



POTATO GENE RESOURCES

Number 23 • 2016/2017



Celebrating Canada's 150th

Teresa Molen
Canadian Potato Genetic
Resources
Fredericton, NB

July 1, 2017 marks the 150th or sesquicentennial anniversary of the Canadian Confederation which saw the union of the provinces of Canada, Nova Scotia and New Brunswick as one Dominion of Canada. Information on the Confederation can be found on the Parliament of Canada website. To commemorate this event, celebrations are planned across the country. Information on Canada 150 celebrations can be found on the Canada 150 website.

Agriculture and Agri-Food Canada is also celebrating 150 years of agriculture.

On July 1, 1867, the federal Department of Agriculture was created and the first Minister of Agriculture was appointed. One hundred and fifty years later, Agriculture and Agri-food Canada continues to provide leadership in the growth, development and sustainability of a thriving Canadian agriculture and agri-food sector. This \$100-billion industry is the world's 5th-largest exporter employing 2.2 million Canadians or 1 of every 8 jobs! The Fredericton Research and Development Centre will celebrate these milestones with an Open House on Saturday August 19th, 2017. In addition to a display, the Canadian Potato Genetic Resources will have demonstration field plots for visitors to see. For further information on this event, or on events near you, follow the "events section" on the Agriculture 150 website.



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada

Canada

Atlantic Seed Stories

Janet Wallace
Albert County, NB

History becomes alive when you bite into, say, a bean that may be a descendant of beans brought by German immigrants 250 years ago. When you enjoy the smell of fresh-baked bread made from Acadian wheat, you can learn how Acadians cleared and dyked land in the Maritimes centuries ago. Dig up potatoes and learn about the Irish Potato Famine and the value of biodiversity. Teaching people about history takes many forms. Linking stories to the hands-on process of gardening and cooking, including in school gardens and cafeterias, can help teach stories to a greater diversity of people.

In 2016, I started looking for local varieties of crops that have been handed down from generation to generation of Maritimers. Tubers of “Fundy”, “Shepody”, “Lumper”, “Garnet Chili”, “Red Acadian”, “Canus” and “Red Gold” were requested through the Canadian Potato Genetic Resources in Fredericton, NB. I planted these, with the help of elementary students and community volunteers, at Riverside Consolidated School (Figure 1) in Riverside-Albert, NB, and the Albert County Museum in Hopewell Cape, NB.

The project has several goals.

- ***To help connect people with their heritage.***

While planting, tending and eating the varieties, we shared stories about the history of the plants, and the history of our community.

- ***To preserve traditional varieties of crops.***

Every year, heirloom varieties are lost because no one saves the seed. By planting and saving seed (and tubers), we can build up an Albert County supply of heirloom vegetable seed and plantstock.

- ***To teach people how to grow garden crops and save seeds.*** Seedsaving and even vegetable gardening are becoming lost skills.

By planting, gardening and saving seed in public gardens, more people in Albert County can learn these skills. This will help Albert County become more self-reliant in food and seed production.



Figure 1. Students at Riverside Consolidated School prepare the bed for planting.

The plants reflect snapshots in our history, including: plants harvested by the First Nations; grain grown on dykeland by Acadian Settlers; herbs passed from French settlers to Mi'kmaq and then to Acadian farmers; vegetables brought by German settlers 250 years ago; potatoes grown after the Irish Potato Famine, which brought many immigrants to Canada; and vegetables brought by recent immigrants and refugees to Canada.

Each plant is a launching pad for various lessons. The overarching goal is to teach history through gardening (and eating). We will also use the project to teach skills, such as gardening and seed saving. There are also fundamental lessons connected to the project, such as the importance of maintaining genetic diversity.

Potatoes play a pivotal role in our project. The potato, so common today, played a role in the history of Atlantic Canada. In particular, the demise of the “Lumper” (Figure 2) potato which was in part responsible for the immigration of many Irish settlers to Canada. Potatoes provide a launching pad for discussions of the need to maintain heirloom crop varieties and genetic diversity. The Irish Potato Famine is the classic, yet tragic, example of the precarious situation created by a lack of genetic diversity in staple crops.



Figure 2. “Lumper” grown in one of the project gardens.

