Canadian Agri-Science Cluster for Horticulture 3

Update to Industry

Semi-Annual – Spring 2022

Activity title: Evaluation of potato selections and varieties for central Canada

Name of Lead Researcher: Dr. K. S. Jordan and Dr. J. A. Sullivan

Names of Collaborators and Institutions:
University of Guelph, Ontario Potato Board, Stuart Cairns Potato Research Committee (through CHC)

Activity Objectives

1. Identify and evaluate processing potato selections with long term storage potential.
2. Identify and evaluate tablestock lines for value added traits such as early maturity, coloured skin and flesh, and specialty market potential.
3. Identify and evaluate very early maturing selections for use by the processing industry.
4. Evaluate elite selections for tolerance to scab (*Streptomyces scabies*)

Research Progress to Date

Field trials were conducted in Ontario to evaluate potential new selections for the potato industry. Early generation material developed by AAFC Fredericton was selected for adaptability in Ontario. The selections are then maintained in the AAFC system for further testing. Our evaluations include a comprehensive measurement of agronomic traits such as vine vigour, maturity, yield, appearance of tubers. Culinary quality is evaluated through boiling and baking tests. Samples of the lines with chip potential are stored is a commercial storage and evaluated for quality characteristics. Trials were conducted for processing (ie. chips), table stock and specialty markets.

Early Maturing Chip Trial

Seven lines with early maturity were grown in a replicated trial at C. J. Bradley Farms in Leamington Ontario. Plots were harvested after 86 days from planting and evaluated for yield and chip quality. Promising results were obtained in two of the lines and further evaluation will be conducted.

AAFC trials- National and Advanced selection

Approximately 25 elite breeding lines were grown in replicated plots at the Elora Research Station. Selections have potential for fresh market, chip processing, creamers and specialty (health) markets. Data was collected on plant vigour, maturity, yield and tuber quality. Samples from lines with chip processing potential are stored in a commercial facility and will be evaluated monthly throughout the storage season for specific gravity, chip colour, and sucrose and dextrose measurements.

Main Crop Chip Trial

Approximately 10 promising chip lines were obtained through collaborations with other breeding programs including the University of Wisconsin and Michigan State University. Replicated field trials were grown at the Elora Research Station. Data were collected on yield and chip processing quality at harvest. Samples are stored in a commercial facility and have been evaluated monthly for specific gravity, chip colour, sucrose and dextrose. Samples stored at 4°C and 8°C for five months were also evaluated.

Main Crop Tablestock Trial

Approximately 6 promising fresh market selections plus standards were obtained through collaborations with other breeding programs, including the University of Wisconsin and Michigan State University. Replicated plots were grown at the Elora Research Station. Data were collected on agronomic characteristics (ie. maturity, yield, tuber appearance) and culinary quality (ie. specific gravity, boiling, baking,)

Early Generation Selection of Breeding Lines

Approximately 180 selections with potential for fresh market and chip processing sectors were grown in 4 hill plots at the Elora Research Station. Eight lines were selected and will be advanced through the system. By selecting earlier generations in Ontario there will be a significant increase in the probability of identifying lines which are adapted for central Canada. This will also be an important tool towards adapting to climate change.

On-farm Trials

These trials were conducted in collaboration with the Ontario Potato Board and Dr. Eugenia Banks. Promising new varieties and advanced selections from breeding programs were evaluated in non-replicated plots in commercial fields in the Alliston and Hamilton areas. Scab tolerance was evaluated in the on-farm trials in 2021.

Extension Activities (presentations to growers, articles, poster presentations, etc.

1. August 11, 2021. *Potato Research Open House*. Elora Research Station. Thirty-five visitors toured the potato trial demonstration. University of Guelph researchers were present to discuss the variety trials, the CanPED network, CPB options and potato starch.
2. October 27, 2021. Ontario Potato Board District 1 meeting. Leamington, ON. Vanessa Currie presented research highlights from the season to growers in the Leamington area.
3. November 2, 2021. Potato Board District 4 meeting. Shelburne, ON. Vanessa Currie presented research highlights from the season to growers in the Shelburne area.
4. November 3, 2021. Potato Board District 7 meeting (virtual). Vanessa Currie presented research highlights from the season to growers in Northern Ontario.
5. November 12, 2021. Ontario Potato Board District 2 meeting (virtual). Vanessa Currie presented research highlights from the season to growers in the Grand Bend area.
6. November 16, 2021 Potato Board District 7 meeting (virtual). Vanessa Currie presented research highlights from the season to growers in the Alliston area.
7. November 17, 201. Stuart Cairns Potato Research Committee. *Evaluation of New Chipping Potato Varieties*. (virtual) Vanessa Currie presented results to the committee along with a 29-page report.
8. December 1, 2021. Ontario Potato Board AGM. Guelph, ON. Vanessa Currie and Katerina Jordan presented a full report to the members of the Ontario Potato Board. January 19, 2022. Tuber Talk. Potatoes in Canada podcast. https://www.potatoesincanada.com/podcasts/updates-from-the-university-of-guelphs-breeding-program/
9. February 16, 2022. Ontario Seed Potato Growers Association meeting (virtual).
10. February 22, 2022. AAFC Potato Breeding Stakeholder Engagement Session. Vanessa Currie participated virtually.

COVID-19 Related Challenges:

The COVID-19 pandemic continued to create challenges for researchers in 2021. Much of the province was in lockdown during April and May, but essential research at the University of Guelph was permitted to continue only with approved research management plans. The potato research program met all the requirements to continue operating and team members were extremely vigilant. The overall size of the trials was reduced, as it had been in 2020. Fortunately, the early maturing chip trial, which had been cancelled in 2020, was resumed successfully. By August, many local restrictions had been lifted and we welcomed visitors in person to our field open house in Elora. Throughout the fall, some industry meetings were held in person and some were virtual. Storage testing was conducted as planned. Our research continued smoothly due to careful compliance with safety procedures and high vaccination rates. The level of cooperation and support from all team members and our cooperators has been exemplary.

Key Message(s):

The need to produce a continuous supply of high quality potatoes is an ongoing challenge to Canadian potato growers. Producers require varieties which generate profitable yields under sustainable production systems. This dynamic situation creates a requirement for a steady stream of new, value-added varieties. In 2021, over 100 advanced selections and new varieties from the AAFC National Potato Breeding program and other breeding programs were evaluated. We made selections from early generation breeding lines to determine adaptability to Ontario conditions. Storage quality tests are ongoing throughout the winter. On-farm trials and scab evaluations were conducted in commercial fields. Results from the trials are reported to the Ontario Potato Board through the annual reports and industry meetings. The potato industry will have access to new, high quality varieties along with current performance data from multiple field sites.

This project under the Canadian AgriScience Cluster for Horticulture 3 is funded in part by the Government of Canada through the Canadian Agricultural Partnership's AgriScience Program, a federal, provincial, territorial initiative, with support from the Fruit and Vegetable Growers of Canada (formerly the Canadian Horticultural Council) and industry contributors.

CANADIAN AGRICULTURAL PARTNERSHIP
Innovate. Grow. Prosper.

FRUIT & VEGETABLE GROWERS OF CANADA | PRODUCTEURS DE FRUITS ET LÉGUMES DU CANADA

Canada