugose fruit virus (ToBRFV)

LEAD RESEARCHER – Aiming Wang, research scientist with Agriculture and Agri-Food Canada at the London Research and Development Centre

This project is generously funded through the Canadian AgriScience Cluster for Horticulture 4, in cooperation with Agriculture and Agri-Food Canada's AgriScience Program, a Sustainable Canadian Agricultural Partnership initiative, the Fruit and Vegetable Growers of Canada (FVGC), and industry contributors.

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Developing a Systems Approach to Pest Management on Greenhouse Vegetable Crops: Mirid Predator Selection

LEAD RESEARCHER

Roselyne Labbé
Research scientist in greenhouse entomology with Agriculture and Agri-Food Canada at the Harrow Research and Development Centre

To find new integrated pest-management strategies to protect greenhouse vegetable crops, a research team is studying two native North American mirid species: *Dicyphus discrepans* and *Dicyphus famelicus*, and one adventive species: *Nesidiocoris tenuis*.

The researchers are raising the native *D. famelicus*, *D. discrepans* and *D. hesperus*. Current work is focusing on the selective breeding of *D. famelicus* as there is a large amount of genetic diversity available. *Nesidiocoris tenuis* has shown itself as an important adventive mirid species affecting many greenhouse producers globally. Researchers are now studying this species for its interactions with other native mirids and comparing their preferences and reproductive capacities on multiple host plants.

In greenhouse trials, researchers have found differences in host plant choices for mirid species. *D. discrepans* and *D. famelicus* will lay their eggs on mullein and tomato plants, while *Nesidiocoris tenuis* prefer tomatoes. This suggests there is likely a strong genetic difference between species that determines their host plant preferences. The researchers plan to study this through future genetic breeding efforts.

Mirid breeding is continuing this winter, along with starting interaction studies between mirid species in the lab. These will be adapted to greenhouse trials over the next year. The research team is also working through phytophagy and predation assessment of isofemale lines established for *D. famelicus* from different geographic and genetic sources.

KEY TAKEAWAYS:

- *Nesidiocoris tenuis* has shown itself as an important adventive mirid species affecting many greenhouse producers globally. Researchers are studying this species for its interactions with our native mirids and comparing their preferences and reproductive capacities on multiple host plants.
- Researchers have found differences in host plant choices for mirid species. *D. discrepans* and *D. famelicus* will lay their eggs on mullein and tomato plants, while *Nesidiocoris tenuis* prefer tomatoes. This suggests there is likely a strong genetic difference between species that determines their host plant preferences.
- Mirid breeding is continuing this winter, along with starting interaction studies between mirid species in the lab. These will be adapted to greenhouse trials over the next year.

A female *D. discrepans*. Photo: Carly Demers

A female *D. famelicus*. Photo: Carly Demers

Novel Approaches for the Management of Tomato Brown Rugose Fruit Virus (ToBRFV)

LEAD RESEARCHER

Aiming Wang
Research scientist with Agriculture and Agri-Food Canada at the London Research and Development Centre

Researchers are working to stop Tomato Brown Rugose Fruit Virus (ToBRFV) from threatening Canadian greenhouse tomatoes and peppers. This research activity is studying the infection process and working to develop novel genetic resistance to ToBRFV. Researchers want to better understand how ToBRFV overcomes broad-spectrum resistance given by Tm-22 and bring back Tm-22 -mediated resistance to ToBRFV.

To date, researchers have been able to create a tomato mutant population with more than 10,000 plants screened. Three lines resistant or tolerant to ToBRFV infection have been identified with confirmation of resistance being passed to the next generation. The resistance gene Tm22 and ToBRFV movement protein (MP) gene have been cloned with confirmation of the interaction of proteins encoded by Tm22 and ToBRFV. Researchers also found that both ToBRFV MP and Tm22 proteins are located in the cytoplasm and are not stable with very short turn-over time.

A number of mutations have been introduced into the different coding regions of ToBRFV. Both replicase proteins found to be essential for viral viability and infectivity. The ToBRFV susceptibility gradient test was done to test ToBRFV resistance across 12 tomato varieties. Seedlings were prepared and inoculated with researchers finding symptom severity varying on leaves across several varieties, ranging from mild to severe. ToBRFV diversity was assessed with the ToBRFV genetic sequence found to be largely stable.

Researchers are conducting resistance screening to confirm ToBRFV resistance is inherited from generation to generation of plants. Researchers are continuing to monitor ToBRFV diversity in Canada, decode the mechanism underlying ToBRFV break-down of Tm22 resistance, and do transcriptomic profiling on tomato lines responsive to ToBRFV infection and viral protein expression.

Tomato plants infected with tomato brown rugose fruit virus (ToBRFV).

Tomato plants infected with typical tomato brown rugose fruit virus (ToBRFV) symptoms.

Photos: Aiming Wang

KEY TAKEAWAYS:

- Both ToBRFV MP and Tm22 proteins are located in the cytoplasm and are not stable with very short turn-over time.
- ToBRFV diversity has been assessed with the ToBRFV genetic sequence found to be largely stable.
- Researchers are conducting resistance screening to confirm ToBRFV resistance is inherited from generation to generation of plants.

Potato Research Activities

The potato sector has three research activities with the Canadian AgriScience Cluster for Horticulture Cluster 4. These three activities are focused on sustainability, soil health and finding new potato varieties for growers across Canada.

Note: The report for Activity 13 – Positioning Canada's potato industry for improved sustainable production will be shared at a later time.