On a more positive note, we also celebrate the “Fundy” and “Shepody” potatoes because of their link to the region. The “Fundy” potato was developed at Agriculture Canada in Fredericton through breeding trials in Alma at what is now Fundy National Park in Albert County, NB. The Alma Sub-station was established in the late 1940s and used for breeding trials until a new sub-station was established in Benton, NB in 1975. The “Fundy” potato was once common in Albert County. As one Mary Ethel Steeves, a 99-year-old woman (who still gardens) says: “We used to have Fundy Potatoes. They were really good potatoes. I just told my friend, we can’t get good potatoes anymore, not like those good old Fundy potatoes.”

If you eat French fries at a restaurant or fast food outlet, particularly in the fall or early winter, there is a good chance you are eating “Shepody” potatoes. Like the “Fundy” potato, “Shepody” (named after a smaller bay where the Hopewell Rocks stand) was also developed during variety trials conducted at

Matthew's Head in what is now Fundy National Park. Unlike “Fundy”, “Shepody” became a commercial success and is now grown across North America. The main use of the potatoes is for early season French fries, but the potatoes are also boiled and baked. “Shepody” and “Fundy” potatoes hold special importance to the people in rural Albert County. Some people recall when the Agriculture and Agri-Food Canada Potato Research Station was open and employed local people. For the children who participate in the school gardens, the past becomes a bit more alive when they realize they are eating something named for the bays in the distance.

In 2016, we had mixed success with the gardens. The dry conditions led to deer encroachment into open areas and they consumed many plants. Also, at one garden, eager volunteers harvested all the potatoes (and didn’t keep track of varieties). They were trying to be helpful by harvesting the tubers when they heard there was a chance of frost. Although we lost some of our planting stock, we did seize upon this as an opportunity to teach people about the hardiness of potatoes.

In October 2016, the elementary students harvested the remaining vegetables. Using these vegetables and the potatoes that were dug earlier, and with the help of community volunteers, we prepared a meal that was shared by all staff and students at Riverside Consolidated School.

To celebrate Canada’s 150th year, we are greatly expanding the project and joining with a francophone community of gardeners in Kent County. We will plant at two museums and at least two elementary schools in 2017. The 2017 project is funded in part by the Government of Canada as part of the Canada 150 program and conducted in partnership with the Albert County Historical Society, the Albert County Museum, Pays de Cocagne Sustainable Development Group and la Musée des pionniers de Grande Digue.

If you want to tell the story of gardens or food in your past, if you have seeds to share, or if you would like to volunteer, please contact Janet Wallace at garden@albertcountymuseum.com. If you are in New Brunswick, feel free to drop in to the museum gardens in Hopewell Cape or Grande-Digue.

Editor's note: We look forward to publishing an up-date in the next Newsletter.

Annual Report 2016

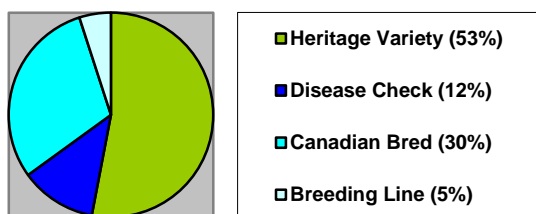
Canadian Potato Genetic Resources

Teresa Molen

The Collection

1. Holdings

• The Canadian Potato Genetic Resources is a node of Plant Gene Resources Canada and holds 177 clones within its genebank. Of this total, 176 are maintained *in vitro*, and 111 clones were grown for tuber production at our Benton Ridge Potato Breeding Substation, Benton, New Brunswick. A full listing of accessions may be found in the request form. The following chart illustrates the types of clones in each category.



2. New Accessions

• Six clones were added to the *in vitro* Repository in 2016. “Likely”, donated in 2014 by Richard Hebda of the Crop Climate Project in Trail, BC was virus freed and is available as *in vitro* plantlets. Three heritage

varieties, “Carola”, “Bintje” and “Norgold Russet” were donated by Cate Henderson, a gardener/seed saver at the Heirloom Seed Sanctuary of the Sisters of Providence of St. Vincent de Paul, in Kingston, Ontario. Virus free *in vitro* plantlets are also available. Two breeding lines, “F61101” and “CH72.03” were acquired from the Potato Breeding Program at the Fredericton Research and Development Centre, Fredericton, New Brunswick.

Likely



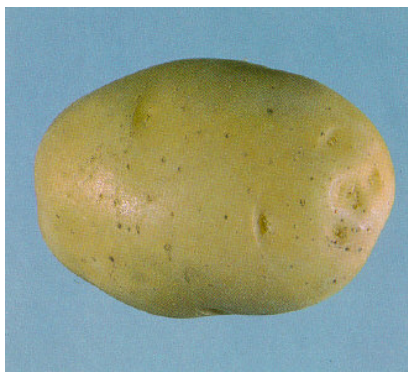
“Likely”, grown in Metchosin, BC in 2013¹.

