



AgriScience Program - Projects Component

Annual Performance Report

Name of Recipient: Prairie Oat Growers Association	
Project Title: The Prairie Oat Breeding Consortium (POBC)	
Project Number: ASP-004	Period Covered by the Report (YYYY/MM/DD to YYYY/MM/DD): 2018/04/01 to 2019/03/31
Project Start Date (YYYY/MM/DD): 2018/04/01	Project End Date (YYYY/MM/DD): 2023/03/31

1. Performance Measures – Project Level

In the performance measures table below, please provide the results and achievements that were finalized during the reporting period, that combines all the CA and CRDA activities. Do not include results that are not final or that will continue to be developed. It is quite possible that in the first year or two, there may not be any results to report. Please see Annex A for a description of each performance measure.

	Performance Measure	Results Achieved	Provide a brief description of each final result achieved during the reporting period.
1.	Number of highly qualified personnel (HQP) working on funded activities		
2.	Training/knowledge transfer events		
	2.1 Number of training/knowledge transfer events organized		
	2.2 Number of presentations made in training/knowledge transfer events	6	<p>Posters</p> <p>1. Belaghihalli N. Gnanesh, Aida Kebede, Jennifer W. Mitchell Fetch, Tom Fetch, Nicholas A. Tinker, Aaron D. Beattie, Wubishet A. Bekele, Taye Zegeye, Peter E. Eckstein, Curt A. McCartney. 2018. Molecular mapping of a major stem rust resistance gene in oat. Poster 2018 American Oat Workers Conference (AOWC), June 18-21, 2018. Seattle, WA.</p> <p>2. Kebede, Aida, Belayneh Admassu-Yimer, Wubishet Bekele, Kathy Esvelt Klos, Tyler Gordon, J. Michael Bonman, Jennifer Mitchell Fetch, Thomas Fetch, Jim Menzies¹, Charlene P. Wight, Nicholas A. Tinker³, Aaron Beattie, Curt McCartney. 2018. Mapping the oat stem rust resistance gene Pg13. Poster 2018 AOWC, June 18-21, 2018. Seattle, WA.</p>



Performance Measure		Results Achieved	Provide a brief description of each final result achieved during the reporting period.
			<p>Presentations:</p> <p>3. Yan, Weikai, Mitchell Fetch, Jennifer, Fregeau-Reid, Judith, Bekele, Wubishet, Tinker, Nicolas. 2018. Genomic selection-a breeder's perspective. Presentation at 2018 AOWC, June 18-21, 2018. Seattle, WA.</p> <p>4. Mitchell Fetch, J.W. 2018. Breeding 101 (or Cereal Breeding for Beginners). Brandon Research and Development Centre Science Seminar Series May 31, 2018.</p> <p>5. Mitchell Fetch, J.W. 2018. A field tour was held at the Lacombe Research & Development Centre August 9, 2018.</p> <p>6. Mitchell Fetch, J. 2019. Variety Development and Commercialization: Breeding and Registration System. Presented to CIGI's (Canadian International Grains Institute) 2019 Combine to Customer Programs - Variety Development and Commercialization, held in Winnipeg. Presented February 21st and March 12th.</p>
3.	Number of participants at training/knowledge transfer events	172	<p>22 attendees for August 9, 2018 field day at the Lacombe Research and Development Centre</p> <p>20 participants at the CIGI presentations.</p> <p>30 participants at the Breeding 101 (or Cereal Breeding for Beginners). Brandon Research Development Centre Science Seminar</p> <p>There were at least 100 attendees at the American Oat Workers Conference.</p>
4.	Number of new knowledge transfer products developed		
5.	Number of papers published in peer reviewed journals	1	<p>1. Kebede A.Z., Friesen-Enns J.R., Gnanesh B.N., Menzies J.G., Mitchell Fetch J.W., Chong J., Beattie A.D., Paczos-Grzęda E., McCartney C.A. 2018. Mapping Oat Crown Rust Resistance Gene Pc45 Confirms Association with PcKM. G3: Genes, Genomes, Genetics, https://doi.org/10.1534/g3.118.200757</p>
6.	Number of new technologies (new products, practices, processes and systems) that are developed		
7.	Number of new technologies (new products, practices, processes and systems) that are assessed under research conditions		



Performance Measure		Results Achieved	Provide a brief description of each final result achieved during the reporting period.
8.	Number of new technologies (new products, practices, processes and systems) that are demonstrated on-farm or in-plant		
9.	Number of new technologies (new products, practices, processes and systems) that attain Intellectual Property (IP) protection.		
10.	Number of new technologies (new products, practices, processes and systems) that are utilized		

2. Activity-level Information

In this section, please complete one table for each activity. For activities with both a CA and CRDA component, please integrate the results into one table.