THE CLUSTER 4 POTATO RESEARCH ACTIVITIES ARE:

ACTIVITY 11

National potato variety evaluation for sustainability, resilience and climate change

LEAD RESEARCHERS – Erica Fava, national potato variety trial coordinator and industry liaison; Jen McFarlane, soft fruits IPM coordinator and research coordinator with E.S. Cropconsult; and Katerina Jordan, associate professor at the University of Guelph

ACTIVITY 12

Regenerative and sustainable agriculture for climate change adaptation and carbon sequestration: rebuilding soil health and increasing crop productivity of Canadian potato production systems

LEAD RESEARCHER – Claudia Goyer, research scientist with Agriculture and Agri-Food Canada at the Fredericton Research and Development Centre

ACTIVITY 13

Positioning Canada's potato industry for improved sustainable production

LEAD RESEARCHER – Mario Tenuta, senior industrial research chair in 4R nutrient management and professor of soil ecology at the University of Manitoba

This project is generously funded through the Canadian AgriScience Cluster for Horticulture 4, in cooperation with Agriculture and Agri-Food Canada's AgriScience Program, a Sustainable Canadian Agricultural Partnership initiative, the Fruit and Vegetable Growers of Canada (FVGC), and industry contributors.

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National Potato Variety Evaluation for Sustainability, Resilience and Climate Change

LEAD RESEARCHERS

Erica Fava
National potato variety trial coordinator and industry liaison

Jen McFarlane
Soft fruits IPM coordinator and research coordinator with E.S. Cropconsult

Katerina Jordan
Associate professor at the University of Guelph

The national potato variety evaluation is working to boost profits and sustainability for the Canadian potato industry by finding new potato selections with improved productivity, disease resistance and climate resilience. New selections are being compared to currently grown potato varieties across the major potato production areas of Canada.

In 2024, industry trials took place in British Columbia, Alberta, Manitoba, Ontario and Quebec. Growers and industry representatives attended field days at most trial locations. Up to 10 common varieties were grown in all trials to allow for a cross-country comparison. Data from the trials are being compiled and analyzed.

In 2024, 10 Agriculture and Agri-Food Canada (AAFC) french fry selections and four standard varieties were grown in field trials in Alberta, Manitoba, Quebec, New Brunswick and Prince Edward Island. Nine AAFC fresh market selections and four standard varieties along with six AAFC chip selections and three standard varieties were grown in field trials in Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick and P.E.I. Field days, with a demonstration plot, happened in all provinces as well at a site in B.C. for all three market types. Data from this year's trials is currently being analyzed.

For 2025, industry variety trials are planned for B.C., Alberta, Manitoba, Ontario and Quebec. Common varieties will be selected to allow for comparisons across the country. AAFC trials will be conducted in Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick and P.E.I. Selections with positive feedback from the field days and those with promising attributes from the data collected will advance in the commercialization pipeline. The most advanced selections will be offered to industry for field trials.

Harvesting potatoes at the New Brunswick trial site. Photo: Erica Fava

Attendees at the 2024 field day at the Lethbridge, Alta. trial site.
Photo: Erica Fava

Attendees at the 2024 field day at the Lethbridge, Alta. trial site.
Photo: Erica Fava

KEY TAKEAWAYS:

- In 2024, industry trials took place in British Columbia, Alberta, Manitoba, Ontario and Quebec. Growers and industry representatives attended field days at most trial location.
- In 2024, AAFC trials happened in Alberta, Saskatchewan, Manitoba, Quebec, Ontario, New Brunswick and Prince Edward Island. Field days, with a demonstration plot, happened in all of the provinces.
- For 2025, industry variety trials are planned for British Columbia, Alberta, Manitoba, Ontario and Quebec.

Research plots being dug up for the 2024 field day at Delta, B.C.
Photo: Heather Meberg

Regenerative and Sustainable Agriculture for Climate Change Adaptation and Carbon Sequestration: Rebuilding Soil Health and Increasing Crop Productivity of Canadian Potato Production Systems

LEAD RESEARCHER

Claudia Goyer
Research scientist with Agriculture and Agri-Food Canada at the Fredericton Research and Development Centre

Regenerative and sustainable agricultural practices (RSAPs) are being studied in several locations across Canada to mitigate soil degradation and loss of biodiversity caused by intensive farming practices and ensure long-term viability of potato farms.

At the start of the 2024 growing season, trials at four experimental hubs and 15 flagship farms were established and were maintained throughout the year. Researchers took samples of soil, plant and air throughout the growing season. In the fall, samples were processed to measure soil physio-chemical properties, plant biomass and yield, soil biodiversity and greenhouse gas emissions.

Trials conducted at McCain Foods Farm of the Future in New Brunswick are showing that crop diversity correlates positively with potato yield. There were no increases in soil-borne diseases noted with an increase in plant diversification among the trials in the short term. Preliminary results have shown increasing plant diversity in potato cropping systems raised marketable potato yields and crop resiliency.

KEY TAKEAWAYS:

- Samples from four experimental hubs and 15 flagship farms were processed to measure soil physio-chemical properties, plant biomass and yield, soil biodiversity and greenhouse gas emissions.
- Trials at McCain Foods Farm of the Future have found no increases in soil-borne diseases among the trials in the short term when increasing plant diversification. Preliminary results have shown increasing plant diversity in potato cropping systems raised marketable potato yields and crop resiliency.

Plot preparation for planting cash crops at Simcoe, Ont. crop rotation plots. Photo: Narges Atabaki

Plots after cultivation with potatoes, cash crop and green manure in Simcoe, Ont.
Photo: Narges Atabaki

Biofumigation preparation using rototiller for mixing the topsoil and chopped mustard before compacting in Simcoe, Ont.
Photo: Narges Atabaki

Biofumigation preparation using a mower for chopping the mustard plants at Simcoe, Ont. crop rotation plots. Photo: Narges Atabaki

Plots after biofumigation practices in Simcoe, Ont.
Photo: Narges Atabaki

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