“Likely”, named after Likely, BC, a small community on Quesnel Lake in the Caribou Mountains is a fingerling with pale to medium brown skin, shallow to medium depth eyes and creamy yellow flesh¹. Readers may recall an article in the 2014 edition of the Potato Gene Resources newsletter titled “A Likely Story – The discovery of a most fascinating potato”. This article can be found on the [Government of Canada Publications](http://www.governmentofcanada.ca/publications) website.

Carola

“Carola”, a German variety, yields oblong tubers with smooth yellow skin, few eyes and yellow flesh³. It is also reported to store well³.

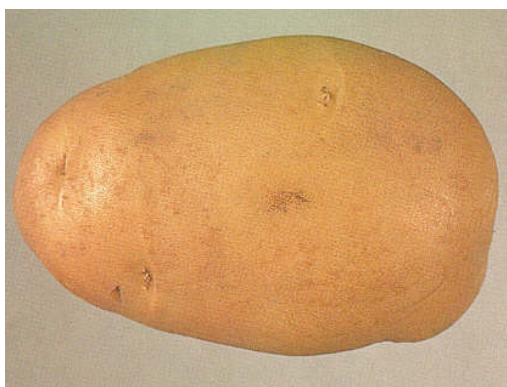
Bintje



“Bintje” Photo by CFIA²

“Bintje” was selected in the Netherlands in 1904 and registered in Canada in 1979². This late maturing variety has large, long-oval tubers with smooth pale yellow skin, shallow eyes and light yellow flesh². More information on “Bintje” can be found on the [Canadian Food Inspection Agency \(CFIA\)](http://www.cfia.gc.ca) website.

Norgold Russet



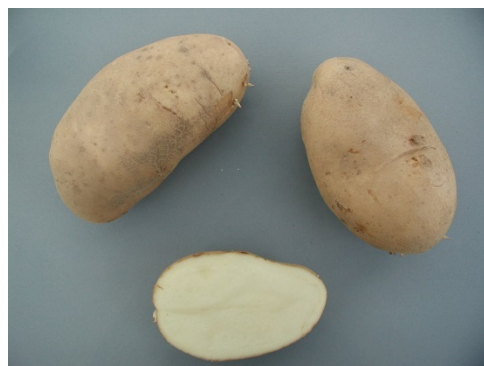
“Norgold Russet” Photo from CFIA⁴

“Norgold Russet” was bred by North Dakota State University in 1955 and registered in Canada in 1968⁴. This early maturing variety yields oblong to long tubers with medium to heavily netted golden russet skin, shallow eyes and white flesh⁴. More information on “Norgold Russet” can be found on the [CFIA](http://www.cfia.gc.ca) website.

CH 72.03

“CH 72.03” is the haploid of F51013. This male sterile breeding line produces round tubers with white skin and flesh.

F61101



“F61101” - AAFC Photo

“F61101” (“51640” x “Record”) produces oval tubers with smooth yellow skin and light yellow flesh. It is used as a chip parent line in potato breeding.

References

¹Richard Hebda and Valerie Huff, “A Likely Story – The discovery of a most fascinating potato”. 2014 Potato Gene Resources Newsletter available on the [Government of Canada Publications](http://www.governmentofcanada.ca/publications) website.

²[CFIA](http://www.cfia.gc.ca) website.

³The records of Carol and Robert Mouck, Heirloom Seed Sanctuary of the Sisters of Providence of St. Vincent de Paul, in Kingston, Ontario.

⁴[CFIA](http://www.cfia.gc.ca) website.

3. Evaluations

- Twenty-two accessions were grown in an evaluation trial at the Fredericton Research and Development Centre. Two replications of

fifteen hills of the following varieties: “OAC Royal Gold”, “NRBK 01”, “NRBK 02”, “NRBK 03”, “NRBK 04”, “NRBK 05”, “NRBK 06”, “NRBK 07”, “NRBK 08”, “NRBK 09”, “NRBK 10”, “NRBK 11”, “Congo”, “Shepody”, “Chieftain”, “Avon”, “Rideau”, “Canso”, “USDA X96-56”, “Superior”, “Christmas Island Rose” and “OAC Ruby Gold”. Samples were also taken for Total Glycoalkaloid (TGA) Analysis, specific gravity measurement, photographs and culinary evaluation.

