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# **Evaluation of the new variety registration support program**

**Audit and Evaluation Services**

**Final approved report**

**Canadian Grain Commission**

**October 2021**

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## Executive summary

This report presents the findings and recommendations of the Canadian Grain Commission's new variety registration support program evaluation. This evaluation was conducted by the Canadian Grain Commission's Audit and Evaluation Services team as part of the Risk-Based Audit and Evaluation for the 2020-2021 fiscal year in accordance with Treasury Board's Policy on Results (2016).<sup>1</sup>

### Program overview

Every year, new varieties are recommended for registration based on guidance from the Prairie Grain Development Committee's prairie recommending committees. The *Seeds Act* and other associated regulations require that new varieties of agricultural crops be registered by the Canadian Food Inspection Agency Variety Registration Office.

The Canadian Grain Commission has provided support to the new variety registration processes for wheat, rye and triticale since the 1950s. The new variety registration support program is seasonal and runs annually from October to February.

The Canadian Grain Commission's Grain Research Laboratory conducts testing services for all wheat, rye and triticale cooperative registration trials for western Canadian wheat variety registration, including:

- analytical testing
- evaluating milling performance
- assessing dough rheological properties
- assessing end-product quality

The Grain Research Laboratory's employees also participate as subject matter experts and voting members in the Quality Evaluation Team of the Prairie Recommending Committee for Wheat, Rye and Triticale.

While the Grain Research Laboratory participates at different levels in recommending committees for other crop types, this evaluation focuses solely on its activities and analyses for the Prairie Recommending Committee for Wheat, Rye and Triticale. The Canadian Grain Commission's Industry Services team and their role in supporting new variety registration process is also not within the scope of this evaluation.

### Methodology

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<sup>1</sup> [Treasury Board Policy on Results \(2016\)](#)

This evaluation assessed the program's relevance, performance, efficiency and COVID-19 learnings based on evidence from a program information review, a document review, key informant <sup>2</sup> interviews and a program employee survey.

## **Relevance**

### **Continued need for the program**

This evaluation supports the continued need for the new variety registration support program. Evidence suggests that there are increasing volumes of new varieties of wheat, rye and triticale recommended annually by the prairie recommending committee. These varieties must be assessed for quality and reviewed by the committee prior to approval.

There is no evidence of duplication by any other comparable program that can provide the same level of consistency, quality and objectivity with other programs and initiatives.

### **Alignment with government priorities**

The new variety registration support program is aligned with Government of Canada priorities to grow exports, expand markets and promote research and innovation in the Canadian agriculture and agri-food sector. The program also supports the Canadian Grain Commission's planned departmental result that domestic and international markets regard Canada's grain as dependable and safe.

### **Alignment with federal roles and responsibilities**

The new variety registration support program supports the Canadian Grain Commission's mandate as enacted by the *Canada Grain Act*. The program is also aligned with governing regulations from the *Seeds Act* and *Seeds Regulations* that encompass the testing, inspection, quality and sale of seeds in Canada.

## **Performance**

The new variety registration support program is successful in achieving its immediate, intermediate and long-term outcomes without evidence of any unintended negative outcomes.

## **Efficiency**

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<sup>2</sup> As noted in Section 3.5 Constraints and Limitations, stakeholder feedback was collected from several different sources, including key informant interviews and publicly available information such as websites, articles and press releases. In addition, the results of the Canada Grain Act review public consultation will be reviewed for any additional feedback regarding the New Variety Registration Program.

Overall, the new variety registration support program is efficient and adequately resourced with no major suggestions from external stakeholders (key informants) and internal stakeholders (program employee survey respondents). Findings and recommendations in the following areas were included in this evaluation:

- program efficiency
- resources
- policy
- industry engagement

## COVID-19 learnings

Despite some operational challenges due to COVID-19 restrictions reported by program employees, key informants indicated that there were no observable impacts to service delivery. In addition, program employees reported some positive workflow adjustments for consideration for long-term implementation. This section is intended for learning purposes only and no findings or recommendations were developed.

## Key findings and recommendations

Table 1 summarizes the key findings from the evaluation and their respective recommendations for further program enhancements.

**Table 1**  
**Summary of key findings and recommendations <sup>3</sup>**

| Key finding  | Recommendation |
|--|----------------|
| <b>Relevance</b>   |                |
| 1. There is a continued need for the Grain Research Laboratory to provide support to the new variety registration process.                     | None           |
| 2. There was no evidence of duplication by another comparable program that can provide the same level of consistency, quality and objectivity. | None           |

<sup>3</sup> As noted in Section 3.5 Constraints and Limitations, stakeholder feedback was collected from several different sources, including key informant interviews and publicly available information such as websites, articles and press releases. In addition, the results of the Canada Grain Act review public consultation will be reviewed for any additional feedback regarding the New Variety Registration Program.

|   |  |
|---|--|
| <p>3. The new variety registration support program is aligned with Government of Canada priorities and supports the Canadian Grain Commission's planned departmental result.</p>  | <p>None</p>  |
| <p>4. The new variety registration support program is aligned with federal roles and responsibilities.</p>  | <p>None</p>  |
| <p><b>Performance</b></p>   |  |
| <p>5. Evidence collected indicates that the program is successful in achieving its immediate, intermediate and long-term outcomes. There was no evidence of unintended negative outcomes of the program.</p>  | <p>None</p>  |
| <p><b>Efficiency</b></p>  |  |
| <p>6. Most key informants and employee survey respondents found the program to be efficient and adequately resourced with sufficient space, equipment, tools, supplies and time to do their jobs. Note: costing information was not available. See recommendations below regarding performance measurement and tracking of program costs.</p> | <p>None</p>  |
| <p>7. Program performance measurement and tracking of program costs is not consistently conducted.</p>  | <p>It's recommended that the Director General of the Grain Research Laboratory develop and implement performance measurement and program cost tracking for the new variety registration support program. It's suggested that input is sought from Finance regarding program cost tracking.</p> |
| <p>8. Program employees indicated a potential need for a laboratory information management system and project management support to improve efficiencies.</p>   | <p>It's recommended that the Director General of the Grain Research Laboratory review the requirements and ensure that they have been included in</p>  |

|   |   |
|---|---|
|   | the current laboratory information management system (LIMS) proposal.   |
| 9. Employee feedback on adequacy of resources was tied to limitations inherent in the current laboratory space at 303 Main Street in Winnipeg (Man.).   | It's recommended that the Director General of the Grain Research Laboratory ensure this feedback is communicated to the 303 Main Street project team and included in deficiency reporting.  |
| 10. Key informant interviewees noted a recent trend of reduction of the number of key scientists across the wheat sciences sector as a whole. Several key informants and one program employee reported concern about the sufficiency of current Grain Research Laboratory resources (related to the new variety registration program) and the complexity and difficulty of succession planning due to the highly specialized nature of the work and difficulty in finding and replacing qualified scientists. | It's recommended that the Director General of the Grain Research Laboratory continue to assess the sufficiency of existing Grain Research Laboratory resources (related to the new variety registration program) and place a heightened priority on succession planning for key scientists within the new variety registration program. |
| 11. Key informants noted the value of the program being provided as a no-fee service to the Prairie Recommending Committee for Wheat, Rye and Triticale and there was some concern expressed regarding the future potential impact should the Grain Research Laboratory begin to charge a fee for these services.   | It's recommended that the Director General of the Grain Research Laboratory bring forward the perspective noted by key respondents, in combination with program performance measurement and costs (as recommended above) to the Commission for their consideration during the next fee review cycle.                                    |
| 12. Key informants indicated they would benefit from more collaboration with the Grain Research Laboratory throughout the year, potentially with scientific meetings and networking events in the area of wheat quality testing and global end-user perspective. Bringing structure would be beneficial.  | It's recommended that the Director General of the Grain Research Laboratory explore the feasibility and implementation of future and ongoing scientific meetings throughout the year.   |

**Note:** See Appendix 1 for management's responses to these recommendations.



## 1.0 Introduction

### 1.1 Evaluation purpose

This report presents the results of a program evaluation of the Canadian Grain Commission Grain Research Laboratory's new variety registration support program. This program provides quality testing services and subject matter expertise to support recommendations of new varieties of wheat, rye and triticale to be approved for commercial sale in western Canada.

The evaluation was conducted in accordance with the Treasury Board's Policy on Results (2016),<sup>4</sup> which requires departments to measure and evaluate performance and use the resulting information to manage and improve programs, policies and services. The evaluation was undertaken by the Audit and Evaluation Services team of the Canadian Grain Commission between October 2020 and March 2021, as required by the Canadian Grain Commission's Risk-Based Audit and Evaluation Plan for the 2020-2021 fiscal year. The evaluation covered the fiscal years between 2018 and 2020.

This outcome evaluation focused on:

- the expected outcomes of the program
- program efficiency
- potential improvements to the program

The results of the evaluation are intended to inform current and future program and policy decisions. This is the first time this program has been evaluated by the Canadian Grain Commission's Audit and Evaluation Services team.

### 1.2 Overview of the variety registration process

The *Seeds Act* and associated regulations state that varieties for most agricultural crops must be approved and registered with the Canadian Food Inspection Agency Variety Registration Office prior to sale in Canada.<sup>5</sup> In order to ensure the continued quality of Canadian grain, the process for recommending new varieties is based on merit, for example, improved grain yield, disease resistance or end-use quality.

New varieties of agricultural crops are recommended annually for registration based on recommendations from the Prairie Grain Development Committee's prairie recommending committees, which are established by the Variety Registration Office and recognized by the Minister of Agriculture and Agri-Food Canada.

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<sup>4</sup> [Treasury Board Policy on Results \(2016\)](#)

<sup>5</sup> [Prairie Recommending Committee for Wheat, Rye and Triticale, Operating Procedures, revised March 2020, page 1](#)

## **Prairie recommending committees**

Prairie recommending committees have been established for 4 different crop type groupings:

- Prairie Recommending Committee for Wheat, Rye and Triticale
- Prairie Recommending Committee for Oats and Barley
- Prairie Recommending Committee for Oilseeds
- Prairie Recommending Committee for Pulse & Special Crops

These recommending committees were established to facilitate scientific discussion and research priorities for the development of new and improved cultivars. Each committee has its own operating procedures and guidelines that govern its activities. Separate recommending committees are set up for eastern Canada.

In the case of the Prairie Recommending Committee for Wheat, Rye and Triticale, the evaluation process is a concurrent determination of the value for cultivation (mandated Canadian Food Inspection Agency registration) and quality-based market eligibility (mandated Canadian Grain Commission variety designation lists in wheat classes).

Prairie recommending committees use science-based criteria to assess proposed new varieties, including assessing their quality, disease resistance and agronomic performance. To be recommended for approval, new varieties should, overall, perform equally or better than the check cultivars in the merit criteria. All varieties require testing, assessment and recommendation from the crop-specific recommending committee before they can be sent to the Variety Registration Office.

Anyone from the grain sector can seek membership on the committee. These committees typically consist of members from the grain sector, agriculture associations, academia and government. Members serve on a volunteer basis. New members are nominated and then voted onto the committee by existing members.

The quality assessment activities for the variety registration process are based on trial registration data prepared by the Grain Research Laboratory. Plant breeders, including commercial entities and public groups, submit new candidate lines and check cultivars for quality evaluation to the Grain Research Laboratory. Private trials may also submit data from other sources and do not always use Grain Research Laboratory to generate quality data.

Results are presented at annual Prairie Grain Development Committee meetings held every February in western Canada where the recommending committees compare candidate lines to the check cultivars. The recommending committees meet to review results and discuss the agronomy, disease resistance and quality of candidate lines. A vote is held to decide whether to recommend each candidate line for continued testing or registration in western Canada.

Based on committee recommendations, the Variety Registration Office typically moves to register new varieties for commercial production.

### **Prairie recommending committee operating procedures**

The registration office reviews and approves the recommending committees' operating procedures annually. Any changes need approval by both the committee and the registration office. The committee is recognized as the sole authority providing variety registration recommendations for the year by the Minister of Agriculture and Agri-Food Canada.

These operating procedures outline grievance steps should any proponents disagree with the findings of the committee. Stakeholder grievances are taken first to the Prairie Recommending Committee for Wheat, Rye and Triticale and, as a last resort, to the registrar of the Variety Registration Office.<sup>6</sup>

### **Wheat variety registration process**

The creation of new wheat varieties can take many years from start to commercial sale. The breeding process can take more than 10 years, including 3 years of pre-registration testing data that is typically required. If approved by the recommending committees and successfully registered, it can take another 1 to 2 years for seed production. As a result, wheat breeders benefit from knowing the quality characteristics that the market demands many years in advance.

This is a complex process. Candidate lines are assessed based on quality, disease resistance and agronomy and there are separate committees set up to assess each of these areas.

The Grain Research Laboratory's role is typically limited to the Quality Evaluation Team, of the prairie recommending committee, where staff complete testing based on quality parameters for cooperative trials for wheat, rye and triticale. Its roles in the process include:

- comprehensive quality evaluation of candidate lines and check varieties
- compilation and organization of quality data in required formats
  - preparation of related documents, such as testing methods, quality parameters and quality objectives as prescribed by the recommending committee's operating procedures<sup>7</sup>
- participation on the recommending committee and Quality Evaluation Team as subject matter experts

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<sup>6</sup> [Prairie Recommending Committee for Wheat, Rye and Triticale, Operating Procedures, revised March 2020, page 2](#)

<sup>7</sup> [Prairie Recommending Committee for Wheat, Rye and Triticale, Operating Procedures, revised March 2020, Appendix F Wheat and Durum: Measurement of Quality Traits, page 50](#)

### **1.3 Evaluation scope**

During the new variety registration process, varieties are assessed for agronomy, disease resistance and quality. The Canadian Grain Commission supports the evaluation processes by providing quality assessment as grain quality is a Canadian Grain Commission-mandated role, whereas it does not have mandates related to agronomy and disease resistance.

The Canadian Grain Commission plays a supporting role to the new variety registration process and this role is the subject of this program evaluation.

While the Grain Research Laboratory participates in all recommending committees related to quality for all crop types, it participates at different levels in each committee. Each recommending committee has a different set of established procedures and processes. The bulk of the Grain Research Laboratory work supports the Prairie Recommending Committee for Wheat, Rye and Triticale.

For the current evaluation, only Grain Research Laboratory activities and analysis for the Prairie Recommending Committee for Wheat, Rye and Triticale will be included. As a result, evaluation findings and recommendations may have limited applicability to other crop recommending committees. There is the potential option to expand the evaluation, in subsequent phases, to include other committees.

## **2.0 Program profile**

The Canadian Grain Commission has provided quality support for the new variety registration process for wheat, rye and triticale since the 1950s.

### **The Grain Research Laboratory's role**

The Grain Research Laboratory provides quality testing services for all wheat, rye and triticale cooperative registration trials for western Canadian wheat variety registration, including:

- conducting analytical testing
- evaluating the milling performance
- assessing dough rheological properties
- assessing end-product quality

Staff review and analyze the data and report the quality characteristics of the candidate cultivars relative to the check varieties at the annual Prairie Grain Development Committee meetings.

As subject matter experts and voting members on the Quality Evaluation Team of the Prairie Recommending Committee for Wheat, Rye and Triticale, employees provide expert opinions and subject matter expertise during discussions, deliberations and

formulation of recommendations for candidate lines as well as for revising quality objectives or modifying quality evaluation protocols.

### **Industry Services' role**

The Industry Services team and their role is excluded from this evaluation. Details on their involvement are provided here for context.