CRDA Activity Number: 1
Name(s) of Activity: Prairie Oat Breeding Consortium
Principal Investigator: Jennifer Mitchell Fetch
Summary of Activity: Please provide a high-level summary of this activity that includes an introduction, objectives, methodology, deliverables, results and discussion. Technical language can be used in this section.
Report Executive Summary By 2023, develop superior oat germplasm ideally suited for production in the variable environments in western Canada, which will be eventually sought after by the oat processing and milling industry, for domestic and export markets. The superior breeding lines will respond to industry needs for improved yield, improved agronomy, resistance to major diseases, pests and other adverse environmental conditions that may become prevalent in the planned areas of production. If these breeding lines become registered cultivars, they will continue to make Canadian producers and North American end users consistently profitable. The goals of this program will align with the National Oat Strategy which states “increased yields of new varieties by ≥ 2% per year, relative to provincial checks, until 2023 while maintaining quality and desired agronomic characteristics” (through breeding) and >3% a year increase in oat yields through improved oat agronomy. This ambitious goal may not be achievable, as a recent publication (Thomas & Graf, 2014) reported an annual 0.7% increase for Canadian Western Hard Red Spring from 1990 to 2013. However, this is the goal of the project and the researcher will strive to reach that goal. The breeding program will utilize available advances in molecular markers and techniques to make selection more efficient while maintaining the quality specifications outlined by the Quality Evaluation Team of the Prairie Recommending Committee on Oat and Barley/Prairie Grain Development Committee.



March 2019

Objective:

The objective of the Prairie Oat Breeding Consortium (POBC) is to develop new oat cultivars suited to production in western Canada, and suited to end use markets identified by POGA and the milling industry. These cultivars will be developed as efficiently and effectively as possible.

Outcome: New oat cultivars that will be produced on a significant acreage and utilized by processors and the milling industry. The cultivars developed will have end-use quality identified as important by the industry and will carry genetic resistance to major diseases, pests and adverse environmental conditions prevalent in the planned production areas.

Performance Assessment / Variance:

In February 2019, 4 oat breeding lines were supported for registration at the PGDC-PRCOB Meetings. OT2122 is a good yielding line, earlier heading, with similar maturity to CDC Dancer in 2018. It has good test weight, thousand kernel weight, average %plumps and thins. OT2122 has excellent protein, betaglucan and TDF levels. It has average levels of oil, well within the range desired by the milling industry. OT2122 will be marketed by SeCan. Data for Variety Registration/Plant Breeders Rights will be created and submitted to the VRO as soon as possible.

Milestones:

Activity: Annual Field Tour

Deliverable: Field Tour

Progress Assessment / Variance: A field tour was held at the Lacombe Research & Development Centre August 9, 2018, with 22 people in attendance, including industry funding partners and representatives from POGA. Everyone was impressed with the facilities, equipment and great-looking plots. Lots of questions and discussions made the tour interesting for everyone.

Activity: Annual Meeting with Industry Partners

Milestone / Deliverable

Meeting with Industry Partner

Progress Assessment / Variance: The annual meeting was held Wednesday, January 24, 2019 at the Richardson Kelburn Farm south of Winnipeg, in spite of the highway closures until that morning. The Western cooperative Oat Registration Trial Report data were presented so decisions could be made on which line(s) should be presented at the PGDC-PRCOB to request support for registration. It was decided that 2 lines would be presented for requests for support due to the improved agronomic, disease resistance and improved quality traits. Decisions were made to move one line from 1st year to 2nd year of testing in the 19WCORT. Data from the 18BOAT were presented and selections made by Jennifer were approved by the POBC for moving into the 19WCORT. Later, email discussions led to presenting 4 lines for request for support at the PRCOB meetings. All 4 were supported.