- Thirty clones were grown in 20-hill plots at the Benton Ridge Potato Breeding Substation, Benton, NB, to provide material for demonstration and cooking quality evaluation throughout the winter and spring.

4. Management

- Passport data for 167 PGR accessions is available online at the Genetic Resources Information Network-Canadian Version (GRIN-CA). GRIN-CA may be accessed through the [Plant Gene Resources of Canada](#) website. No new information was posted in 2016 due to the inaccessibility of GRIN-CA during upgrades.
- Disease testing was conducted for new *in vitro* accessions and clones which have been maintained *in vitro* for five years. Forty-six clones were grown in the greenhouse and tested twice in 2016. All clones were negative for PVA, PLRV, PotLV, PVS, PVX and PVY. Results for PSTV and BRR are pending. Extra mini tubers from the greenhouse grow out will be offered to genebank clients in the spring of 2017.
- All *in vitro* clones were screened for bacterial and fungal contamination using Potato Dextrose Broth and Richardson's

Broth, twice during 2016. All clones currently in the Genebank are negative for these contaminants.

- A total of 1227 microtubers were harvested from 172 of the genebank accessions in 2016. Approximately half of the microtubers were sent to Saskatoon in November 2016 to be stored as back up at Plant Gene Resources of Canada, AAFC. The viability of the collection is protected by this remote location storage arrangement. Dallas Kessler, of Plant Gene Resources Canada, Saskatoon SK, continues to monitor the microtubers. The remaining microtubers are stored at the genebank in Fredericton, NB.

5. Distribution

- Accessions in the Canadian Potato Genetic Resources fall under [The International Treaty on Plant Genetic Resources for Food and Agriculture](#) which requires the recipient to sign a Standard Material Transfer Agreement (SMTA) that the material shall be used or conserved only for the purposes of research, breeding and training (education) for food and agriculture. This agreement is included with the request form. For more information and assistance in determining whether your plans fall into this agreement visit: [The International Treaty on Plant Genetic Resources](#) website. By accepting shipment of the requested material you are accepting the terms of the SMTA and recognize that your name will be submitted as a recipient of this material to the Governing Body of the Treaty.
- Thirty-two requests for 1021 clones were received in 2016. Of this number, 130 clones were distributed as *in vitro* plantlets, 696 clones as field grown tubers, and 130 clones as greenhouse grown mini tubers. “O'Higgins Blue”, “Congo”, “O'Higgins Calico” and “Christmas Island Rose” were the most requested accessions in 2016.

Distribution of Clones by Purpose – 2016

Purpose of Request	Number of requests	Clones	<i>In vitro</i> plantlets	Field tubers	Mini-tubers
Research	23	627	172	353	102
Teaching or Demonstration	4	212	5	189	18
Conservation	5	182	18	154	10
Total	32	1021	195	696	130

Requests by Destination – 2016

Destination	Number of requests
Newfoundland and Labrador	1
Prince Edward Island	3
New Brunswick	6
Quebec	5
Ontario	7
Saskatchewan	2
Alberta	3
British Columbia	1
USA	3
China	1
Total	32

Five-Year Compilation of Clone Distribution for Potato Gene Resources 2012-2016

Year	Research	Education	Conservation	Total	Field tubers or mini-tubers	<i>In vitro</i> plantlets	Total
2012	20	2	7	29	806	172	978
2013	15	2	3	20	422	85	507
2014	13	2	11	26	492	119	611
2015	14	1	7	22	360	186	546
2016	23	4	5	32	826	195	1021
Total	85	11	33	129	2906	757	3663

Repository Items of Interest

Communication

- In addition to the requests for clones, many requests for information about the genebank, the availability of clones, clone descriptions and pedigrees, and techniques for handling *in vitro* material were received throughout 2016.

- Please note the following correction to Newsletter Number 22: The last line in column one on page 7 should read the “Canadian-bred Brigus” instead of “the American Brigus”.

- The annual Potato Gene Resources newsletter has a distribution list of approximately 300 recipients.

- The current newsletter and several back issues may be accessed on the Weekly Checklist of [Government of Canada Publications](#).

Meetings and Miscellaneous Information

- The 2016 annual Technical Advisory Committee (TAC) meeting of the USDA potato genebank NRSP6 project was held at Fort Collins, CO, June 14-15, 2016. Information on the genebank and minutes of TAC meetings can be found at the [USDA Potato Genebank](#) website.