After registration, the Canadian Grain Commission's Industry Services team is responsible for assigning all newly registered varieties to a wheat class (variety designation lists). While involved most extensively in the wheat, rye and triticale recommending committee, Industry Services also participates in the process for other new varieties of the crops, including:

- Prairie Recommending Committee for Oats and Barley
- Prairie Recommending Committee for Oilseeds
- Prairie Recommending Committee for Pulse & Special Crops

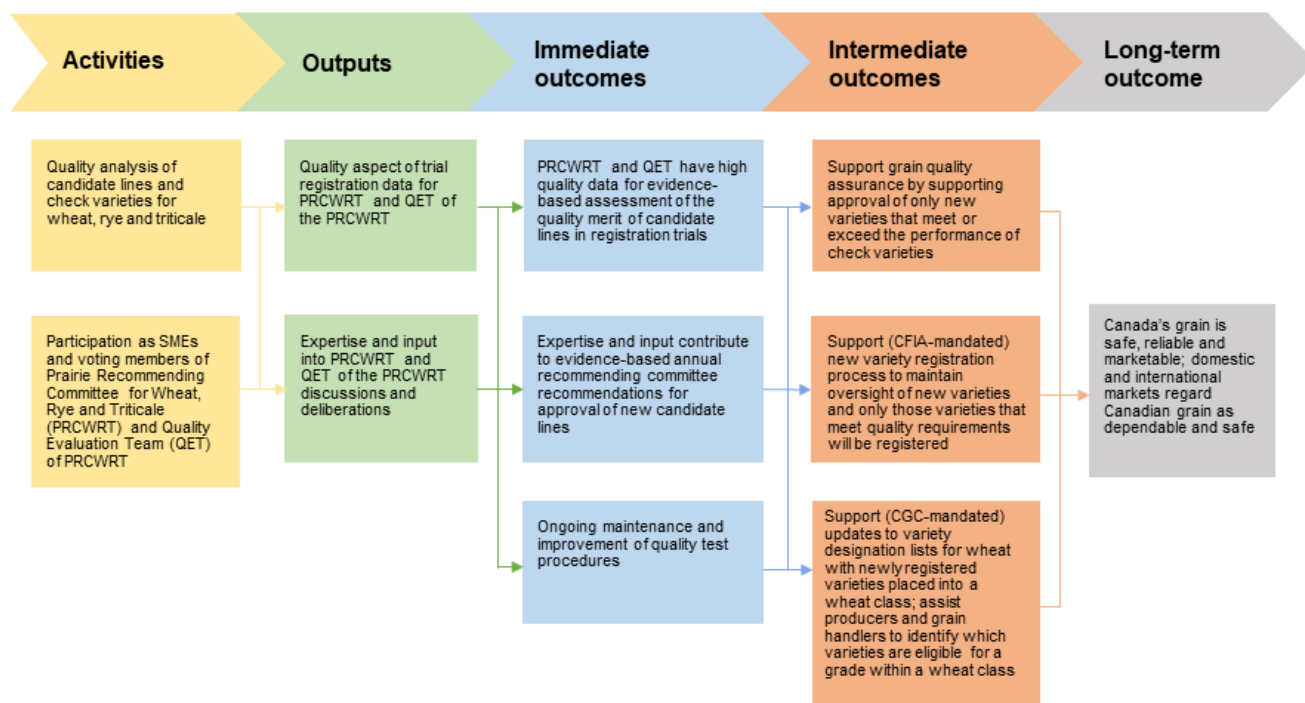
### **Program logic model**

A logic model is a visual roadmap of how the program is expected to achieve its intended outcomes. It illustrates the intended causal relationships between the program activities, outputs and outcomes. This program logic model in Figure 1 was developed jointly by the evaluator, program manager and the evaluation working group. It outlines the program activities and outputs as well as immediate, intermediate and long-term outcomes.

### **Figure 1**

#### **New variety registration support program logic model**

# LOGIC MODEL: New variety registration support – wheat, rye and triticale



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## Acronyms

SMEs – subject matter experts  
 PRCWRT – Prairie Recommending Committee for Wheat, Rye and Triticale  
 QET – Quality Evaluation Team  
 CFIA – Canadian Food Inspection Agency  
 CGC – Canadian Grain Commission

## Inputs

- Highly specialized scientists and other employees
- Supplies
- Equipment
- Laboratory space
- Funding

## **Legislation**

- *Canada Grain Act*
- *Canada Grain Regulations*
- *Seeds Act*
- *Seeds Regulations*

## **Activities**

- Quality analysis of candidate lines and check varieties for wheat, rye and triticale
- Participation as subject matter experts and voting members of Prairie Recommending Committee for Wheat, Rye and Triticale and the Quality Evaluation Team of the recommending committee

## **Outputs**

- Quality aspect of trial registration data for the Prairie Recommending Committee for Wheat, Rye and Triticale and the Quality Evaluation Team of the committee
- Expertise and input into the Prairie Recommending Committee for Wheat, Rye and Triticale and the Quality Evaluation Team of committee discussions and deliberations

## **Immediate outcomes**

- The Prairie Recommending Committee for Wheat, Rye and Triticale and the Quality Evaluation Team have high quality data for an evidence-based assessment of the quality merit of candidate lines in registration trials
- Expertise and input contribute to evidence-based annual Prairie Recommending Committee for Wheat, Rye and Triticale recommendations for approval of new candidate lines
- Ongoing maintenance and improvement of quality test procedures

## **Intermediate outcomes**

- Support grain quality assurance by supporting the approval of only new varieties that meet or exceed the performance of check varieties
- Support the Canadian Food Inspection Agency-mandated new variety registration process to maintain oversight of new varieties and only those varieties that meet quality requirements will be registered
- Support the Canadian Grain Commission-mandated updates to variety designation lists for wheat with newly registered varieties placed into a wheat

class and assist producers and grain handlers to identify which varieties are eligible for a grade within a wheat class

### **Long-term outcome**

- Canada's grain is safe, reliable and marketable and domestic and international markets regard Canadian grain as dependable and safe

## **2.1 Program activities**

The new variety registration program is seasonal and runs each year from October to February. The program occurs immediately after the seasonal Harvest Sample Program. As a result, any equipment maintenance, ordering of supplies and hiring seasonal staff are typically performed while the Harvest Sample Program is operating and are not required during the new variety registration support program.

As explained in the operating procedures for the Prairie Recommending Committee for Wheat, Rye and Triticale, the role of the Canadian Grain Commission is:

“The [Canadian Grain Commission], as a service to the [Prairie Recommending Committee for Wheat, Rye and Triticale], will assess the check varieties from the trial for protein, grade and degrading factors and then calculate the desired location blend for quality submission purposes. The blend calculation will then be used by the breeder to prepare composites for each check variety and each candidate line. The composite samples will then be submitted to the testing laboratory for the required testing based on trial category. The [Canadian Grain Commission], as a service to the [Prairie Recommending Committee for Wheat, Rye and Triticale], will assess the check varieties from the trial for protein, grade and degrading factors and then calculate the desired location blend for quality submission purposes. The blend calculation will then be used by the breeder to prepare composites for each check variety and each candidate line. The composite samples will then be submitted to the testing laboratory for the required testing based on trial category.”<sup>8</sup>

Once samples are received, the Grain Research Laboratory staff cleans, prepares and mills the samples as needed. They then conduct tests for the following, as defined by the Quality Evaluation Team of the Prairie Recommending Committee for Wheat, Rye and Triticale:

- wheat characteristics

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<sup>8</sup> [Prairie Recommending Committee for Wheat, Rye and Triticale, Operating Procedures, revised March 2020, Appendix F Wheat and Durum: Measurement of Quality Traits, page 47](#)



- milling performance
- flour and semolina properties
- dough rheological behaviours
- end-product quality

Tests conducted vary depending on whether the line is bread wheat, durum or soft wheat. Some tests are routinely replicated (conducted more than once) to ensure the results are accurate and reliable. A summary of tests conducted, by wheat type and the number of samples and tests for variety registration trials is included in Table 2.

**Table 2**  
**Summary of tests conducted for each variety registration trials**

| Durum                                | Replicates     | WBW, CBW,<br>PARK, HY,<br>HWW, RW,<br>CNHR* | Replicates  | Soft White<br>Spring**                            | Replicates  |
|--------------------------------------|----------------|---|-------------|---|-------------|
|                                      |                | 134 samples/<br>7 trials/15<br>tests        |             | 17 samples/<br>16 tests                           |             |
| Grading, hard vitreous kernels (HVK) | 1              | Grading                                     | 1           | Grading   | 1           |
| Test weight                          | 1              | Test weight                                 | 1           | Test weight                                       | 1           |
| Wheat protein                        | 4              | Wheat protein                               | 2           | Wheat protein                                     | 2           |
| Wheat ash                            | 4              | Flour protein                               | 2           | Flour protein                                     | 2           |
| Falling Number                       | 2              | Protein loss on milling                     | Calculation | Protein loss on milling                           | Calculation |
| Cadmium content                      | 2              | Wheat Falling Number                        | 2           | Wheat Falling Number                              | 2           |
| Milling                              | 2              | Flour amylograph peak viscosity             | 1           | Flour amylograph peak viscosity                   | 1           |
| Semolina ash                         | 4              | Milling                                     | 1 or 2      | Milling   | 1           |
| Semolina protein                     | 4              | Flour ash                                   | 2           | Flour ash   | 2           |
| Semolina wet gluten/gluten index     | 2              | Flour starch damage (megazyme)              | 2           | Flour starch damage (megazyme)                    | 2           |
| Semolina alveograph                  | 1-2            | Farinograph                                 | 1-3         | Solvent retention capacity (SRC) – water          | 2           |
| Semolina yellow pigment content      | 3              | Extensograph (modified)                     | 1-2         | Solvent retention capacity (SRC) – lactic acid 5% | 2           |
| Semolina L*a*b*                      | 1 x 3 readings | Lean no time test baking                    | 2-3         | Alveograph  | 1-2         |

|                             |                |                                   |   |                                   |   |
|-----------------------------|----------------|-----------------------------------|---|-----------------------------------|---|
| Spaghetti colour, L*a*b* 85 | 2 x 3 readings | Raw water noodle colour L*a*b* 2h | 2 | Sugar snap cookie test            | 2 |
| Spaghetti texture analysis  | 1 x 6 cuts     |                                   |   | Raw water noodle colour L*a*b* 2h | 2 |

Source: Grain Research Laboratory

\* WBW: Western bread wheat, CBW: Central bread wheat, PARK: Parkland, HY: High yielding, HWW: Hard white wheat, RW: Red winter, CNHR: Canada North Hard Red

\*\* SWS: Soft white spring

Once the tests are completed, the Grain Research Laboratory employees compile the results and enter them into a colour-coded tool used for comparison at the Prairie Grain Development Committee meetings. Supporting documents are created and the resulting package is distributed and provided online through the committee's website with member only, password protected access. These data are considered confidential during the registration process but become public domain once the variety is registered.<sup>9</sup>

Table 3 outlines the typical stages of testing that are undertaken in the Grain Research Laboratory for each sample.<sup>10</sup>

**Table 3**  
**Testing stages for trial registration data (2018-2019)**

| <b>Trial registration data</b>  | <b>Stage</b> |
|---|--------------|
| Receival of check samples, protein measurement, submission to grading                       | Stage 1      |
| Grading of check samples (Industry Services)  | Stage 2      |
| Composite formulation   | Stage 3      |
| Making and delivering composites to the Canadian Grain Commission                           | Stage 4      |
| Sample receival, cleaning, preparation and milling  | Stage 5      |
| Grading of composites (Industry Services)   | Stage 6      |
| Bread wheat and durum research testing (with 7-day post-milling rest period before testing) | Stage 7      |
| Analytical testing (wheat and flour, no rest period)  | Stage 8      |

Source: Grain Research Laboratory

<sup>9</sup> [Prairie Recommending Committee for Wheat, Rye and Triticale, Operating Procedures, revised March 2020, page 19](#)

<sup>10</sup> Information and program documents provided by the Program Manager

|   |          |
|---|----------|
| Table completion (analysis, compilation and organization of quality data into required formats) | Stage 9  |
| Introduction documents, flagging, reviewing, distribution*                                      | Stage 10 |

\*the deadline is 2 weeks before Prairie Grain Development Committee meetings

The number of samples received varies by year depending on the number of trials being considered for approval and can be difficult to predict. A 6-year average of the number of composites received between 2013 and 2018 is presented in Table 4. The average number of variety registration trials with and without replication is presented in Table 5. Collectively, these tables illustrate the volume of samples conducted by the laboratory during the seasonal program period.

Table 4 provides detail about the volume and type of testing completed between 2013 and 2018. This includes check and candidate lines combined. The data is reported on an average basis as there were significant changes in the required tests over this period due to reforms to the Prairie Recommending Committee for Wheat, Rye and Triticale.

**Table 4**

**Average number of composites each year**

| <b>Trial</b>                   | <b>6-year average (2013 to 2018)</b> |
|--------------------------------|--------------------------------------|
| Western bread wheat            | 25                                   |
| Parkland bread wheat           | 24                                   |
| Central bread wheat            | 26                                   |
| High yielding wheat            | 24                                   |
| Hard white wheat               | 18                                   |
| Hard red winter wheat          | 17                                   |
| Canada Northern Hard Red wheat | 10                                   |
| <hr/>                          |                                      |
| Durum                          | 28                                   |
| Soft white spring wheat        | 17                                   |
| <hr/>                          |                                      |
| <b>TOTAL TESTED</b>            | <b>189</b>                           |

Source: Grain Research Laboratory (2013 to 2018)

Table 5 provides detail about the volume and type of testing typically completed during this seasonal program. This includes check and candidate lines combined. This table is based on data collected during the 2018-2019 fiscal year and represents a typical year.

**Table 5**

**Estimated number of sample tests with replication**

| <b>Trials</b>           | <b>Number of samples</b> | <b>Number of tests</b> | <b>Total number of tests</b> |
|-------------------------|--------------------------|------------------------|------------------------------|
| Bread wheat (7 trials)  | 134                      | 15                     | 3122                         |
| Durum                   | 28                       | 20                     | 983                          |
| Soft white spring wheat | 17                       | 16                     | 425                          |
| <b>TOTAL</b>            | <b>179</b>               |                        | <b>4530</b>                  |

Source: Grain Research Laboratory (2013 to 2018)

The Grain Research Laboratory typically provides trial registration data to members of the Prairie Recommending Committee for Wheat, Rye and Triticale 2 weeks before the Prairie Grain Development Committee meetings. Grain Research Laboratory employees attend these 4-day annual meetings and, serving as subject matter experts and voting members on the committee, provide recommendations on new variety approvals. Once recommendations are submitted, the Quality Evaluation Team meets to review and update test procedures for the next year.

This program runs from October to February, concluding at the Prairie Grain Development Committee meetings held annually in February. The meetings typically rotate between Banff (Alberta), Winnipeg (Manitoba) and Saskatoon (Saskatchewan). In the 2020-2021 season, they were held virtually for the first time.

## 2.2 Program resources and funding

### Funding

This program is conducted under the Grain Research Laboratory umbrella as part of the Grain Research Program. It's managed by the Research Scientist, Bread and Durum Wheat Research. The program has no dedicated budget and utilizes resources from other programs and teams. As a result, actual program costs are not routinely tracked. The new variety registration program manager has provided a high level costing estimate from the 2019 season of \$283,000 annually (including salary costs, employee benefits payments and supplies). A more robust costing exercise is currently underway as part of the management action plan in Appendix 1.

