

Canadian Agri-Science Cluster for Horticulture 3



Update to Industry

2020-21 – Semi-Annual

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 (as per approved workplan):

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:

We have conducted field trials to evaluate potential new selections for the Ontario industry. We also make selections from early generation material developed by the AAFC National Potato Breeding Program at Fredericton NB. The selections are then maintained in the AAFC system for further testing in Ontario and the National Trial system. 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 in a commercial storage and evaluated for quality characteristics such as specific gravity, chip colour, sucrose and dextrose. These evaluations are done each month during the storage period.

Trials are conducted for processing (i.e. chips), table stock and specialty markets. Specifically, the trials were:

National Trial –

Approximately 35 elite breeding lines plus standards were grown in replicated plots at the Elora Research Station. Selections have potential for fresh market, chip processing, French fry 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 15 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 evaluated monthly on specific gravity, chip colour, sucrose and dextrose.

Main Crop Tablestock Trial

Approximately 15 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 100 selections representing all market sectors were grown in small plots (ie. 4 hills and 8 hills) at the Elora Research Station. Lines chosen will be advanced through the system. By evaluating earlier generations of material and making selections in the Ontario environment there will be a significant increase in the probability of identifying material that is adapted for central Canada. This will also be an important tool towards adapting to climate change. Two early maturing chip lines were identified and will be targeted for advance trial in 2021.

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 Shelburne areas, which have a high concentration of potato producers. Scab tolerance was evaluated in the On-farm trials in 2020.

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

1. October 28, 2020. Ontario Potato Board District 1 meeting (virtual). Vanessa Currie presented research highlights from the season to growers in the Leamington area.
2. November 3, 2020. Potato Board District 4 meeting (virtual). Vanessa Currie presented research highlights from the season to growers in the Shelburne area.
3. November 4, 2020. Potato Board District 7 meeting (virtual). Vanessa Currie presented research highlights from the season to growers in Northern Ontario.
4. November 13, 2020. Ontario Potato Board District 2 meeting (virtual). Vanessa Currie presented research highlights from the season to growers in the Grand Bend area.
5. November 18, 2020 Potato Board District 7 meeting (virtual). Vanessa Currie presented research highlights from the season to growers in the Alliston area.
6. December 2, 2020. Ontario Potato Board AGM (virtual). Vanessa Currie presented research highlights and the full report to the members of the Ontario Potato Board.

COVID-19 Related Challenges:

Like everything in 2020, the potato research program had to work within restrictions caused by the COVID-19 pandemic. We were fortunate to have the support of the partnership and we made the necessary adjustments to the project that would be most valuable while still working safely. The overall approach was a reduction in the size of the trials. Our collaborators at AAFC in Fredericton and Lethbridge were also on lockdown in the spring and the staff had limited access to seed sorting facilities. We had to omit French fry types this year but instead we were able to focus on chip and fresh market lines. Unfortunately, we were not able to plant the early maturing chip trial in Leamington, due to the lockdown in March and April. All research projects had to be approved for continuation before researchers could resume activities. In addition, Windsor-Essex region was the last region in Ontario to have restrictions loosened. Everybody did their best to keep things running smoothly and despite the restrictions and uncertainty, we ran a successful season and have valuable results to share. One of the biggest disappointments was the cancellation of our annual field day. There were no tours of the Elora plots this year. We missed seeing our potato community and hearing your feedback on the new varieties. A short video is in production to help illustrate the season highlights.

Key Message(s):

Potato growers supplying the processing and fresh market industries are challenged with the need to produce a continuous supply of high quality potatoes. Producers require varieties which generate profitable yields and high payable loads. This dynamic situation creates a need for a steady flow of new and value-added varieties. In 2020, we tested approximately 75 advanced selections and new varieties from the AAFC National Potato Breeding program and other North American breeding programs. We made selections from early generation breeding lines to determine their adaptability to Ontario conditions. Storage quality tests are ongoing throughout the winter. 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.

This project is generously funded through the Canadian Agri-Science Cluster for Horticulture 3, in cooperation with Agriculture and Agri-Food Canada's AgriScience Program, a Canadian Agricultural Partnership initiative, the Canadian Horticultural Council, and industry contributors.



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