Activity: Annual Report

Milestone / Deliverable: Information and data will be collected for an annual report submitted to appropriate recipients

Progress Assessment / Variance

This is the submitted and approved report



Issues:

- Describe any challenges or concerns in achieving the results and deliverables of this activity during the reporting period. How were they overcome or how do you plan to overcome?
- Describe any potential changes to the work plan and the budget during the reporting period. How were or how will they be managed?

1. Late release of budget funds prevented full spending, but as presented in the report, the milestones were met, and the project health is good.
2. At the beginning of July 2018, the project lead indicated intentions to retire in January 2020, in the hope that a replacement breeder could be identified quickly and put in place to have at least a year of overlap, for a smooth succession, according to the wishes of the industry funding partners. This has not happened to date.
3. Issues affecting the Wheat Breeding program at Brandon directly affect the Oat Breeding program due to the highly effective interaction and efficiencies of the programs. Therefore, the departure of Dr. Andrew Burt from the Hard White Wheat program and the Northern CWRS program, and conversion of that breeding position to a Phenomics Scientist, lead to the Eastern Prairies CWRS Breeder (Dr. Santosh Kumar) being tasked with handling all 3 programs. This in turn required more input, effort and time from myself, in order to assist with the smooth and efficient operations of all the breeding programs. Although the remaining wheat breeder managed the excess work well, there was a great deal of stress and effort required from both of us to keep things moving smoothly.
4. Equipment purchasing processes and procedures have changed considerably without much information available to programs on how to move money into Vote 5 for making equipment purchases. It is not completely clear as to who should or would be paying for equipment items that were included on the annual equipment call. There was a considerable amount of money left over in the breeding programs due to these changes and the lack of information regarding the appropriate processes.
5. It has been extremely difficult to identify candidates for the GL-MAN-06 position located at Lacombe, Alberta. Several potential candidates were identified and offered the position for a 2-year term. However, they all declined the position and found more desirable options. Then, with the help of the Brandon Human Resources person, an option was identified for Sunset Funding, which allowed a person to be offered the position until the end of the CAP Funding in March 2023. A suitable candidate expressed interest in that longer term and will begin work at the beginning of May 2019. It is sincerely hoped this person will stay in the position until at least March 2023. It would be highly desirable if that person could be hired indeterminately.

Key Achievements:

A key achievement represents a significant achievement or tangible result that could potentially be applied either by farmers or industry or the science community. In one to three paragraphs, please provide key achievements that meet one of the following criteria:

- 1) The item has commercial potential (all testing and piloting has been completed);
- 2) The item has been commercialized; or
- 3) The item has been adopted by the sector.

Examples of tangible results could include increased sustainability (beneficial management practice), reduced costs, improved productivity or increased profitability. Please note that the information provided will be used for communication purposes only.



If no key achievements have been realized at this stage, please leave this section blank.

4 lines received support for registration at the PGDC PRCOB meetings in February 2019. OT2122 will be marketed by SeCan and Variety Registration and Plant Breeders Rights documents will be filed as soon as possible. If marketers decide to licence the other 3 lines, all 4 lines could be grown on considerable acreage in western Canada.



Annex A

Performance Measures Table	
Performance Measures	Description
1. Number of highly qualified personnel (HQP) working on funded activities	<p>This includes individuals who are registered in Master or PhD programs and are working on activities that receive funding through the Canadian Agricultural Partnership. They are only counted in their first year working on projects.</p> <p>For each reported HQP, please provide the following: the name of the student, level of degree, field of study and name of the academic institution.</p>
2. Training/knowledge transfer events	
2.1. Number of training/knowledge transfer events organized	<p>This includes events completed in the reporting year that were organized under the project to share results of the activities with audiences who may use that knowledge in the future. Examples could include training events, scientific meetings, symposia, conferences, workshops, industry meetings, field days or webinars.</p> <p>For each reported item, please provide the following: name of the event, name of the organizer and organization, location, and year/month/day.</p>
2.2. Number of presentations made in training/knowledge transfer events	<p>Examples of events could include, but are not limited to conferences, symposiums or training events.</p> <p>For each reported item, please provide the following: name of presenter, title of presentation, name of the event, location, and year/month/day.</p>
3. Number of participants at training/knowledge transfer events	<p>This includes individuals who attend the events listed and who may use that knowledge in the future.</p>
4. Number of new knowledge transfer products developed	<p>New knowledge could include, but is not limited to:</p> <ol style="list-style-type: none"> 1) newly acquired knowledge that differs significantly from previously acquired knowledge; 2) existing knowledge that is enhanced to meet different requirements; 3) existing knowledge that is applied in different situations. <p>These are knowledge transfer materials created under the project that have been disseminated to transfer information to audiences who may use that knowledge in the future. Examples could include brochures, factsheets, flyers, guides, articles in trade magazines, technical bulletins and social media items. Only the number of products developed should be reported, not the number of copies that were printed and disseminated.</p> <p>For each reported item, please provide the following: author(s), title of the item, type of the reported item (e.g. brochure), name of the trade magazine/publisher and page number(s) if applicable, and year/month/day.</p>