Fees are not charged for this work. The Grain Research Laboratory provides collaborative trials as a service to the Prairie Recommending Committee for Wheat, Rye and Triticale. Costs for staffing, laboratory space, supplies, equipment and travel time as well as expenses for the committee meetings are funded by the Grain Research Laboratory through appropriation funding and revolving fund revenues. Any laboratory

analysis for trials involving other crop types or private breeder initiatives may be done on a fee-for-service basis.

### Human resources

This program has no fixed human or fully dedicated resources and utilizes employees from other programs and teams and temporary staff on a seasonal basis. As employee data is not routinely collected for this seasonal program, available data from different time periods was used. During the 2020-2021 season, 29 Grain Research Laboratory employees participated in the program, either full-time or part-time. In addition, 2 to 3 casual staff were involved for a 5-month period to support the program.

A breakdown of employee hours for the 2018-2019 season is included in Table 6.

**Table 6**

**Estimated hours for Analytical Services variety registration trials (annually from October to February) (2018 to 2019)**

|                                  |             |
|----------------------------------|-------------|
| <b>Technicians – Total hours</b> | <b>3740</b> |
| Bread and Durum Wheat Research   | 1550        |
| Analytical, wheat enzymes        | 1295        |
| Milling                          | 640         |
| Industry Services                | 210         |
| Grain safety                     | 45          |
| <b>Chemists – Total hours</b>    | <b>640</b>  |
| Bread and Durum Wheat Research   | 525         |
| Analytical, wheat                | 115         |
| <b>Scientists – Total hours</b>  | <b>350</b>  |

Source: Grain Research Laboratory (2013 to 2018)

## 3.0 Methodology

Multiple lines of evidence and triangulated findings were used to ensure reliability and validity of data and information to support the evaluation. The evaluation team investigated 4 lines of evidence:

- program information review

- document review
- key informant interviews
- program staff survey

### 3.1 Program information review

- Staffing information
- Discussions with the Grain Research Laboratory program manager
- Discussions with the Finance division
- Numbers of grain quality tests completed
- Note: as the Grain Research Laboratory does not track costs specifically for this 5-month program, program financial data was not available

### 3.2 Document review

The documents reviewed covered relevant legislation, including the *Canada Grain Act* and *Canada Grain Regulations*, the *Seeds Act* and *Seeds Regulations* as well as publicly available mandate letters and federal budgets. Over 55 documents, reports and articles as well as 48 external websites were also reviewed.

In addition, internal Canadian Grain Commission documents were reviewed, including:

- Grain Research Laboratory's annual reports
- Canadian Grain Commission Departmental Plan and Departmental Results Framework
- Canadian Grain Commission's Business Continuity Plan and related Business Impact Assessment

Documents related to the external new variety registration support program process were reviewed and included:

- historical data on approved wheat rye, and triticale varieties
- prairie recommending committee operating procedures (and reforms of these procedures)
- the Prairie Grain Development Committee website
- past reviews and assessments

A complete list of documents reviewed is included in Appendix 4.

### **3.3 Key informant interviews**

In February 2021, key informant interviews were conducted with 26 current and past members or observers of the Prairie Recommending Committee for Wheat, Rye and Triticale. This included individuals from:

- Agriculture and Agri-Food Canada
- Canadian Food Inspection Agency
- academia who are stakeholders and users of the outputs of the new variety registration support program
- Canadian Grain Commission (other divisions to the Grain Research Laboratory)
- Recent retirees from these groups

Key informants were scheduled for online video interviews that consisted of both open ended and scale questions. The interview was designed to gather stakeholders' views on relevance and program performance. In total, 26 key informants were interviewed between February and March 2021.

Key informant interview breakdown is as follows:

- 18 informants from Agriculture and Agri-Food Canada and the Canadian Food Inspection Agency
- 6 university researchers and academics or recently or semi-retired researchers, scientists or academics
- 2 employees from Canadian Grain Commission in divisions external to the Grain Research Laboratory

### **3.4 Survey of the Grain Research Laboratory's new variety registration support program employees**

A survey of program employees was conducted during February and March 2021. The survey was designed to collect information from the Grain Research Laboratory employees involved in the new variety registration support program who had worked on any aspect the program for at least 1 season. This included:

- scientists
- laboratory technicians
- program managers
- those involved in the preparation of samples, data and documentation

The survey was completed by 25 out of 29 staff members who were invited to participate (86% response rate). Respondent breakdown is as follows:

- 32% work in Analytical Services (n=8)
- 32% work in Bread and Durum Wheat Research (n=8)

- 12% work in Milling and Malting/Research on Barley and Other Grains (n=3)
- 12% work in Variety Identification Research and Monitoring (n=3)
- 8% work in Trace Organics and Trace Elements Analysis (n=2)
- 4% work in Wheat Enzymes (n=1)

Responses were collected, analyzed and summarized for reporting.

### 3.5 Constraints and limitations

The following methodological constraints and limitations were identified. Steps taken to mitigate their impacts are included.

Constraint: This is typically a seasonal activity for the Grain Research Laboratory running from October to February. As a result, costs and full-time, part-time and casual employees have not historically been tracked specifically for this seasonal program.

Mitigation: Program resource and cost information collected by the program manager from different time periods were reviewed. A rough cost estimate, built by the program manager for the 2019 period was utilized.

Constraint: Canadian Grain Commission Industry Services employees also provide support to the new variety registration process serving as voting members and subject matter experts of quality on the different crop committees and are excluded from the scope of this evaluation.

Mitigation: Findings of this evaluation may have limited applicability to the Industry Services roles related to new variety registration.

Constraint: Due to the ongoing Canada Grains Act Review not all stakeholders were not interviewed directly.

Mitigation: During the program evaluation, stakeholder feedback was collected from several different sources, including key informant interviews and publicly available information such as websites, articles and press releases. In addition, the results of the Canada Grain Act review public consultation will be reviewed for any additional feedback regarding the New Variety Registration Program.

## 4.0 Evaluation findings



## 4.1 Relevance

**Key finding: There is a continued need for the Grain Research Laboratory to provide support to the new variety registration process.**

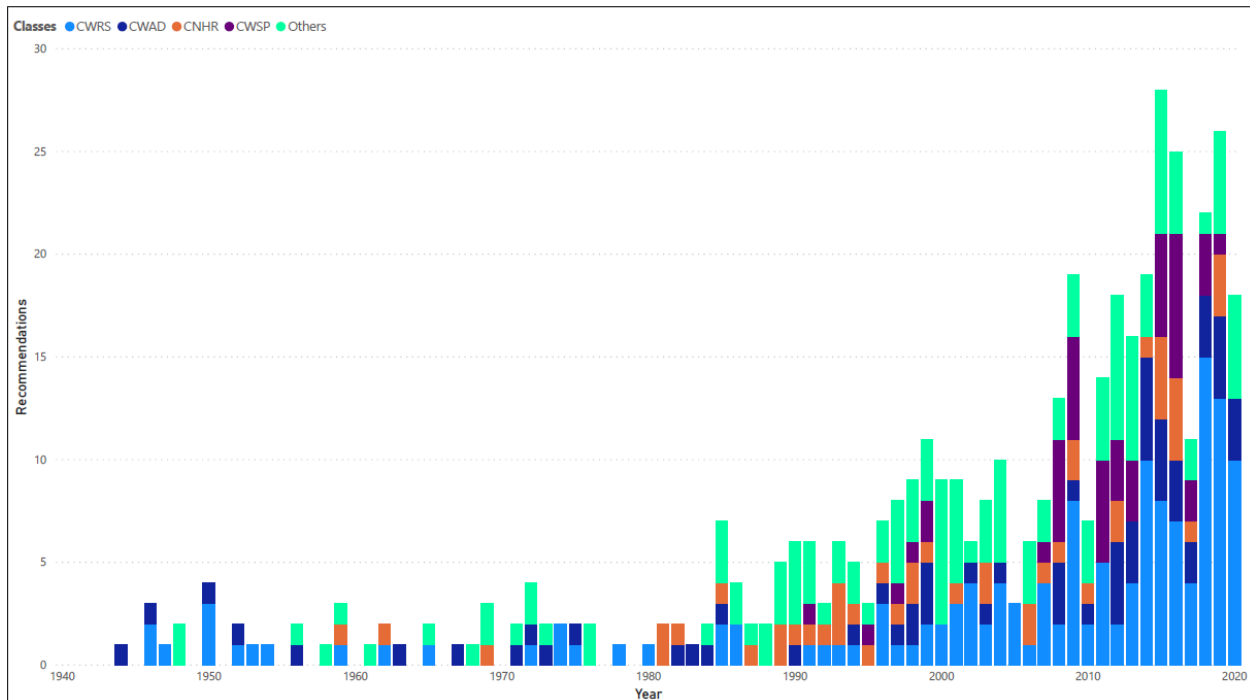
### 4.1.1. Continued need for the program

#### Increasing volume of new varieties

Data on the volume of new varieties of wheat, rye and triticale recommended by the prairie recommending committee from 1940 to 2020 indicate that the volume of new varieties has consistently increased over time (see Figure 2). Prior to approval, these varieties must be assessed for quality and reviewed by the recommending committees. This has resulted in continued need for the program resources to support this process.

**Figure 2**

**Western Canadian wheat recommendations (1940 to 2020)**



Source: [Prairie Recommending Committee for Wheat, Rye and Triticale](#)

Program survey responses from Grain Research Laboratory employees showed there is currently a greater need for the Grain Research Laboratory's role in supporting the new variety registration process and its role becomes more vital as new varieties continue to emerge. Research activities conducted by the Grain Research Laboratory address different quality parameters that support the integrity and marketability of Canadian grain for both domestic and international markets.

Canada's seed regulatory framework modernization initiative is currently underway and there's some indication that innovation and technology may support and accelerate advances in plant breeding. This is expected to make plant breeding more affordable and accessible to new entrants. This is a sector whose growth is expected to continue over the next 20 years.<sup>11 12</sup>

### **Prairie Development Grain Committee mandate**

Key informants viewed Grain Research Laboratory participation as providing a connection for end-use quality characteristics data with breeders to international markets, which supports the committee's first and third mandate items. More information on the Prairie Development Grain Committee mandate is available in Appendix 2.

In addition, quality data produced by this Grain Research Laboratory program is viewed as a key marketing tool for wheat exporters. This data allows for the assessment of proposed wheat varieties based on the end-use needs of consumers and foreign buyers.

The trial registration data provided annually to the Quality Evaluation Team of the Prairie Recommending Committee for Wheat, Rye and Triticale is essential to identify candidate lines that merit registration and eligibility for the Canadian Grain Commission's variety designation list. The data also forms the basis for the comprehensive evaluation of quality of new wheat lines before registration.

#### **4.1.2 Complementarity and overlap with similar programs and initiatives**

**Key finding: There was no evidence of duplication by another comparable program that can provide the same level of consistency, quality and objectivity.**

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<sup>11</sup> Looking Ahead, Trends and Forces Impacting the Future of the Seed Industry, Agriculture and Agri-Food Canada, June 25, 2020, page 9

<sup>12</sup> Canada's Seed Regulatory Framework, A primer for Seed Regulatory Modernization, Agriculture and Agri-Food Canada, June 25, 2020

The majority of key informants (25 out of 26) felt that the trial registration data provided by the Grain Research Laboratory does not duplicate other programs or initiatives. Informants were not aware of other laboratories that could consistently provide the same service that is provided by the Grain Research Laboratory.

Two key informants indicated that the data provided by the early trials (pre-registration trials) and wheat breeder data is sometimes, although infrequently, used to complement Grain Research Laboratory data when a candidate line is marginal or there is significant discussion amongst the Quality Evaluation Team members during Prairie Grain Development Committee meetings.

When asked about other possible laboratories that could provide this service, key informants indicated that there are other potential providers and they're used by the private trials for pre-registration analysis. Some examples of other providers included:

- the Canadian International Grains Institute (Cigi)
- the University of Guelph's laboratory services
- some private laboratories such as SGS Canada

The Prairie Recommending Committee for Wheat, Rye and Triticale has prescribed protocols that could be used by other service providers, but informants felt that there was no other source that was as comprehensive, technically stringent and could complete all the parameters outlined in the recommending committee's operating procedures when compared to the Grain Research Laboratory.

Most key informants indicated there was no other source that could provide the same level of consistency and precision when compared to what's delivered by the Grain Research Laboratory and that for registration trials, the laboratory's services were key.

## 4.2 Alignment with government priorities

**Key finding: The new variety registration support program is aligned with Government of Canada priorities to grow exports, expand markets and promote research and innovation in the Canadian agriculture and agri-food sector. The program also supports the Canadian Grain Commission's planned departmental result that domestic and international markets regard Canada's grain as dependable and safe.<sup>13</sup>**

### Canadian Grain Commission key department result

The objectives of the Grain Research Laboratory's new variety registration support program are closely aligned with the Canadian Grain Commission's core departmental

<sup>13</sup> [Canadian Grain Commission, 2020-2021 Departmental Plan, page 9](#)

mandate to regulate grain handling in Canada and to establish and maintain science-based standards of quality for Canadian grain.

The Grain Research Laboratory's involvement in the quality portion of trial registration data as well as expertise and input into discussions and deliberations for the Prairie Recommending Committee for Wheat, Rye and Triticale and the Quality Evaluation Team contribute to the achievement of the departmental result that domestic and international markets regard Canada's grain as dependable and safe.

### **Growing exports and expanding markets**

Agriculture is a key sector of the Canadian economy and a critical component to its future growth. In 2019, agricultural products accounted for \$67 billion or just over 9% of Canada's exports.<sup>14</sup> In addition, the agriculture and agri-food system, which encompasses all stages of the value chain from farm input suppliers to food retail and service providers, generated approximately \$143 billion (7.4%) of the country's gross domestic product in 2019.<sup>15</sup>

A key government priority is to increase Canada's agriculture and agri-food exports to \$75 billion by 2025.<sup>16</sup> The new variety registration support program promotes export growth by ensuring new varieties meet end-use needs for quality.

The program's intermediate outcomes include supporting grain quality assurance by approval of only new varieties that meet or exceed the performance of current varieties. The program's long-term outcome includes contributing to ensuring that international markets regard Canadian grain as dependable and safe. More detail can be found in the logic model previously shown in Figure 1.

Program objectives align with the federal government priorities as reflected in the commitments and initiatives outlined below.

