

Participatory Plant Breeding

Spring 2017 Newsletter



Greetings!

Hello from the PPB team! We hope this newsletter finds you well, and that your preparations for the 2017 growing season are coming along. Here in Manitoba we looking forward to the thaw!

Thanks to all the farmer breeders participating in the program. Thanks to everyone who has sent in their grain samples, harvested their potato selections, and kept open communication with us. If you were able to make the PPB phone calls last month, thanks for participating!

Included in this newsletter you will find a snapshot on the process of your cleaning grain, information on the parents and boutique wheat crosses made for the program, life after selection, and update for 2017 season.

Sample Processing at the University of Manitoba

We have successfully processed all of the received wheat and oat populations from the 2016 season and are currently readying packages to send out to farmers for 2017.



Updates for the Participatory Plant Breeding Program for the 2017 Season

Agronomic Evaluation of Farmer Selections

This year, we will be conducting four field trials comparing farmer selected wheat, oat, and potato populations against registered checks and each other. The trials are done to evaluate the performance and mark differences between farmer selections and registered checks.

We ask questions like:

- “How do farmers and growing environment shape a population from the same cross?”
- “Does selecting populations under organic management result in populations that perform better than varieties selected under conventional management under an organic management environment?”
- “How do the registered checks and farmer selections differ in disease resistance?”
- “What kind of qualities are organic farmers across Canada selecting for?”
- “How to registered checks and farmer selections differ in weed competition?”

We then share this knowledge with participating farmers, and besides having interesting information on selections, the information will assist in narrowing down which population to focus increasing production on.

The evaluation trials also showcase populations to potential breeders who may want to include them in their own population evaluation trials.

The data from the evaluation trials if valuable for other farmers and research scientists that may be interested in participating in our PPB program or start their own PPB programs in their own regions/countries.

Wheat and oat trials will take place in Manitoba, and potato trials will take place in southern Ontario and Quebec. All the trials will take place on organic land.

Community Building

We have had some requests from participating farmers to be connected through the program and to share contact information with each other. In this way, you can be connected with farmers with similar goals, assess populations, and share solutions and challenges. I plan to share this information in some way with everyone at some point, if you **do not** want your name and contact information shared **please let me know**. We understand and respect people’s privacy

Life after Selection

You’ve spent countless hours planting, selecting, monitoring your populations... and now you have come to the end of 3 years... now what?!

Cereals

Submit the populations (or breeding lines) for registration

Here’s an example of the breeding process for AAC Tradition, the first organically bred wheat cultivar in Canada (this information is available for most registered cultivars on the Canadian Food Inspection Agency Website)

'AAC Tradition' (experimental designation 'BW487') originated from the cross '98B25-AS6D01' / 'ND744' conducted at the Agriculture and Agri-Food Canada Cereal Research Centre, Winnipeg, Manitoba in 2003. In 2004, F2 seeds were grown under organic management near Carman, Manitoba and 250 spikes were collected. An F3 bulk was grown near

Lincoln, New Zealand during the 2004-2005 winter season and spikes were collected. In 2005 and 2006, the F4 and F5 were grown in Manitoba. In 2007, the F6 lines were yield tested at four locations in western Canada (Brandon, Glenlea, Saskatoon, and Swift Current). Spikes were collected from the yield plots and increased as F7 rows in 2007-2008 at the off-season nursery near Palmerston North, New Zealand. The F7 lines were harvested and evaluated as F8 lines at three locations in western Canada. At advanced stages of variety development, selection criteria included yield, height, tolerance to lodging, maturity and disease resistance. In 2009, the line was advanced as an F9 to the Bread Wheat Organic 'A' test and was subsequently evaluated in the 2010 Bread Wheat Organic 'B' test. In 2011, the line was designated 'BW487' and was entered in the Central Bread Wheat Cooperative test where it was evaluated from 2011 to 2013. The variety was registered for release and named in 2016. We have heard that there is a shortage of the variety across Canada for the season of 2017.

It took 13 years from the initial cross to release in a breeding program fully funded for the intention of registration. Here at the University of Manitoba the PPB program does not have the financial and physical resources to register varieties. The farmer selection evaluation experiments we conduct showcase the varieties and allow cereal breeders in the area to look at the farmer-selected breeding lines to consider including them in their breeding lines trial for registration. The data collected from these trials are then published and breeders across Canada and potentially the world can access this information to possibly include the data in their trials.

Increase seed to grow for your operation

Making the jump from plot size amounts to seed amounts to use in your larger equipment. **The team at the University of Manitoba wants to offer our plot equipment services and organic land to increase seed for your farm.** If you're interested in this, please contact Michelle to work out seed amounts, how much you need, possible shipment costs, etc.

Potato

Submit the populations (or breeding lines for registration) for registration.

Here's an example of the breeding process for AAC Alta Cloud (this information is available for most registered cultivars on the Canadian Food Inspection Agency Website)

AC Alta Cloud' (experimental designation CV98112-3) originated from a cross made at the San Luis Valley Research Farm of Colorado State University in the United States and was assigned to Agriculture and Agri-Food Canada's Lethbridge Research Centre as per a reciprocal exchange agreement of unselected F1 seedlings. The cross was conducted in 1998 between the female parent designated 'AC91014-2' and the male parent variety 'Canela Russet'. In 1999, true potato seed was sown in a greenhouse at Colorado State University and the resulting seedling tubers were planted in 2000 at the Vauxhall Research Substation of Agriculture and Agri-Food Canada for selection. A clone designated CV98112-3 was selected in 2000, and progressed through 4-hill, 10-hill, and 50-hill generation stages of selection and evaluation at Vauxhall in 2001, 2002 and 2003, respectively. Selection criteria in the field in Vauxhall and in the laboratory in Lethbridge included vine maturity, shape and size of tuber, specific gravity, culinary quality, fry colour at harvest and out of long-term storage at 5 and 10°C, incidence of tuber defects, and reaction to diseases including common scab, late blight, fusarium dry rot and verticillium wilt. The final trial for 'AAC Alta Cloud' was conducted in 2012 at the Potato Research Centre of Agriculture and Agri-Food Canada in Fredericton, New Brunswick. The potato variety was registered in 2013.

The garden variety potato registration process is faster than the commercial potato variety and cereal registration process. More information on registering garden variety potatoes and production restrictions can be found [here](#).

Virus-Freeing Potatoes

The danger of continually saving potatoes for seed on your land is the potential for different viruses to build up which can devastate a potato crop. Certified potato seed growers use seed potatoes that have gone through the process of virus-freeing to avoid this build-up.

Virus-freeing potatoes requires chemotherapy or thermotherapy of meristem tip or stem cutting cultures in a lab. During my trip to British Columbia this past summer, I spoke to the Lab Director of [Phyto Diagnostics Company Ltd.](#) at a field day, who does virus freeing seed producers and researchers across Canada. He reported that it costs about \$1500 dollars/sample and takes about 6 months to complete, depending on the cultivar's response. The lab will send back 5 tubes of tissue culture to send to propagators to receive mini-tubers.

From talking to producers at the field day, it costs about \$40-\$45 per lbs of mini-tubers (25-30 minitubers per lbs). The farmers there have used [Valley Tissue Culture in Minnesota](#), however, others closer to you probably exist. A simple video of how this is done can be found [here](#). This is an important consideration for farmers in the program who are interested in saving their own potatoes.

If you have any other questions you may not have seen here, shoot me an e-mail.

Thank you for your participation in the on-farm breeding program!

If you have any questions about this program or would like to become involved please let us know.

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