<p>5. Number of papers published in peer reviewed journals</p>	<p>This includes scientific papers that are published in peer reviewed journals. Papers that are not yet published (ex. manuscripts in preparation, under review or accepted) should not be reported.</p> <p>For each reported item, please provide the following: author(s), year of publication, article title, title of journal, volume (issue), and page number(s).</p> <p>If the item is a book or a book chapter, add name of publisher.</p> <p>If the item is an article for conference proceedings, add title of published proceedings, location, and year/month/day.</p>
<p>6. Number of new technologies (new products, practices, processes and systems) that are developed</p>	<p>A new technology could include, but is not limited to:</p> <ol style="list-style-type: none"> 1) a newly created technology that differs significantly from existing technologies; 2) an existing technology that is modified to meet different requirements; 3) an existing technology that is tested in different situations. <p>New products are goods and services that differ significantly in their characteristics or intended uses from products previously produced and used. Examples could include equipment, software, novel foods or consumer goods.</p> <p>New practices are new agronomic techniques or methods that can be applied directly by producers.</p> <p>New processes are the set of operations performed by equipment in which variables are monitored or controlled to produce an output in labs or processing facilities.</p> <p>New systems are the set of detailed methods, procedures and routines created to carry out a specific activity, perform a duty, or solve a problem.</p> <p>Development consists of the creation of a new product, the generation of a new practice, or the demonstration of utility of a new process or system.</p> <p>To avoid duplication, for any new technologies, only set a target that represents the last stage in the innovation process. For example, a new technology is either developed, or assessed, or demonstrated or utilized.</p>
<p>7. Number of new technologies (new products, practices, processes and systems) that are assessed under research conditions</p>	<p>See the definition of new technologies under #6.</p> <p>Are assessed: when new technologies are evaluated or tested under research conditions.</p> <p>To avoid duplication, for any new technologies, only set a target that represents the last stage in the innovation process. For example, a new technology is either developed, or assessed, or demonstrated or utilized</p>
<p>8. Number of new technologies (new products, practices, processes and systems) that are demonstrated on-farm or in-plant</p>	<p>See the definition of new technologies under #6.</p> <p>Are demonstrated: when new technologies are presented to the sector by experiments, prototypes, examples or pilot on-farm or in-plant.</p>



	<p>To avoid duplication, for any new technologies, only set a target that represents the last stage in the innovation process. For example, a new technology is either developed, or assessed, or demonstrated or utilized.</p>
<p>9. Number of new technologies (new products, practices, processes and systems) that attain Intellectual Property (IP) protection</p>	<p>See the definition of new technologies under #6.</p> <p>Examples for IP protection could include, but are not limited to: plant breeder rights, patents filed, registered trademarks and copyrights, and registered or released varieties.</p> <p>For each new variety, please provide the registration number, the variety name, and year/month/date.</p>
<p>10. Number of new technologies (new products, practices, processes and systems) that are utilized</p>	<p>See the definition of new technologies under #6.</p> <p>Are utilized: when new technologies are adopted or implemented for use within the sector. Examples may include, but are not limited to: a signed license agreement, a signed letter of intent, a new product that is available on the market, and a new practice which is adopted by farmers.</p> <p>To avoid duplication, for any new technologies, only set a target that represents the last stage in the innovation process. For example, a new technology is either developed, or assessed, or demonstrated or utilized.</p>