- The mandate letters from the Office of the Prime Minister to the Minister of Agriculture and Agri-Food Canada emphasize the government's continued efforts to support the agricultural sector through maximizing the government's policy and financial tools to facilitate its global export growth potential<sup>17</sup> and creating long-term competitiveness.<sup>18</sup>
- The Canadian Agricultural Partnership, a 5-year (2018 to 2023) federal, provincial and territorial initiative, outlines federally funded research activities and programs that focus on key areas, including growing markets and expanding

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<sup>14</sup> [Global Affairs Canada, Canada's State of Trade 2020, page 9 \(indicating \\$792B in Canadian exports in 2019\)](#)

<sup>15</sup> [Agriculture and Agri-Food Canada, Departmental Results Report 2019-2020, page 3](#)

<sup>16</sup> Agriculture and Agri-Food Canada, Canadian Agricultural Partnership: Federal Activities and Programs 2018

<sup>17</sup> [Office of the Prime Minister, Minister of Agriculture and Agri-Food Canada Mandate Letter, 2019, page 3](#)

<sup>18</sup> [Office of the Prime Minister, Minister of Agriculture and Agri-Food Canada Supplementary Mandate Letter 2021, page 1](#)

growth. Under this key focus area, the Government of Canada has set the goal to grow Canada's agriculture and food exports to \$75 billion by 2025.<sup>19</sup>

- Growing Canada's agri-food exports has remained a consistent priority for the Government of Canada as evidenced in past federal budget documents:
  - Budget 2017's Skills and Innovation Plan set a goal to grow Canada's agri-food exports to at least \$75 billion annually by 2025.<sup>20</sup>
  - Budget 2018 states the government's commitment to pursuing trade agreements in North America, Europe and Asia (see Table 7 for the top 10 importers of wheat, rye and triticale) and seeking out new markets, which creates greater market access potential for Canadian grain<sup>21</sup>
    - This is important for Canadian agriculture and agri-food exports as 76.6% of such exports are under free trade agreements.<sup>22</sup>
  - Budget 2019 states the federal government has committed to a broad review of the *Canada Grain Act* and operations of the Canadian Grain Commission to address potential issues raised by the Canadian grain sector<sup>23</sup>

**Table 7**

**Top 10 importers of wheat, rye and triticale in kilotonnes  
(August 2003 to January 2021)**

| Destination   | Kilotonnes |
|---------------|------------|
| Indonesia     | 12,213.70  |
| Japan         | 11,545.00  |
| United States | 9362.60    |
| Peru          | 8525.20    |
| China         | 8236.30    |
| Bangladesh    | 7698.30    |
| Italy         | 7543.30    |
| Colombia      | 7411.40    |
| Mexico        | 6048.70    |

<sup>19</sup> [Agriculture and Agri-Food Canada, Canadian Agricultural Partnership: Federal Activities and Programs 2018](#)

<sup>20</sup> [Government of Canada, Budget 2017. Chapter 1 – Skills, Innovation and Middle-Class Jobs, page 107](#)

<sup>21</sup> [Government of Canada, Budget 2018. Chapter 1 – Growth: Strengthening and Diversifying trade, page 64](#)

<sup>22</sup> [Agriculture and Agri-Food Canada, Overview of the Canadian Agriculture and Agri-Food Sector 2020, page 11](#)

<sup>23</sup> [Government of Canada, Budget 2019, Chapter 2, Part 5 – Building a Nation of Innovators, page 118](#)

|              |                  |
|--------------|------------------|
| Algeria      | 5785.10          |
| <b>Total</b> | <b>84,369.60</b> |

Source: Canadian Grain Commission Statistics and Business Information

## Research and innovation

The Government of Canada is committed to supporting the agriculture and agri-food sector through initiatives that promote innovation and sustainable growth as outlined in the Canadian Agricultural Partnership.

Funding has been allocated to the AgriScience Program (\$338 million) and AgrilInnovate Program (\$128 million) to support discovery and applied science and accelerate commercialization of innovative products that increase agri-sector competitiveness and sustainability.<sup>24</sup>

Globally, Canadian grain remains competitive based on its reputation for quality. As Canada faces competition from other parts of the world, continued innovation remains key to its global success. To maintain Canada’s current success and reputation for quality, it’s integral to ensure that the only Canadian wheat varieties entering the market are those that meet quality guidelines and needs of the wheat class.<sup>25</sup>

The new variety registration support program is aligned with the Grain Research Laboratory’s mission to enhance the marketability of Canadian grains through scientific research, monitoring and analytical services.<sup>26</sup> This mission supports Government of Canada priorities in the Growing Forward Policy 2 framework to transform the agriculture and agri-food sector through an increased emphasis on research, innovation, competitiveness and market development.<sup>27</sup>

### 4.3 Alignment with federal government roles and responsibilities

**Key finding: The new variety registration support program is aligned with federal roles and responsibilities.**

<sup>24</sup> [Agriculture and Agri-Food Canada, Canadian Agricultural Partnership: Federal Activities and Programs 2018](#)

<sup>25</sup> Canadian Grain Commission, Grain Research Program Information Profile, page 6

<sup>26</sup> [Canadian Grain Commission, Grain Research Laboratory Annual Program Report 2019, page 2](#)

<sup>27</sup> [Canadian Food Inspection Agency, Crop Variety Registration in Canada: Issues and Options 2013, page 3](#)

## **Canadian Grain Commission roles and responsibilities**

The *Canada Grain Act* is the federal legislation that defines and outlines the roles and responsibilities of the Canadian Grain Commission. The Canadian Grain Commission's mandate, as outlined in section 13 of the Act, is to:

“in the interests of grain producers, establish and maintain standards of quality for Canadian grain and regulate grain handling in Canada, to ensure a dependable commodity for domestic and export markets.”

Under section 2 of the Act, which defines grain classes as “any variety or varieties of grain designated by order of the Commission”, the Canadian Grain Commission has the authority to maintain variety designation lists and to designate new eligible wheat varieties to a class. Wheat, rye and triticale are included as grains regulated under the *Canada Grain Regulations*.<sup>28</sup>

The new variety registration support program's activities support the Canadian Grain Commission's federal responsibilities to:

- recommend and establish grain grades and standards, grade name
- specifications and methods for all regulated grains in order to maintain quality standards and meet the requirements of grain buyers<sup>29</sup>
- implement a grading and inspection system for Canadian grain to reflect its quality and meet the need for marketing
- undertake, sponsor and promote grain and grain product research<sup>30</sup>

The new variety registration program's relevance and alignment with the Canadian Grain Commission's roles and responsibilities is seen in key Grain Research Laboratory reports, including the 2019 Annual Program Report.<sup>31</sup>

## **Supporting Canadian Food Inspection Agency roles and responsibilities**

The Canadian Food Inspection Agency administers and enforces the *Seeds Act and Seeds Regulations*.<sup>32</sup> The *Seeds Act* governs the regulation of the seed industry in Canada and encompasses the testing, inspection, quality and sale of seeds. Section 3(1)(b) states that:

“except as provided by the regulations, no person shall sell or advertise for sale in Canada or import into Canada seed of a variety that is not registered in the prescribed manner.”

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<sup>28</sup> [Justice Canada, \*Canada Grain Regulations Section 5 \(1\)\*, page 1](#)

<sup>29</sup> [Justice Canada, \*Canada Grain Act Part II, Section 16 \(1\)\*, page 12](#)

<sup>30</sup> [Justice Canada, \*Canada Grain Act\*](#)

<sup>31</sup> [Canadian Grain Commission, \*Grain Research Laboratory, Annual Program Report 2019\*](#)

<sup>32</sup> Canadian Grain Commission, *Variety Registration Process 2012*

Under the authority of the *Seeds Act* and the *Seeds Regulation* (Part III and Schedule III), the Canadian Food Inspection Agency Variety Registration Office provides government oversight to ensure that health and safety requirements are met and that information related to the identity of the variety is available to regulators to prevent fraud. It also facilitates seed certification, international trade of seed and tracking and tracing of varieties commercially.<sup>33</sup>

To support its grain quality assurance mandate, the Canadian Grain Commission's new variety registration support program and variety designation lists are closely linked to the Canadian Food Inspection Agency's variety registration process. The Canadian Grain Commission's variety designation lists are updated when the Canadian Food Inspection Agency registers new varieties or the registration status of existing varieties changes. Any varieties that are cancelled by the Canadian Food Inspection Agency are removed from the Canadian Grain Commission's variety designation lists and are no longer eligible to receive a grain grade or be placed in a wheat class. This process is conducted in alignment with section 28 of the *Canada Grain Act*, which states:

“where grain of any kind is of a variety produced from seed of a variety that is not registered under the *Seeds Act* for sale in or importation into Canada, no person shall, except with the permission of the Commission, assign to that grain a grade that is higher than the lowest grade established by regulation for that kind of grain.”<sup>34</sup>

## 4.4 Performance

This program evaluation assessed the effectiveness of the Grain Research Laboratory's support activities to the new variety registration program and the extent to which it achieves its intended outcomes. The assessment relies heavily on key informant interviews.

**Key finding: The program is successful in achieving its immediate outcomes, including:**

- **the Quality Evaluation Team of the Prairie Recommending Committee for Wheat, Rye and Triticale has high quality data for evidence-based assessments of the quality merit of candidate lines in registration trials**
- **expertise and input contribute to evidence-based annual recommending committee recommendations of approval for new candidate lines**
- **ongoing maintenance and improvement of quality test procedures**

<sup>33</sup> [Canadian Food Inspection Agency, Variety Registration 2020](#)

<sup>34</sup> Canadian Grain Commission, Variety Registration Process 2012



When asked about both the Grain Research Laboratory's role producing trial registration data and its role as subject matter experts on the Prairie Recommending Committee for Wheat, Rye and Triticale and the committee's Quality Evaluation Team, key informants indicated they had a high level of confidence that the Grain Research Laboratory support contributes to the immediate, intermediate and long-term outcomes of the new variety registration program.

Key informants indicated that they were confident that the Grain Research Laboratory contributed to the immediate outcomes. On a scale of 1 to 5 (where 1 indicates not confident and 5 indicates very confident), key informants reported a high level of confidence (on average greater than 4.3) across all outcomes.

#### **4.4.1 Immediate outcome: Supporting high quality trial registration data**

The program contributes to ensuring that the Quality Evaluation Team of the Prairie Recommending Committee for Wheat, Rye and Triticale has high quality data for evidence-based assessments of the quality merit of candidate lines in registration trials. Key informants characterized the data as critical to the process of assessing the quality merit of new varieties for wheat, rye and triticale and found the data to be of high quality, comprehensive and delivered professionally.

Key informants also indicated that quality merit data for wheat, rye and triticale generated by the Grain Research Laboratory is widely respected and trusted. Of key importance to the informants was the objectivity and consistency of the data. The recommending committee's operating procedures support this and comment specifically on the need for reliable and accurate quality data over time:

“Each time a test is performed on a composite sample, the method for that test must be closely followed in order to assure reliable and accurate quality data that can be compared from year to year through the entire registration trial process.”<sup>35</sup>

As mentioned by key informants, the benefits of having the work completed in the Grain Research Laboratory are the stability of employees, equipment and implementation of test procedures (as outlined in the recommending committee's operating procedures) from year to year. Something minor like a change in equipment or the laboratory environment where tests are completed can impact the results.

When asked, key informants noted no gaps in the Grain Research Laboratory's trial registration data over time where the data was under its control. Key informants noted

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<sup>35</sup> [Prairie Recommending Committee for Wheat, Rye and Triticale, Operating Procedures, revised March 2020, page 49](#)

that gaps in data have occurred in the past due to weather or crop disease issues, which are beyond the Grain Research Laboratory's control.

Based on past experiences, key informants also indicated some concern with the consistency of data provided by laboratories other than the Grain Research Laboratory and their ability to meet all required parameters. Grain Research Laboratory data and expertise were consistently viewed by informants as critical to the decision on whether to register a new variety for commercial sale in western Canada.

Several key informants noted instances in the past where private data were not complete or had not followed the protocols and needed to be re-analyzed. In one noted instance, 2 key informants abstained from voting due to concerns over data that the Grain Research Laboratory had not completed.

#### **4.4.2 Immediate outcome: The Grain Research Laboratory's role as subject matter experts contributes to evidence-based recommendations**

Evidence collected during the evaluation supports the Grain Research Laboratory employees' roles as subject matter experts whose expertise and input contribute to evidence-based Prairie Recommending Committee for Wheat, Rye and Triticale and the recommending committee's Quality Evaluation Team's recommendations for approval of new candidate lines.

When asked if the Grain Research Laboratory's role has become more or less important over time, key informants were divided:

- 38.5% (n=10) of all key informants felt that its role has become increasingly important over time
- 38.5% (n=10) felt that their role has not changed in importance over time
- 11.5% of informants (n=3) felt that their role has become less important over time
- 11.5% (n=3) were unsure

These results were interpreted within the context of the following 2 factors that have impacted the Grain Research Laboratory's role over time:

- reforms to the prairie recommending committee
- evolving global export markets

#### **Reforms to the prairie recommending committee**

The Minister of Agriculture and Agri-Food Canada requested reforms to the operations of the Prairie Recommending Committee for Wheat, Rye and Triticale in 2013. The stated intent of this process was to enhance innovation and remove barriers that restrict innovation in the crop sector while considering the interests of the entire value chain.

A working group in consultation with stakeholders, which included grain producers, scientists, end users and life sciences companies, developed and implemented the

requested reforms. According to the working group, there was overwhelming support to retain the merit-based registration system for wheat and to continue to assign a wheat class at the same time.<sup>36</sup>

The focus of the resulting reforms was to:

- streamline committee procedures
- enhance predictability and transparency
- reduce data requirements where possible
- ensure that the committee structure and membership represented the full value chain<sup>37</sup>

Key informants felt that changes in the Grain Research Laboratory's role over time were in line with the outcome of the reform. Several informants noted that, as a result of the reforms, the composition of the recommending committees has become more diverse over time. Public sector and science-based representation has proportionally decreased and representation from the sector and other parts of the value chain has increased. In addition, changing data requirements have also impacted the Grain Research Laboratory's role by changing required tests and the need for interpretation of these tests.

As a result of these reforms, the Grain Research Laboratory now plays an enhanced role in knowledge creation and sharing and data interpretation for new committee members with differing and potentially less technical backgrounds. Key informants indicated that the Grain Research Laboratory provides a role in interpreting data at committee meetings and knowledge transfer in 2 main areas:

- quality parameters and market perspective
- end-user needs

### **Evolving global export markets**

Many key informants indicated that the Grain Research Laboratory plays an increasing role on the Prairie Recommending Committee for Wheat, Rye and Triticale by providing feedback from Canada's international wheat customers. This provides perspective on international consumer end-use needs for breeders to target new varieties.

Informants reinforced that Canada is a global exporter of wheat, rye and triticale and Canada's reputation and competitive advantage is based in quality as opposed to other suppliers who may compete on volume or price due to advantage in climate, geographic

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<sup>36</sup> Correspondence between the Minister Agriculture and Agri-Food Canada and the Chair of the Prairie Recommending Committee for Wheat, Rye and Triticale regarding reforms between February and July 2013

<sup>37</sup> Key Informant interviews and correspondence between the Minister of Agriculture and Agri-Food Canada and the Prairie Recommending Committee for Wheat, Rye and Triticale, 2013

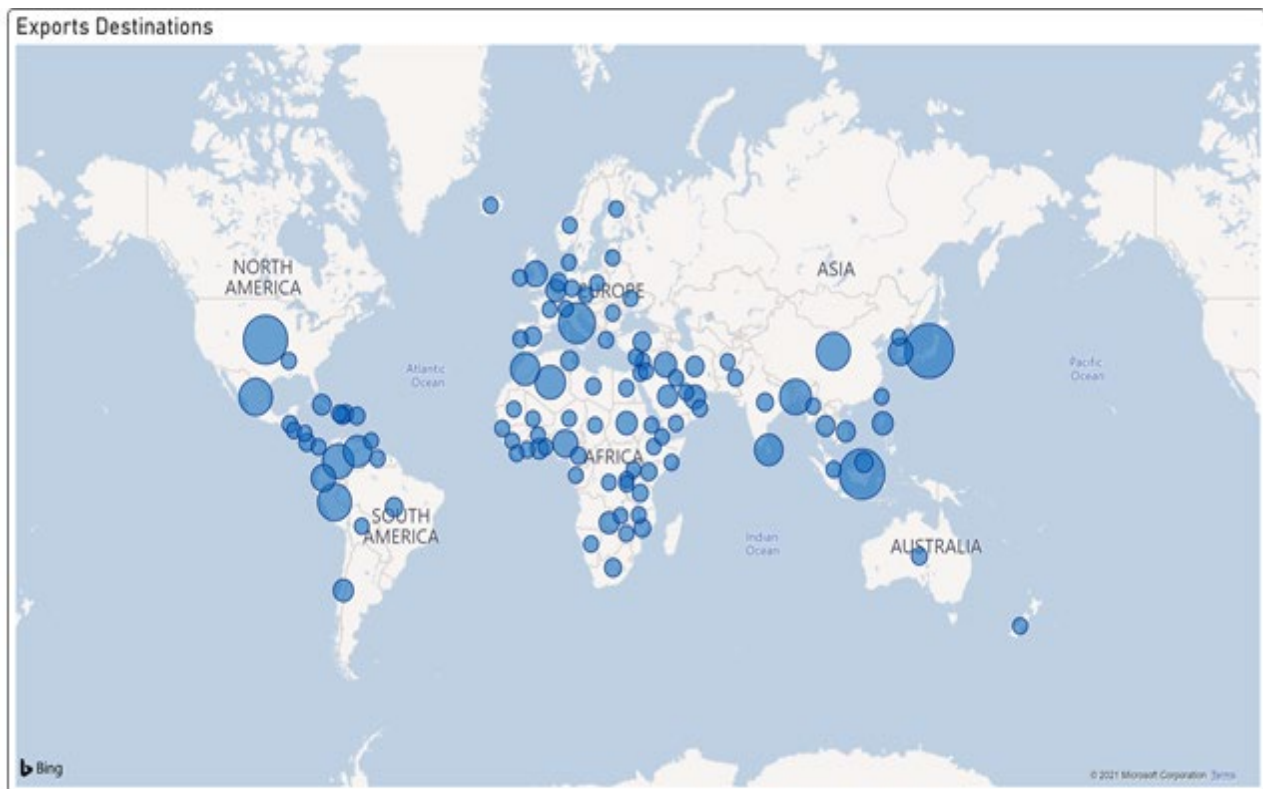
location or production costs. It's critical to the success of the sector that Canada's quality reputation is maintained.