Donor Agreement

- Donors wishing to provide plant material to Agriculture and Agri-Food Canada (AAFC) for the purpose of research, conservation and distribution by Plant Gene Resources of Canada must now complete a “donor agreement”. Decisions on accepting material into the Canadian Potato genebank are up to the discretion of the curator, Dr. Benoit Bizimungu (Benoit.Bizimungu@agr.gc.ca).

Displays

- Posters and accessions were displayed at the Benton Ridge Potato Breeding Substation Open House on July 20, 2016.

- Genebank material was displayed at the New Brunswick Provincial Exhibition in Fredericton, NB from September 4-10, 2016.

Visitors

- August 9, 2016 – The Atlantic Canadian Organic Regional Network (ACORN) held “A totally tuber field day” on August 9, 2016. A tour of the Fredericton Research and Development Centre and Genebank included a viewing of the Potato Genetic Resources evaluation plot in the field before moving on to tour a local organic potato farmer.



Research Scientist/Germplasm Curator, Dr. Benoit Bizimungu (Right) view the Potato Genetic Resources evaluation plot during the ACORN tour in August 2017.

- September 20, 2016 – A delegation of visitors from Hunan Agricultural University, Changsha, Hunan Province and Guangdong Academy of Agricultural Sciences, Guangzhou, Guangdong Province, China toured the facility.

- October, 12, 2016 – Members of the Canadian Potato Council Research Working Group toured the Fredericton Research Development Centre and Genebank.

Fredericton Research and Development Centre Website

- The Fredericton Research and Development Centre is custodian of the Canadian Potato Genetic Resources. [The Fredericton Research and Development Centre](#) website offers an overview of the Centre's mandate, resources and achievements along with research studies being conducted at the Centre and the staff associated with those studies.

Plant Gene Resources of Canada

- Plant Gene Resources of Canada (PGRC), the national Canadian genebank, preserves, characterizes and distributes plant genetic resources for food and agriculture. PGRC is based on collaboration between AAFC Research Centres and people dedicated to preserving the genetic diversity of crop plants and their wild relatives. PGRC plays a significant part of AAFC's commitment to the Canadian Biodiversity Strategy in response to the Convention on Biological Diversity and the International Treaty on Plant Genetic Resources.

- [The Plant Gene Resources of Canada \(PGRC\)](#) website includes information on the PGRC multi-nodal system of germplasm conservation in Canada and allows searching for germplasm information on the Genetic Resources Information Network-Canadian version (GRIN-CA). Dr. Axel Diederichsen, Research Scientist and Curator at PGRC can be contacted at the Saskatoon Research and Development Centre of AAFC at axel.diederichsen@agr.gc.ca.

The Genebank and the Seed Potato System

- The Canadian Potato Genetic Resources provides *in vitro* plantlets and greenhouse or field tubers for breeding, research and heritage preservation. While extensively tested for freedom from disease, the plantlets and tubers distributed are produced outside the Canadian Seed Certification System and are not eligible for certification.

- The Canadian Seed Potato Certification System operates under the *Seeds Act* and its regulations. Certification begins with tested plantlets established *in vitro* in a facility accredited for this task by the CFIA. The plantlets are used to produce greenhouse tubers which then go to the field in a limited generation system, at each step meeting strict standards specified in the regulations. More information on potato seed certification can be found at the [CFIA](#) website.

Help us Reduce our Paper Usage

The Potato Gene Resources Newsletter is available as an electronic version. If you are still receiving a paper version and wish to receive future Newsletters by e-mail, in pdf (portable document format), please send your e-mail address to: Teresa.Molen@agr.gc.ca. We will continue to send the printed Newsletter to those who do not ask to receive it electronically. Maintaining contact with you is important.

TO RECEIVE THE NEWSLETTER, PLEASE CONTACT:



Teresa Molen
Editor, Potato Gene Resources Newsletter
Fredericton Research and Development Centre
Agriculture and Agri-Food Canada
P.O. Box 20280, Fredericton, NB E3B 4Z7 Canada
Tel: 506-460-4484, Fax: 506-460-4377
Email: Teresa.Molen@agr.gc.ca

Potato Gene Resources

Également offert en français sous le titre : *Banque de gènes de pommes de terre*

© Her Majesty the Queen in Right of Canada, represented by the Minister of Agriculture and Agri-Food (2017).

Electronic versions available at [The Government of Canada Publications](http://TheGovernmentofCanadaPublications) website.

ISSN No. 1496-497X

AAFC No. 12626E

For more information reach us at www.agr.gc.ca or call us toll-free 1-855-773-0241.