As niche markets develop and international buyers seek specific quality characteristics, it has become increasingly important that wheat breeders and committee members have access to evolving end-use demand information to target new varieties to end-user and international buyer needs.

Evolving end-use needs can be complex, shifting and can vary across geographic regions. Several key informants indicated that wheat breeders and stakeholders would benefit from further collaboration with the Grain Research Laboratory throughout the wheat breeding process to learn more about differing global end-user needs and priorities regarding end-use functionality.

Figure 3 shows the historical grain volume export and highlights the diversity of western Canadian wheat export markets.

**Figure 3**  
**Historical exports for Canadian grain**  
**2003 to 2021**



Source: [Canadian Grain Commission Grain Statistics Weekly](#)

#### **4.4.3 Immediate outcome: Maintenance and improvement of quality test procedures**

Evidence indicates that the new variety registration program contributes to the ongoing maintenance and improvement of quality test procedures.

According to the Prairie Recommending Committee for Wheat, Rye and Triticale operating procedures, the committee meets annually to review and update test procedures with the input of all committee members. The Variety Registration Office approves the new operating procedures every year indicating acceptance of the test procedures.

When asked about the importance of the Grain Research Laboratory's contributions to the ongoing maintenance and improvement of quality test procedures, key informants indicated that they were very confident in its support in this area. Views and opinions expressed by key informants indicate that the Grain Research Laboratory has brought significant improvements to test procedures over time, modernizing and seeking better and more efficient ways to interpret quality.

About 11% (n=3) of key informants indicated some dissatisfaction with test procedures (that are defined in the Prairie Recommending Committee for Wheat Rye and Triticale operating procedures) and felt that there was room to improve and innovate in this area.

During the interviews, key informants were asked how confident they were that the Grain Research Laboratory's role, in both laboratory analysis and as subject matter experts on the committee, contributed to these intermediate outcomes of the maintenance and improvement of quality test procedures. On a scale of 1 to 5 (where 1 indicates not confident and 5 indicates very confident), informants reported a high level of confidence (on average, greater than 4.3) across all outcomes.

**Key finding: The Grain Research Laboratory's new variety registration support program is successful in supporting the achievement of the following intermediate outcomes:**

- **support grain quality assurance by assisting with approval of only new varieties that meet or exceed the performance of check varieties**
- **support the Canadian Food Inspection Agency-mandated new variety registration process to maintain oversight of new varieties and only those varieties that meet quality requirements will be registered**
- **support the Canadian Grain Commission-mandated updates to variety designation lists for wheat with newly registered varieties placed into a wheat class and assist producers and grain handlers to identify which varieties are eligible for a grade within a wheat class**

#### **4.4.4 Intermediate outcome: Supporting grain quality assurance**

The Grain Research Laboratory supports the grain quality assurance system by supporting the approval of only new varieties which meet or exceed the performance of check varieties.

According to key informants, the Grain Research Laboratory plays a key role in interpreting data and ensuring the committee decisions are based on an accurate interpretation of the data. By ensuring that only new varieties that meet or exceed the performance of existing varieties, the Grain Research Laboratory contributes to maintaining and protecting the high quality and reputation of Canadian wheat globally.

The importance of maintaining this quality and reputation in the international market was front of mind for key informants. When asked about their confidence level that the program supports the grain quality assurance program, key informants indicated a high level of confidence. On a scale of 1 to 5 (where 1 indicates not confident and 5 indicates very confident), informants reported an average response of just over 4.7.

There are historical examples where a grain quality issue has had a negative impact on the agricultural sector and the Canadian economy. The following 2 examples highlight the value of maintaining the consistency and quality of Canadian wheat.

##### **Wheat class modernization**

Prior to 2015, customer complaints were received regarding lower-than-expected gluten strength in Canada's premium wheat classes. Customers were concerned that this low strength was impacting end-use baking performance. In 2015, the Canadian Grain Commission conducted a public consultation on modernizing Canada's wheat class system to resolve this issue. After some initial concern from the sector during consultations, stakeholders overall supported modernization and the need to protect the consistency and quality of these 2 premium wheat classes.<sup>38</sup>

Through an evaluation protocol developed by the Prairie Recommending Committee for Wheat, Rye and Triticale with stakeholder support, the Canadian Grain Commission updated the wheat classes. Quality parameters were adjusted in 2015 and 2018 and 30 varieties that did not meet Canada Western Red Spring and Canada Prairie Spring Red quality standards were moved into newly created wheat class called Canada Northern Hard Red.<sup>39</sup>

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<sup>38</sup> [Grain commission wheat class process criticized, Manitoba Co-operator, Allan Dawson, May 11, 2018](#)

<sup>39</sup> [Backgrounder: Wheat class modernization, Canadian Grain Commission, April 20, 2018](#)

Articles from stakeholders during this time showed diverse opinions, but overall support for the scientific, merit-based registration system to ensure consistency and quality.<sup>40 41</sup>

### **Garnet wheat controversy**

An historical example that supports the importance of quality assessment of new varieties occurred in the 1920s and 1930s when the Grain Research Laboratory did not have the opportunity to test and recommend the Garnet variety for end-use quality before it was licensed. This was due to a dispute that caused a temporary laboratory closure. Testing and recommending the variety were characterized as “a crucial step in its development...”<sup>42</sup> that was missed.

Garnet wheat was licensed and widely grown in western Canada. Due to quality issues, exports of the variety were restricted within a few years and Garnet was moved to a lower wheat class by the Canadian Grain Commission’s Chief Grain Inspector for Canada. There was a resulting drop in price for the variety and significant losses to Canadian producers who had grown it. This resulted in some compensation being paid to producers. This was considered an economic disaster that had “... largely resulted from its being licensed before sufficient quality testing had been done.”<sup>43</sup>

#### **4.4.5 Intermediate outcome: Supporting the Canadian Food Inspection Agency-mandated new variety registration process**

The Grain Research Laboratory’s new variety registration support program supports the Canadian Food Inspection Agency-mandated new variety registration process to maintain oversight of new varieties and only those varieties that meet quality requirements will be registered.

As noted in section 4.4.2 above, the new variety registration process underwent reforms in 2013 at the request of the Minister of Agriculture and Agri-Food Canada.

According to key informant interviews, these reforms impacted the role of the Grain Research Laboratory in the new variety registration process through changes to testing protocols and composition of the recommending committee. Informants also felt the reforms highlighted the importance in the Grain Research Laboratory’s quality assessments of candidate lines and the continued need for their involvement as subject matter experts at committee meetings.

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<sup>40</sup> [Powerful interests behind Ritz’s views on wheat registration, Alberta Farmer Express, Allan Dawson, March 16, 2013](#)

<sup>41</sup> [Wheat Class Modernization: What, When Why and How, Julienne Isaacs, June 14, 2018](#)

<sup>42</sup> [Manitoba History: The Garnet Wheat Controversy, 1932 - 1938, Jim Blanchard, Manitoba History, Number 19, Spring 1990, Manitoba Historical Society p.7](#)

<sup>43</sup> “Manitoba History: The Garnet Wheat Controversy, 1932 – 1938”, Jim Blanchard, Manitoba History, Number 19, Spring 1990, Manitoba Historical Society

The Canadian Food Inspection Agency Variety Registration Office is responsible for approval of committee recommendations. They're also responsible for handling any grievances of disagreements with committee recommendations. Key informants indicated that it's unusual for the recommendations of the committee to be challenged by the Variety Registration Office. The registration office grievance procedures are outlined in the Prairie Recommending Committee for Wheat, Rye and Triticale operating procedures<sup>44</sup> and provide recourse should the registration office disagree with the recommendations of the committee.

In discussion with the Variety Registration Office, they confirmed that no grievances have been filed in the past 6 years and were unaware of any grievances having been filed prior to that, indicating the effectiveness of the Grain Research Laboratory-supported committee in putting forward recommendations for only those new varieties which meet or exceed the performance of existing varieties. In addition, key informants could not recall any instances where the registration office had declined, challenged or disputed committee recommendations.

Data on the number of varieties approved demonstrates an increasing trend over time. Occasionally, approved varieties have their registration cancelled or are not registered by the sector after they are recommended by the prairie recommending committee. This can occur for a variety of reasons, often commercial or market reasons.<sup>45</sup>

Figure 4 shows the trend of increasing numbers of varieties recommended for approval and shows that the proportion of cancelled or not registered varieties is small. This trend supports the soundness of the new variety registration process that's supported by the Grain Research Laboratory.

#### **Figure 4**

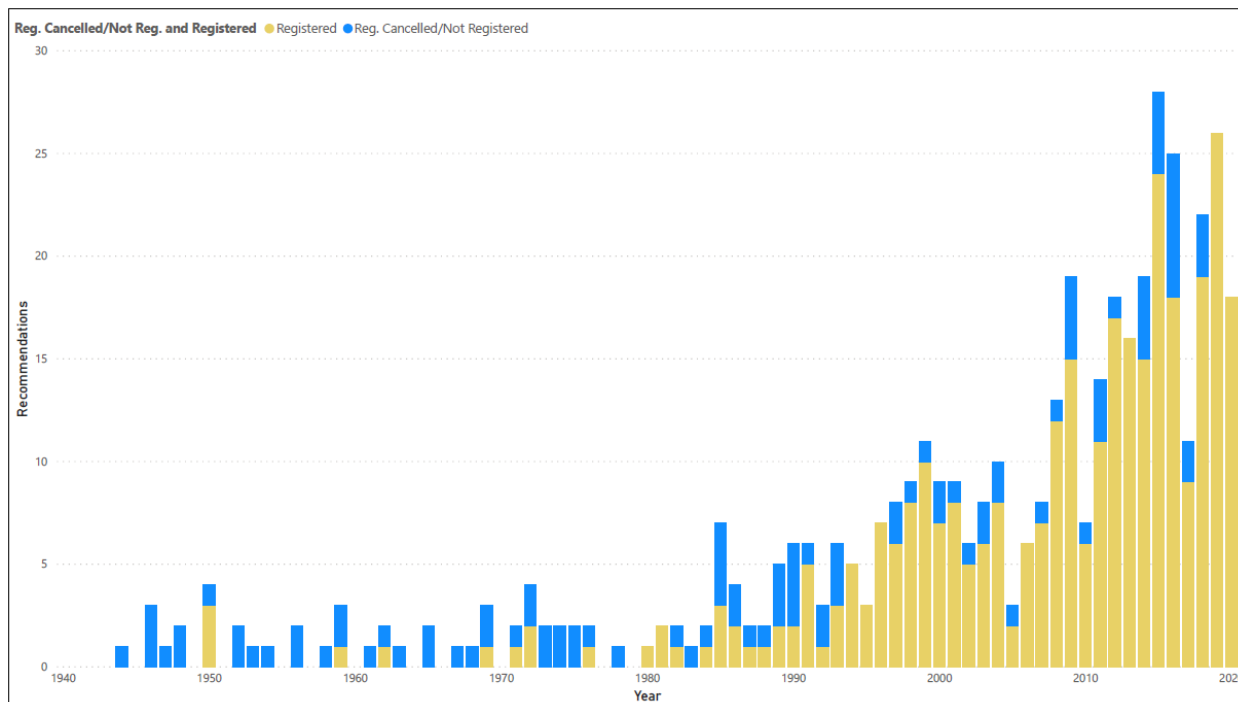
#### **Western Canadian wheat recommendations (1940 to 2020)**

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<sup>44</sup> [Prairie Recommending Committee for Wheat, Rye and Triticale, Operating Procedures, revised March 2020, page 2](#)

<sup>45</sup> Key informant interviews





Source: [Prairie Recommending Committee for Wheat, Rye and Triticale](#)

#### 4.4.6 Intermediate outcome: Supporting the Canadian Grain Commission-mandated updates to variety designation lists

The Grain Research Laboratory’s program supports updating wheat variety designation lists with newly registered varieties being placed into a wheat class that meet or exceed existing check varieties in terms of quality.

Once an approved new wheat variety is registered, it’s placed into a wheat class and added to the wheat variety designation lists by the Canadian Grain Commission’s Industry Services team. This team is responsible for placing the new variety into a wheat class that fits with its end use.<sup>46</sup> While the activities of Industry Services remain outside the scope of this evaluation, Industry Services is an end user of the new variety registration support program, and the program provides support to the Industry Services team’s role.

This is typically a straightforward process, but in cases where a variety is marginal on 1 or 2 quality parameters, the Industry Services team reports a need for further support from and discussion with the Grain Research Laboratory on issues of quality. Key informants noted the importance of determining quality and wheat class at the same time as a variety is being recommended for registration.

<sup>46</sup> Justice Canada, Canada Grain Act, Section 2, pg. 1 <https://lois-laws.justice.gc.ca/PDF/G-10.pdf>.

Key informants were asked about their level of confidence that the new variety registration support program supports the Canadian Grain Commission's mandate under the *Canada Grain Act* to maintain variety designation lists and place new wheat cultivars into a class. On a scale of 1 to 5 (where 1 indicates not confident and 5 indicates very confident) informants reported a high level of confidence (on average, just under 4.8).

#### **4.4.7 Long-term outcome: Canada's grain is safe, reliable and marketable**

**Key finding: The Grain Research Laboratory's new variety registration support program is effective in supporting the outcome to ensure Canada's grain is safe, reliable and marketable and that domestic and international markets regard Canadian grain as dependable and safe.**

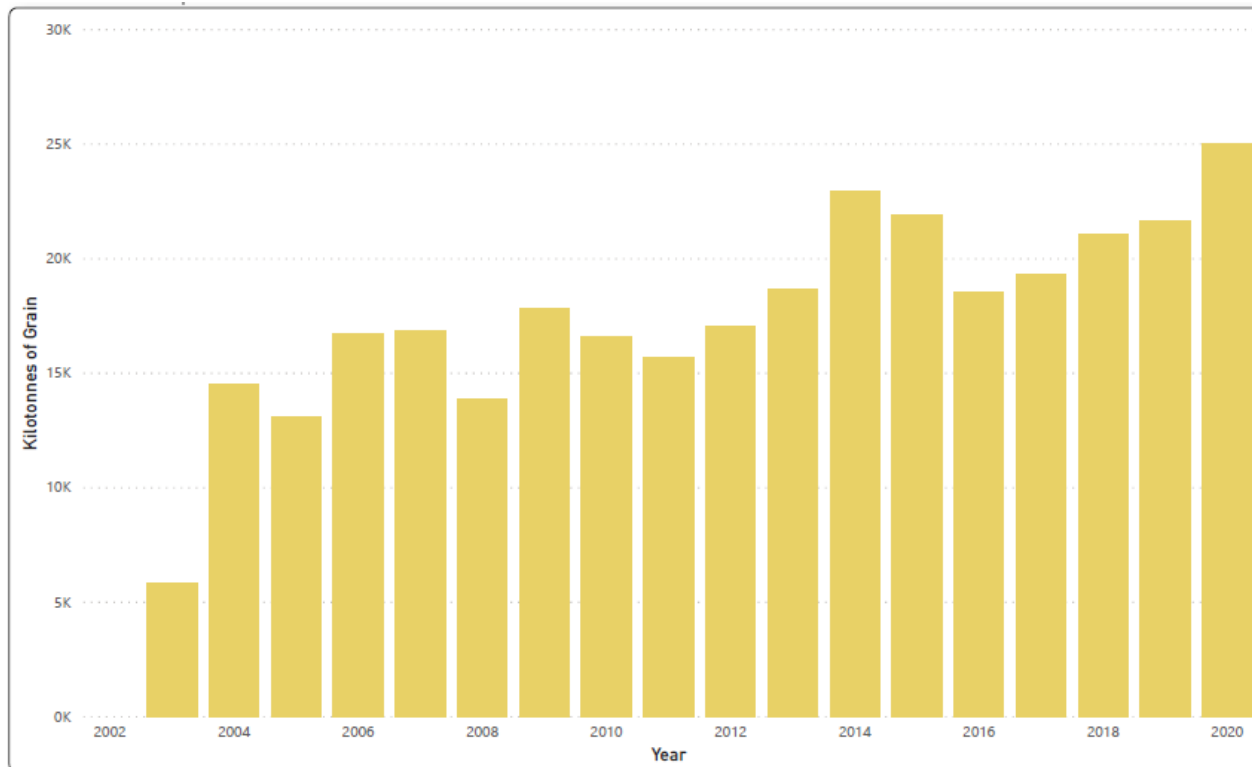
On a scale of 1 to 5 (where 1 indicates not confident and 5 indicates very confident), key informants reported an average level of confidence greater than 4.6 that the Grain Research Laboratory's role in the new variety registration process supports this long-term outcome.

A look at historical grain export volumes, seen in Figure 5, indicates that grain exports continue to grow over time. Key informants have indicated that international demand for Canadian grain is supported by the reputation for high-quality Canadian grain.

The Grain Research Laboratory's role in the new variety registration process supports and upholds the continued quality of Canadian grain by supporting the approval of only new varieties that meet or exceed the performance of existing ones, thus upholding the quality and consistency of Canadian grain.

#### **Figure 5**

#### **Historical grain export volumes (wheat, rye and triticale)**



Source: Canadian Grain Commission, Statistics and Business Information

### Potential for unintended outcomes

Key informants noted positive unintended outcomes of the Grain Research Laboratory's role in the new variety registration process. No negative unintended outcomes were identified. The positive unintended outcomes included:

- the ability to provide end user perspective, a global picture and information on up-and-coming international niche market
  - Grain Research Laboratory participation in other initiatives, including the annual New Crop Missions, has created a channel for end-user feedback
- mentorship
  - assisting breeders in targeting their varieties to international demand both during registration trials and throughout the year
  - providing support to other laboratories and other wheat breeders (for example, it was reported that some other laboratories calibrate their equipment using Grain Research Laboratory advice and samples)
  - providing assistance to breeders and other laboratories when needed as a second opinion

- providing explanations and guidance to non-technical Prairie Recommending Committee for Wheat, Rye and Triticale members, other laboratories and scientists
- insight into the market class during the breeding process

## 4.5 Efficiency

Due to the absence of program data, evaluators were not able to track program efficiency over time. Information collected from key informant interviews and employee survey respondents was used to assess efficiency.

### 4.5.1 Program efficiency

**Key finding: Most key informants and employee survey respondents found the program to be efficient and adequately resourced.**

Overall, the program was found to be run efficiently. There were no major suggested changes to existing program activities by either key informants or internal Grain Research Laboratory survey respondents.

Most key informants indicated a significant improvement in the data format in recent years, specifically in terms of development of a Microsoft Excel-based tool with colour coding, flags and check mean comparisons, which greatly improved the ease of interpretation for committee members. The Prairie Recommending Committee for Wheat, Rye and Triticale developed this tool to provide increased data transparency and ease the interpretation of large amounts of complex data comparing new varieties to check varieties over a number of test parameters. This tool was hoped to be particularly useful to assist committee members who have less of a technical background in wheat science and chemistry. In addition to implementing the tool, key informants stated the Grain Research Laboratory's new variety registration program support with interpreting and explaining the complex data has become increasingly valuable to the committee.

Key informants were also satisfied with the timeliness of data delivery in recent years. Several informants reported issues in the past but felt these issues had been resolved. No informants reported concerns about the current timeliness of the data.

The Grain Research Laboratory's new variety registration support program employees were asked about their views on the efficiency of the program. On average, survey respondents felt the program was run efficiently. On a scale of 1 to 5 (where 1 indicates not at all efficient and 5 indicates completely efficient), responses ranged from 3.2 to 4.7.

**Key finding: Program performance measurement and tracking of program costs is not consistently conducted.**

Discussions with the program manager indicated that ongoing program performance measurement is not conducted on a regular basis with employee engagement. Program costs are also not routinely tracked.

Employee engagement could contribute to improvements in program efficiency and early identification of resource needs. Consistent tracking of program inputs over time would allow for future and ongoing measurement of program efficiency.

#### **4.5.2 Program resource adequacy**

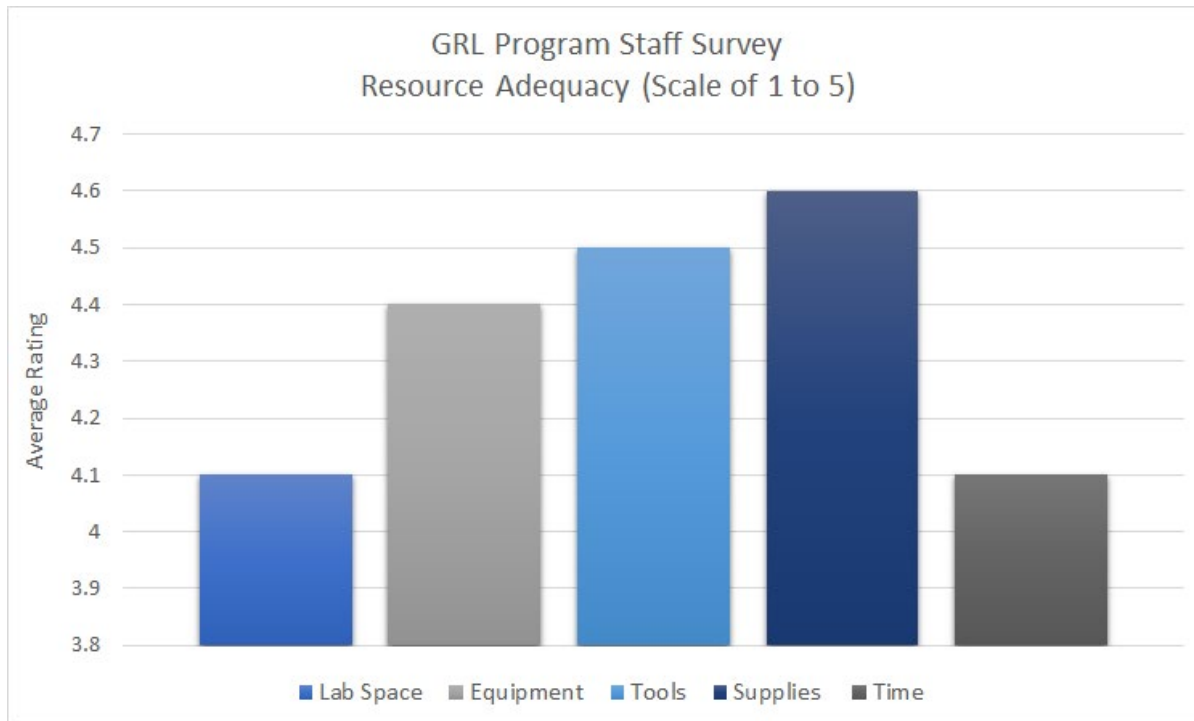
**Key finding: A couple of Grain Research Laboratory new variety registration support program employees indicated a potential need for a laboratory information management system and project management support to improve efficiencies.**

Program employees were asked on a scale of 1 to 5 (where 1 is not all adequate and 5 is completely adequate), to what extent the resources they have to do their jobs are adequate. Respondents were asked specifically about laboratory space, equipment, tools, supplies and time.

As highlighted in Figure 6, responses varied by resource type from 4.1 to 4.6 out of 5 indicating that, overall, employees responded that they had adequate resources to do their jobs.

Of employees surveyed, 2 respondents (or 8% of all respondents) noted that the implementation of a central laboratory information management system (LIMS) with project management support would significantly improve communication, data review and reporting and would result in employee time savings that could be allocated to other programs.

**Figure 6**  
**Program resource assessment**



Source: Grain Research Laboratory program employee survey (n=25)

**Key finding: Employee feedback on adequacy of resources was tied to limitations inherent in the current laboratory space at 303 Main Street in Winnipeg (Man.).**

Survey respondents provided suggestions for improvement regarding program resources. Of those surveyed, 6 respondents (24% of all respondents) indicated a need for additional storage space as well as temperature and humidity control for samples to avoid test duplication or additional control testing for monitoring.

It was noted by the program manager that this is a limitation inherent in the current laboratory space at 303 Main Street in Winnipeg (Man.).

**Key finding: Key informant interviewees noted a recent trend of a reduction in the number of key scientists across the wheat sciences sector in recent years. Several key informants and one program employee reported concern about the sufficiency of current Grain Research Laboratory resources and the complexity and difficulty of succession planning due to the highly specialized nature of the work and difficulty in finding and replacing qualified scientists.**

Key informants indicated the ongoing need for Grain Research Laboratory expertise in:

- producing trial registration data annually
- providing subject matter expertise during committee deliberations
- providing recommendations for maintenance and improvement of quality testing procedures

Several key informants expressed concern about the critical nature of the Grain Research Laboratory's role in variety registration and the relative decline in resources noticed over time. Informants noted that in past years, more scientists participated in the program. Currently, there is only one scientist managing the program.

Key informants also expressed concern about succession planning within the Grain Research Laboratory to accommodate future retirements. This question was not asked directly of key informants during interviews, but 8 key informants (31% or all informants) brought the issue up independently when asked if they had other comments or information to add.

#### 4.5.3 Policy

**Key finding: Key Informants noted the value of the program being provided as a no-fee service to the Prairie Recommending Committee for Wheat, Rye and Triticale and there was some concern expressed regarding the future potential impact should the Grain Research Laboratory begin to charge a fee for these services.**

Around 19% of key informants (n=5) noted that the Grain Research Laboratory doesn't charge a fee for the preparation of trial registration data and instead provides this as a service to the Prairie Recommending Committee for Wheat, Rye and Triticale. The data become publicly available once the new variety is registered.

The new variety registration program activities are currently funded by Grain Research Laboratory's appropriations and revolving fund revenues. It's considered an activity in the public interest and the work is completed with no fees.

The Grain Research Laboratory or other service providers may provide program services and trials to prairie recommending committees for other crop types and for private trials on a fee-for-service basis. The recommending committee operating procedures state that registration trial testing can be conducted under a fee-for-service arrangement if resources permit and that it isn't a function of the committee.<sup>47</sup>

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<sup>47</sup> [Prairie Recommending Committee for Wheat, Rye and Triticale, Operating Procedures, revised March 2020, page 14](#)

It's unclear who would bear these costs should the Grain Research Laboratory move to a fee-for-service approach in future. Some key informants expressed concern that any change to the current fee arrangement could result in higher costs being passed to applicants thus creating a disincentive to propose new varieties to the recommending committee. These 6 key informants brought the issue up independently when asked if they had any other comments or information to inform the evaluation.

#### 4.5.4 Industry engagement

**Key finding: Key informants indicated they would benefit from more collaboration with the Grain Research Laboratory throughout the year, potentially with scientific meetings and networking events in the areas of wheat quality testing and global end-user perspectives.**

Key informants indicated they would benefit from more collaboration or additional scientific meetings with the Grain Research Laboratory and the entire value chain throughout the year.

Informants noted that there is currently no similar means of collaboration outside of the annual Prairie Grain Development Committee meetings to discuss and improve wheat, rye and triticale quality traits to meet global market end-user needs. It was noted that a deeper understanding of global markets and end-user needs would benefit wheat breeders and the entire value chain.

Grain Research Laboratory participation in other initiatives, collaborative research and intelligence gained from annual New Crop Missions, for example, have created a conduit for end-user feedback, which is essential for Canadian wheat breeders.

#### 4.6 COVID-19 learnings

Due to the temporary and unpredictable COVID-19 environment, this section has been provided for learning purposes only. There are no key findings or recommendations developed for this section.

Despite some challenges reported by Grain Research Laboratory staff operating under COVID-19 restrictions, key informants indicated that there were no discernable COVID-19 impacts regarding service delivery. Trial registration data were comprehensive and delivered without interruption or delay and were provided on time to the Prairie Recommending Committee for Wheat, Rye and Triticale for Prairie Grain Development Committee meetings. Grain Research Laboratory employees who are recommending



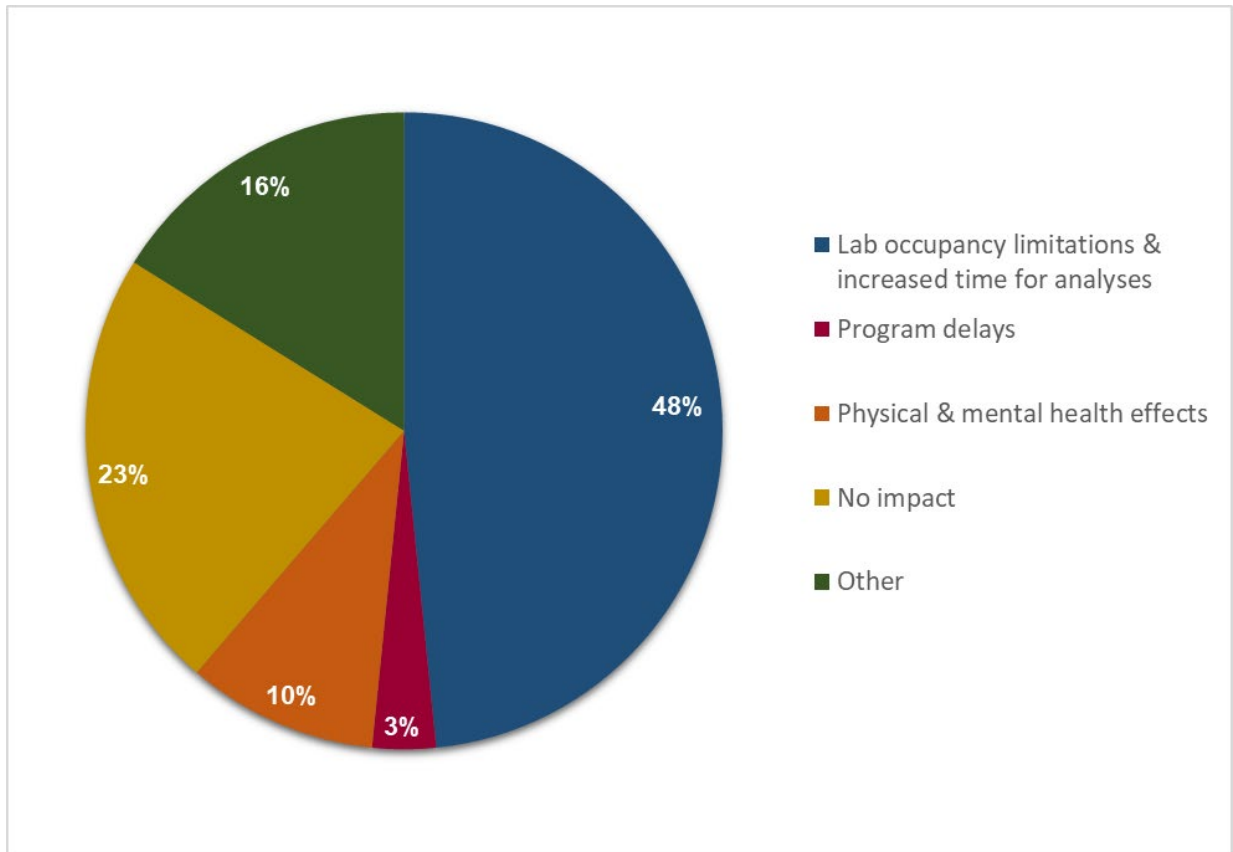
committee members attended sessions as subject matter experts and voting members virtually this year.

Employees were also asked about COVID-19 impacts. Over 60% (n=15) of surveyed program employees reported some concerns or challenges operating under COVID-19 restrictions.

As shown in Figure 7, occupancy limits were the biggest challenge reported. Around 60% (n=15) of respondents reported that laboratory occupancy limitations were the most significant COVID-19 impact on new variety registration-related tasks because occupancy scheduling and physical distancing requirements limit the number of people allowed in the laboratory at a given time, thus affecting the number of analyses that can be completed in the laboratories.

Of those surveyed, 3 respondents felt that the additional pressures to complete high-priority work with restricted access to the laboratory resulted in negative impacts that affected their work. In addition, 1 respondent reported unfavourable working conditions due to COVID-19-related ventilation and cooling restrictions, which is a limitation inherent in the current building space.

**Figure 7**  
**Reported COVID-19 impacts**



Source: Grain Research Laboratory program employee survey (n=25)

Survey respondents identified the following feedback for executing new variety registration-related tasks under current COVID-19 work arrangements. Program employees viewed these as positive workflow adjustments for continued consideration for future program improvements:

- accessing test documents remotely
  - providing flexibility to employees during data review and verification of results documents
  - allowing supervisors to monitor activities, such as maintenance, remotely
  - moving documents and related in-person communications to online and remote systems where possible
- conducting a re-assessment of work to simplify methods and obtain maximum data with minimum on-site work
- allowing for better laboratory and equipment coordination through time flexibility and ensuring that different groups are not in need of the same laboratories and equipment at the same time
- planning work ahead of time to allow for maximization of work that can be done during limited laboratory access

## 5.0 Summary of findings and recommendations

### 5.1 Relevance (4)

Key finding: There is a continued need for the Grain Research Laboratory to provide support to the new variety registration process.

Recommendation: none

Key finding: There was no evidence of duplication by another comparable program that can provide the same level of consistency, quality and objectivity.

Recommendation: none

Key finding: The new variety registration support program is aligned with Government of Canada priorities to grow exports, expand markets and promote research and innovation in the Canadian agriculture and agri-food sector. The program also supports the Canadian Grain Commission's planned departmental result that domestic and international markets regard Canada's grain as dependable and safe.

Recommendation: none

Key finding: The new variety registration support program is aligned with federal roles and responsibilities.

Recommendation: none

### 5.2 Performance (1)

Key finding: Evidence collected indicates that the program is successful in achieving its immediate, intermediate and long-term outcomes. There was no evidence of unintended negative outcomes of the program.

Recommendation: none

### 5.3 Efficiency (7)

#### 5.3.1 Program efficiency

Key finding: Most key informants and employee survey respondents found the program to be efficient and adequately resourced with sufficient space, equipment, tools, supplies and time to do their jobs. Note: costing information was not available. See

recommendation below regarding performance measurement and tracking of program costs.

Recommendation: none

Key finding: Program performance measurement and tracking of program costs is not consistently conducted.

Recommendation: It's recommended that the Director General of the Grain Research Laboratory develop and implement performance measurement and program cost tracking for the new variety registration support program. It's suggested that input is sought from Finance regarding program cost tracking.

### **5.3.2 Program resource adequacy**

Key finding: Program employees indicated a potential need for a laboratory information management system and project management support to improve efficiencies.

Recommendation It's recommended that the Director General of the Grain Research Laboratory review the requirements and ensure that they have been included in the current library information management system (LIMS) proposal.

Key finding: Employee feedback on adequacy of resources was tied to limitations inherent in the current laboratory space at 303 Main Street in Winnipeg (Man.).

6 respondents (24% of all respondents) indicated a need for additional storage space and temperature and humidity control for samples to avoid test duplication or additional control testing for monitoring. It was noted by the program manager that this is a limitation inherent in the current laboratory space at 303 Main Street.

Recommendation: It's recommended that the Director General of the Grain Research Laboratory ensure this feedback is communicated to 303 Main Street project team and included in deficiency reporting.

Key finding: Key informant interviewees noted a recent trend of a reduction in the number of key scientists across the wheat sciences sector as a whole. Several key informants and one program employee reported concern about the sufficiency of current Grain Research Laboratory resources (related to the new variety registration program) and the complexity and difficulty of succession planning due to the highly specialized nature of the work and difficulty in finding and replacing qualified scientists.

Recommendation: It's recommended that the Director General of the Grain Research Laboratory continue to assess the sufficiency of existing Grain Research Laboratory resources (related to the new variety registration program) and place a heightened priority on succession planning for key scientists within the new variety registration program.

### **5.3.3 Policy**

Key finding: Key informants noted the value of the program being provided as a no-fee service to the Prairie Recommending Committee for Wheat, Rye and Triticale and there was some concern expressed regarding the future potential impact should the Grain Research Laboratory begin to charge a fee for these services.

Recommendation: It's recommended that the Director General of the Grain Research Laboratory bring forward the perspective noted by key respondents, in combination with program performance measurement and costs (as recommended above) to the Commission for their consideration during the next fee review cycle.

### **5.3.4 Industry engagement**

Key finding: Approximately half of key informants indicated they would benefit from more collaboration with the Grain Research Laboratory throughout the year potentially with scientific meetings and networking events in the area of wheat quality testing and global end-user perspective. Bringing structure would be beneficial.

Recommendation: It's recommended that the Director General of the Grain Research Laboratory explore the feasibility and implementation of future and ongoing scientific meetings throughout the year.

## Appendix 1: Findings, recommendations and management action plans<sup>48</sup>

The table below summarizes findings and recommendations identified during the program evaluation that require management action plans.

| Relevance   | Observation and findings   | Potential impact | Recommendations | Management action plans |
|---|--|------------------|-----------------|-------------------------|
| Continued need for the program                            | There is a continued need for the Grain Research Laboratory to provide support to the new variety registration process.  | None             | None            | Not required            |
| Does program duplicate or overlap with any other programs | There was no evidence of duplication by another comparable program that can provide the same level of consistency, quality and objectivity.  | None             | None            | Not required            |
| Alignment with Government of Canada priorities            | The new variety registration support program is aligned with Government of Canada priorities to grow exports, expand markets and promote research and innovation in the Canadian agriculture and agri-food sector. The program also supports the Canadian Grain Commission's planned departmental result | None             | None            | Not required            |

<sup>48</sup> As noted in Section 3.5 Constraints and Limitations, stakeholder feedback was collected from several different sources, including key informant interviews and publicly available information such as websites, articles and press releases. In addition, the results of the Canada Grain Act review public consultation will be reviewed for any additional feedback regarding the New Variety Registration Program.

|   |  |  |   |  |
|---|--|--|---|--|
|   | that domestic and international markets regard Canada's grain as dependable and safe.  |  |   |  |
| Alignment with federal roles and responsibilities   | The new variety registration support program is aligned with federal roles and responsibilities.   | None                                       | None  | Not required   |
|   |  |  |   |  |
|   |  |  |   |  |
| <b>Performance</b>  | <b>Observation and findings</b>  | <b>Potential impact</b>                    | <b>Recommendations</b>  | <b>Management action plans</b>                                 |
| Achievement of intended outcomes  | Evidence collected indicates that the program is successful in achieving its immediate, intermediate and long-term outcomes. There was no evidence of unintended negative outcomes of the program.   | None                                       | None  | Not required   |
|   |  |  |   |  |
|   |  |  |   |  |
| <b>Efficiency</b>   | <b>Observation and findings</b>  | <b>Potential impact</b>                    | <b>Recommendations</b>  | <b>Management action plans</b>                                 |
| Are Grain Research Laboratory new variety registration program activities performed in the most efficient and economical way? | Most key informants and employee survey respondents found the program to be efficient and adequately resourced with sufficient space, equipment, tools, supplies and time to do their jobs. Note: costing information was not available. See recommendation below regarding performance measurement and tracking of program costs. | None                                       | None  | Not required   |
| Is performance measurement being conducted?   | Program performance measurement and tracking of program costs is not consistently conducted.   | Missed opportunity to benefit from program | It's recommended that the Director General of the Grain Research Laboratory develop and | The Director General commits to the development of performance |

|  |  |  |   |  |
|--|--|--|---|--|
|  |  | measurement efficiency                                   | implement performance measurement and program cost tracking for the new variety registration support program. It's suggested that input is sought from Finance regarding program cost tracking. | measurements including the frequency of the measurement and program cost tracking (with input from Finance).<br><br>The estimated completion date is October 31, 2021.   |
| Are there concerns about program resources and sustainability? | Program employees indicated a potential need for a laboratory information management system (LIMS) and project management support to improve efficiencies. | Missed opportunity to benefit from program improvements. | It's recommended that the Director General of the Grain Research Laboratory review the requirements and ensure that they have been included in the current LIMS proposal.                       | The Director General commits to reviewing the requirements to ensure the items identified have been communicated to the Project Management Office for inclusion in the laboratory information management system (LIMS) proposal. Note the CGC's Project Management Office (PMO) is responsible for the design and implementation of the laboratory information management system (LIMS) across the Canadian Grain Commission's laboratory environment. |



|  |   |  |  |   |
|--|---|--|--|---|
|  |   |  |  | Estimated completion date July 15, 2021.  |
| Are there concerns about program resources and sustainability? | <p>Employee feedback on adequacy of resources was tied to limitations inherent in the current laboratory space at 303 Main Street in Winnipeg (Man).</p> <ul style="list-style-type: none"> <li>6 respondents (24% of all respondents) indicated a need for additional storage space and temperature and humidity control for samples to avoid test duplication or additional control testing for monitoring. It was noted by the program manager that this is a limitation inherent in the current laboratory space at 303 Main Street.</li> </ul> | Risk of program quality being impacted by lack of resources (quality, timeliness). | It's recommended that the Director General of the Grain Research Laboratory ensure this feedback is communicated to 303 Main Street project team and included in deficiency reporting. | <p>The Director General commits to communicate to the 303 Main Street project team the deficiencies, limitations and other issues related to laboratory space at 303 Main Street. This will be aligned with the finding of the latest laboratory deficiencies report.</p> <p>Estimated completion date is May 15, 2021.</p> <p>Note the implementation and completion of the laboratory deficiencies initiative and Head Quarters initiative are managed in collaboration with Finance.</p> |
| Are there concerns about program resources and sustainability? | Key informant interviewees noted a recent trend of a reduction in the number of key scientists across the wheat sciences sector as a whole. Several key informants and 1 program employee reported concern about the sufficiency of current Grain Research Laboratory resources (related to the new   | Risk of inability to sustain program in future due to lack of resources.           | It's recommended that the Director General of the Grain Research Laboratory continue to assess the sufficiency of existing Grain Research Laboratory resources                         | The Director General commits to prepare a 5-year people plan for the wheat and durum program in addition to the regular staffing plan   |

|  |   |  |  |  |
|--|---|--|--|--|
|  | variety registration program) and the complexity and difficulty of succession planning due to the highly specialized nature of the work and difficulty in finding and replacing qualified scientists.   |  | (related to the new variety registration program) and place a heightened priority on succession planning for key scientists within the new variety registration program.   | that will support staffing and succession planning.<br><br>Estimated completion date is December 31, 2021.   |
| Are there concerns about program resources and sustainability?   | Key informants noted the value of the program being provided as a no-fee service to the Prairie Recommending Committee for Wheat, Rye and Triticale and there was some concern expressed regarding the future potential impact should the Grain Research Laboratory begin to charge a fee for these services.             | Risk of inability to sustain program in future due to lack of clarity regarding funding. | It's recommended that the Director General of the Grain Research Laboratory bring forward the perspective noted by key respondents, in combination with program performance measurement and costs (as recommended above) to the Commission for their consideration during the next fee review cycle. | The Director General commits to bringing the perspective on fees noted in conjunction with performance measures and costs forward as part of the next fee review cycle.<br><br>Estimated completion date is July 31, 2022. |
| Are there potential program improvements that could be realized? | Approximately half of key informants indicated they would benefit from more collaboration with the Grain Research Laboratory throughout the year potentially with scientific meetings and networking events in the area of wheat quality testing and global end-user perspective. Bringing structure would be beneficial. | Missed opportunity to further engage with the industry.                                  | It's recommended that the Director General of the Grain Research Laboratory explore the feasibility and implementation of future and ongoing scientific meetings throughout the year.  | The Director General commits to explore the opportunities to formalize communication and knowledge. Consultation with main participants will be done at the 2022 PGDC meetings to determine the proper format.             |

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  | Estimated completion date is March 31, 2022. |
|  |  |  |  |  |

## Appendix 2: Prairie Grain Development Committee background

The Prairie Development Grain Committee mandate, which is available on their website, includes the following statements:<sup>49</sup>

- to act as a forum for exchange of information relevant to the development of improved cultivars of grain crops for the western Canadian prairies
- to advise regulatory agencies regarding legislation and regulations governing grain breeding, cultivar production and sector development
- to facilitate scientific discussion and communication of research priorities for the improvement of the prairie grain sector
- to facilitate and organize an annual meeting of the prairie grain recommending committees at a common place and time

Both the key informant interviews and document reviews demonstrate that the Grain Research Laboratory provides support to the new variety registration process. They indicate that employee attendance at the Prairie Grain Development Committee meetings supports the committee's mandates for:

- engaging in scientific discussion
- communicating research priorities to breeders
- improving the prairie grain sector

The Prairie Recommending Committee for Wheat, Rye and Triticale operating procedures notes the requirement that members of the recommending committees have the “knowledge and expertise required to establish and administer testing protocols and to determine the merit of varieties ... of crops for the specific region.”<sup>50</sup> The operating procedures also require that committee membership represents the full value chain of stakeholders, including:

- variety and trait developers
- producers
- end users<sup>51</sup>

The Canadian Grain Commission plays a supporting role in helping the Prairie Recommending Committee for Wheat, Rye and Triticale meet its mandate. A staff

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<sup>49</sup> [Prairie Grain Development Committee mandate](#)

<sup>50</sup> [Prairie Recommending Committee for Wheat, Rye and Triticale, Operating Procedures, revised March 2020, page 4](#)

<sup>51</sup> [Prairie Recommending Committee for Wheat, Rye and Triticale, Operating Procedures, revised March 2020, page 4](#)

representative is listed as the value chain representative on the Quality Evaluation Team. The recommending committee’s operating procedures also outline specific Canadian Grain Commission roles and services provided to the committee, including:

- wheat breeders are encouraged to consult with the Canadian Grain Commission during their process prior to seeking registration (page 3, 15 and 25)
- for end-use quality testing, each check and candidate composite sample will be based on the Canadian Grain Commission method of determination (page 12)
- the Canadian Grain Commission will be consulted regarding the introduction of new crop kinds (page 15)
- the Canadian Grain Commission’s Industry Services team uses available data to determine wheat variety classifications (page 19)
- the Canadian Grain Commission assesses check varieties as a service to the committee (page 47)

### Appendix 3: Evaluation matrix

|                     |  |  | Data sources    |                          |                         |
|---------------------|--|--|-----------------|--------------------------|-------------------------|
| Evaluation question | Sub question   | Indicators   | Document review | Key informant interviews | Program employee survey |
| 4.1 Relevance       | 4.1.1 Is there a continued need for the Grain Research Laboratory's new variety registration support program?                      | a. Determine whether stakeholders feel there is a continued need for the program   | X               | X                        |                         |
|                     |  | b. Is there evidence of continued demand for and use of the program?   | X               | X                        |                         |
|                     | 4.1.2 Are there other programs that complement, duplicate or overlap with the Grain Research Laboratory's new variety registration | a. Stakeholder opinion on whether the program complements or duplicates the work of other available programs, initiatives or |                 | X                        |                         |

|  |  |  |   |   |  |
|--|--|--|---|---|--|
|  | support program?   | laboratories   |   |   |  |
| <b>4.2 Alignment with government priorities</b>              | <b>4.2. To what extent do the Grain Research Laboratory's new variety registration program's goals and objectives align with federal and departmental priorities?</b>                                      | a. Alignment of program objectives with current federal and departmental priorities  | X | X |  |
| <b>4.3 Alignment with federal roles and responsibilities</b> | <b>4.3 To what extent do the Grain Research Laboratory's new variety registration program goals and objectives align with federal roles and responsibilities ?</b>   | a. Program supports and serves Canadian Grain Commission mandate under the <i>Canada Grain Act</i>   | X | X |  |
|  |  | b. Program supports and serves the Canadian Food Inspection Agency's new variety registration activities as mandated by the agency                                     | X | X |  |
| <b>4.4 Performance</b>                                       | <b>4.4.1. Immediate outcome: The Prairie Recommending Committee for Wheat, Rye and Triticale and the Quality Evaluation Team have high quality data for evidence-based assessment of the quality merit</b> | a. Stakeholder confidence that quality trial registration data produced by the Grain Research Laboratory's new variety registration support program is of high quality | X | X |  |
|  |  | b. Evidence that recommendations have been robust over the years   | X | X |  |

|  |  |  |   |   |  |
|--|--|--|---|---|--|
|  | <b>of candidate lines in registration trials</b>   | c. Stakeholder views that quality trial registration data is a significant factor in the committee's evidence-based assessment of quality merit of candidate lines   | X | X |  |
|  | <b>4.4.2 Immediate outcome: Expertise and input contributes to evidence-based annual Prairie Recommending Committee for Wheat, Rye and Triticale recommendations for approval of new candidate lines</b> | a. Stakeholder views whether expertise and input provided by the Grain Research Laboratory's new variety registration program contributes to evidence-based recommendations  | X | X |  |
|  |  | b. Prairie recommending committee members and stakeholders' views and if they have confidence in the expertise and input provided by the Grain Research Laboratory   | X | X |  |
|  |  | c. Evidence that the Canadian Food Inspection Agency follows the Prairie Recommending Committee for Wheat, Rye and Triticale recommendations for approval and registration of candidate lines -- new varieties -- history of recommendations | X | X |  |
|  |  |  |   |   |  |

|  |   |   |  |   |  |
|--|---|---|--|---|--|
|  |   | d. Incidence or stakeholder opinion that there have been past new variety recommendations that industry did not have full confidence in or was challenged or reversed     |  | X |  |
|  | <b>4.4.3 Immediate outcome: Ongoing maintenance and improvement of quality test procedures</b>  | a. Stakeholder opinion that no gaps or problems in quality merit testing procedures have been identified  |  | X |  |
|  |   | b. Stakeholder and recommending committee member confidence in the ongoing improvement of quality testing procedures: that they are up to date and produce the right data |  | X |  |
|  | <b>4.4.4 Intermediate outcome: Support grain quality assurance system by supporting approval of only new varieties that meet or exceed performance of check varieties</b> | a. Stakeholder opinions on quality of new varieties   |  | X |  |



|  |  |   |  |          |  |
|--|--|---|--|----------|--|
|  | <p><b>4.4.5 Intermediate outcome: Support the Canadian Food Inspection Agency-mandated new variety registration process to maintain oversight of new varieties and only those varieties that meet quality requirements will be registered</b></p>  | <p>a. Stakeholder opinion on whether program objectives support and contribute to the Canadian Food Inspection Agency mandate</p> |  | <p>X</p> |  |
|  | <p><b>4.4.6 Intermediate outcome: Support the Canadian Grain Commission-mandated updates to variety designation lists for wheat with newly registered varieties placed into a wheat class as well as assist producers and grain handlers to identify which varieties are eligible for a grade within a wheat class</b></p> | <p>a. Stakeholder opinions that program objectives contribute to the Canadian Grain Commission mandate</p>                        |  | <p>X</p> |  |
|  |  | <p>b. Stakeholder opinion that program outputs are used to maintain variety designation lists</p>                                 |  | <p>X</p> |  |
|  |  | <p>c. Stakeholder opinions on their level of confidence in the variety designation lists</p>                                      |  | <p>X</p> |  |

|                       |   |   |   |   |   |
|-----------------------|---|---|---|---|---|
|                       | <b>4.4.7 Long-term outcome: Canada's grain is safe, reliable and marketable and domestic and international markets regard Canadian grain as dependable and safe</b> | a. Evidence that immediate and intermediate outcomes are achieved   | X | X |   |
|                       | <b>4.4.8 Have there been any unintended outcomes of the program (either positive or negative)?</b>  | a. Stakeholder opinion on whether there are any unintended outcomes of the Grain Research Laboratory's new variety registration support program   |   | X |   |
| <b>4.5 Efficiency</b> | <b>4.5.1 Are Grain Research Laboratory new variety registration program activities performed in the most efficient and economical way?</b>                          | a. Program employees' opinion on whether steps have been taken to ensure the program is run efficiently and effectively   |   |   | X |
|                       |   | b. User (Quality Evaluation Team of the Prairie Recommending Committee for Wheat, Rye and Triticale) feedback on format and timeliness of data provided and on subject matter expert role |   | X |   |
|                       | <b>4.5.2 Is program performance measurement conducted?</b>  | a. Performance data is collected, available, reliable and complete as well as being sufficient and used to improve the program  |   |   | X |

|                        |   |  |  |   |   |
|------------------------|---|--|--|---|---|
| 4.6 COVID-19 learnings | 4.6 Identify impacts and adjustments to the Grain Research Laboratory's new variety registration support program activities due to COVID-19 | a. Program employee responses on how program practices were adjusted due to COVID-19 operation restrictions  |  |   | X |
|                        |   | b. Program employees' opinions regarding program modifications, improvements and learnings due to COVID-19 adjustments in workflow on the new variety registration program |  |   | X |
|                        |   | c. Stakeholder feedback on timelines and quality of trial registration data during COVID-19  |  | X |   |

**Appendix 4: List of documents reviewed**

- **Internal Canadian Grain Commission sources** Canadian Grain Commission, Grain Research Laboratory (2017), [Grain Research Laboratory: Annual Program Report 2017](#)
- Canadian Grain Commission, Grain Research Laboratory (2019), [Grain Research Laboratory: Annual Program Report 2019](#)
- Canadian Grain Commission (1999), Program review 1999
- Canadian Grain Commission (2012), How a variety becomes registered and/or eligible for delivery
- Canadian Grain Commission (2016), [2016 to 2017 Report on Plans and Priorities](#)

- Canadian Grain Commission (2018), Draft Canadian Grain Commission mandate letter
- Canadian Grain Commission (2019), [2020-21 Departmental Plan](#)
- Canadian Grain Commission (2019), [Canadian wheat class modernization](#)
- Canadian Grain Commission (2019), [2019-2020 Departmental Results Report](#)
- Canadian Grain Commission (2021), [Variety designation lists](#)
- Canadian Grain Commission, Grain Research Logic Model
- Canadian Grain Commission, Performance Information Profile
- Canadian Grain Commission (2018), [Backgrounder: Wheat class modernization process](#)

### **Legislative sources**

- [Canada Grain Act](#), RSC 1985, c. G-10
- [Canada Grain Regulations](#), CRC, c. 889
- [Seeds Act](#), RSC 1985, c. S-8
- [Seeds Regulations](#), CRC, c. 1400

### **Other federal government sources**

- Agriculture and Agri-Food Canada (2020), [2019-2020 Departmental Results Report](#)
- Agriculture and Agri-Food Canada (2020), [Overview of the Canadian Agriculture and Agri-Food Sector](#)

- Canada Food Inspection Agency (2019), [Crop Specific Recommending Committees - Contact information](#)
- Canada Food Inspection Agency (2013), [Crop Variety Registration in Canada: Issues and Options](#)
- Agriculture and Agri-Food Canada (2018), [Canadian Agricultural Partnership: Federal activities and programs](#)
- Department of Finance Canada (2019), [Investing in the Middle Class: Budget 2019](#)
- Office of the Prime Minister (December 2019), [Minister of Agriculture and Agri-Food Mandate Letter](#)
- Office of the Prime Minister (January 2021), [Minister of Agriculture and Agri-Food Supplementary Mandate Letter](#)
- Dyck, A., Prairie Grain Development Committee (n.d.), [QET Adhoc Committee Review](#)
- Agriculture and Agri-Food Canada (June 2020), Canada's seed regulatory framework: A primer for seed regulatory modernization, June 25, 2020
- Agriculture and Agri-Food Canada (2020), Looking ahead: Trends and forces impacting the future of the seed industry
- Global Affairs Canada (2020), [Canada's State of Trade 2020](#)

#### **Prairie Grain Development Committee sources**

- Prairie Grain Development Committee (2019), [Quality objectives for western Canadian wheat classes](#)
- Prairie Grain Development Committee (2018), [Terms of Reference](#)

- Prairie Grain Development Committee (n.d.), [Mandate](#)
- Prairie Recommending Committee for Wheat, Rye and Triticale (2013), [Operating procedures: final draft](#)
- Prairie Recommending Committee for Wheat, Rye and Triticale (2018), [Operating procedures: final draft](#)
- Prairie Recommending Committee for Wheat, Rye and Triticale (2020), [Operating procedures: final draft](#)
- Prairie Recommending Committee for Wheat, Rye and Triticale (2021), [Western Canadian Wheat, Rye & Triticale Recommendations \(2021 to 1940\)](#)
- Quality Evaluation Team of the Prairie Recommending Committee for Wheat, Rye and Triticale (2015), [Quality objectives for western Canadian wheat classes](#)
- Beres, B. (2013), Prairie Grain Development Committee, [Proposed Reforms for the Prairie Recommending Committee for Wheat, Rye and Triticale \(PRCWRT\)](#)
- Correspondence between Minister Agriculture and Agri-food Canada and Chair Prairie Recommending Committee for Wheat, Rye and Triticale regarding reforms between February and July 2013

### **External literature sources (articles and reports)**

- Alberta Barley (2020), [Prairie wheat and barley commissions concerned about the impact of SVUAs](#)
- Alberta Farmer Express (2013), [Powerful interest behind Ritz's views on wheat registration](#)
- Alberta Seed Guide (2016), [Wheat Class Modernization Plan Moves Ahead](#)
- Alberta Seed Guide (2018), [Wheat Class Modernization: What, When Why and How](#)

- Canadian Cereals (2021), [2020 New Crop Report](#)
- Germination (2016), [PGDC Helps Fuel an Industry at Annual Meeting](#)
- GrainsWest (2020), [If you've got it, flaunt it: Leveraging the inherent strength of the Canadian grain system](#)
- Manitoba Co-operator (2018), [A fine balance](#)
- Manitoba Co-operator (2016), [Alberta raises concerns about changes to Western Canada's wheat classes](#)
- Manitoba Co-operator (2018), [Grain commission wheat class process criticized](#)
- Manitoba Co-operator (2017), [New wheat class a mixed bag](#)
- Newswire (2016), [Wheat class modernization plan moves ahead](#)
- The Saskatchewan Wheat Development Commission (SaskWheat) (2018), [2018 wheat class modernization](#)
- The National Farmers Union (2018), [NFU letter to CGC Commissioners re: Eastern wheat class](#)
- Top Crop Manager (2015), [Wheat class modernization](#)
- Farms.com (2016), [Wheat Class Modernization: Interview with Brian Kennedy](#)

#### **External sources (news releases)**

- [ADM](#)
- [Agri-Food and Rural Development Division – Government of Manitoba.](#)

- [Ag-Info Centre – Agriculture and Forestry – Government of Alberta](#)
- [Ag-Quest, Inc.](#)
- [Agri-food and local food – Government of Alberta](#)
- [Alberta Wheat and Barley Commission](#)
- [American Seed Trade Association \(ASTA\)](#)
- [Association of Official Seed Certifying Agencies \(AOSCA\)](#)
- [BC Grain Producers Association](#)
- [BASF Canada](#)
- [Canada Bread Company](#)
- [Canadian International Grains Institute \(Cigi\)](#)
- [Canadian Seed Growers' Association \(CSGA\)](#)
- [Canadian Seed Institute \(CSI\)](#)
- [Canadian Seed Trade Association \(CSTA\) – aka Seed Canada](#)
- [CANTERRA SEEDS](#)
- [Cereals Canada](#)
- [Commercial Seed Analysts Association of Canada \(CSAAC\) - aka Seed Canada](#)
- [Condie Seed](#)



- [Court Seeds](#)
- [FP Genetics](#)
- [Germplasm Resource Information Network \(GRIN\) – US Department of Agriculture](#)
- [Gowan Canada](#)
- [Integrated Crop Management Services \(ICMS\) Inc.](#)
- [International Seed Federation \(ISF\)](#)
- [International Seed Testing Association \(ISTA\)](#)
- [International Union for the Protection of New Varieties of Plants \(UPOV\)](#)
- [KWS LOCHOW GMBH](#)
- [Lefsrud Seed and Processors Ltd.](#)
- [Les Moulins de Soulanges](#)
- [Limagrain Cereals Research Canada](#)
- [Manitoba Seed Growers' Association](#)
- [Markert Seeds](#)
- [Nutrien Ag Solutions, Inc.](#)
- [Organisation for Economic Co-operation and Development \(OECD\)](#)
- [Paterson Grain](#)

- [Progressive Seeds Pty Ltd](#)
- [The Saskatchewan Wheat Development Commission \(Sask Wheat\)](#)
- [SGS Canada Ltd.](#)
- [Saskatchewan Ministry of Agriculture](#)
- [SaskOrganics](#)
- [SeCan](#)
- [Seed Association of the Americas \(SAA\)](#)
- [Seed Depot Corporation](#)
- [Syngenta Canada](#)
- [Western Grain Elevator Association \(WGEA\)](#)
- [Western Grains Research Foundation](#)
- [Winter Cereals Canada](#)