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Prairie Recommending Committee for Oilseeds (PRCO) Operating Procedures – Flax

**July 2025
Appendixes updated July 2025**

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Table of contents

INTRODUCTION.....	3
1. PRCO OBJECTIVES	3
2. GUIDELINES FOR COMMITTEE OPERATION	4
2.1 MEMBERSHIP AND STRUCTURE.....	4
2.2 MEETINGS.....	6
2.3 VOTING.....	7
2.4 APPEAL OF PRCO RECOMMENDATION FOR REQUEST OF SUPPORT FOR REGISTRATION OF A CANDIDATE CULTIVAR.....	10
2.5 APPEAL OF A PRCO RECOMMENDATION BY THE CONTRACT REGISTRATION COMMITTEE.....	11
3. REGISTRATION TRIALS	11
3.1 TYPES OF REGISTRATION.....	11
3.2 REGISTRATION TRIALS.....	12
3.2.1 <i>General Guidelines</i>	12
3.2.2 <i>Co-operative Registration Trials</i>	13
3.2.3 <i>Private Registration Trials</i>	18
3.2.4 <i>Contract Registration Trials</i>	19
3.3 REGISTRATION RECOMMENDATION.....	22
4. THE REQUEST DOCUMENT	23
4.1 SUBMISSION OF DATA FOR SUPPORT OF REGISTRATION.....	23
4.2 DESCRIPTION OF THE CANDIDATE.....	25
4.3 DATA SUMMARIES.....	25
4.4 SUBMISSION FOR REGISTRATION.....	26
4.5 ERRORS IN THE REQUEST FOR SUPPORT OF REGISTRATION DOCUMENT.....	26
4.6 DEFINITION OF MERIT.....	26
4.7 SUPPLEMENTARY DATA.....	27
5. POLICY ON RELEASE OF INFORMATION	27
5.1 PRCO OPERATING PROCEDURES	27
5.2 PRCO CO-OPERATIVE TEST REPORTS.....	27
5.3 PRCO MINUTES	27
6. CONFLICT OF INTEREST	28
APPENDIX A - DEFINITIONS	29
APPENDIX B - AUTHORITY PROVIDED UNDER SECTION 65.1 IN THE SEEDS REGULATIONS.....	32
APPENDIX C - ELIGIBILITY REQUIREMENTS FOR VARIETY REGISTRATION.....	33
APPENDIX D1 – AGRONOMIC EVALUATION FOR THE LINSEED FLAX CO-OPERATIVE TRIALS	34
APPENDIX D2 – QUALITY EVALUATION FOR THE LINSEED FLAX CO-OPERATIVE TRIALS.....	36
APPENDIX D3 – DISEASE EVALUATION FOR THE LINSEED FLAX CO-OPERATIVE TRIALS.....	37
APPENDIX D4 – MINIMUM STANDARD FOR LINSEED FLAX CULTIVAR REGISTRATION.....	40

Prairie Recommending Committee for Oilseeds (PRCO) Operating Procedures - Flax

INTRODUCTION

This document outlines the flax evaluation and testing system operated by the Prairie Recommending Committee for Oilseeds (PRCO). *Appendix A* contains definitions. *Appendix B* describes authority provided under section 65.1 in the Seeds Regulations. *Appendix C* describes eligibility requirements for variety registration. *Appendix D* describes the operating procedures for the registration of a flax cultivar for production in Western Canada. Information for PRCO members is incorporated into a companion document, *General Information Concerning Membership in the Prairie Recommending Committee for Oilseeds (PRCO)* and is available to PRCO members in the password-protected section on the PGDC website (www.pgdc.ca) under the “Committee: Oilseeds” link.

Option 1 of the Crop Variety Registration in Canada-Issues and Options document is selected by the Flax Industry, which allows the flexibility inherent in the current Variety Registration system to emerge.

Flax will stay in Part I of the Variety Registration system. Part I will retain their Recommending Committees (RC's), merit criteria and performance testing requirements. The RC must assess merit based on the performance trial data and recommend the variety for registration to the Canadian Food Inspection Agency's Variety Registration Office (CFIA's VRO). This merit assessment is made by comparing the performance test results from field trials to the attributes of reference varieties (also known as 'check' varieties). The CFIA's VRO accepts the recommendations and, after reviewing and evaluating the information package that must accompany the application for registration, registers the new variety.

The objective of variety registration in Canada is to ensure new crop varieties provide improved agronomic performance and reliability for producers and/or improved quality for end users.

1. PRCO OBJECTIVES

The PRCO is responsible for the testing and evaluation of candidate cultivars of condiment mustard [*Sinapis alba* L. (yellow mustard) and *Brassica juncea* (L.) Czern. and Coss. (oriental and brown types)] and flax (*Linum usitatissimum* L.) for registration in Canada. There are two types of flax grown in Western Canada, brown and yellow flax; both have high linolenic acid oil used for industrial and edible purposes.

The PRCO mandates are:

- To establish guidelines and define criteria for the recommendation of potential cultivars of flax and condiment mustard for registration by the Variety Registration Office (VRO) of the Plant Production Division, Canadian Food Inspection Agency (CFIA);
- To co-ordinate and conduct trials and characterize the phenotype of potential cultivars of flax and condiment mustard as per the operating procedures developed by the PRCO and approved by the VRO;

- To specify relevant reference cultivars as standards for agronomic, quality and disease resistance traits of candidate cultivars of flax and condiment mustard;
- To determine whether flax and condiment mustard candidate cultivars have merit relative to the standard and to recommend such candidate cultivars to the VRO;
- To act as a forum for exchange of information relevant to the development of improved cultivars of flax and condiment mustard for Canada;
- To advise Canadian regulatory agencies on issues concerning flax and condiment mustard grown in Canada.

2. GUIDELINES FOR COMMITTEE OPERATION FOR FLAX

The PRCO is the recommending body for registration of brown and yellow flax. To obtain this recommendation, the candidate cultivar must be evaluated in a Flax Co-operative trial usually for a minimum of ten (10) station years of data over a two (2) year period and meet the minimum standards (*Appendix D4*) which demonstrate agronomic, quality and disease resistance acceptability and merit.

In order for a candidate cultivar to be evaluated in the Flax Co-operative trials, the sponsor of the candidate line must obtain approval from the PRCO. The PRCO is made up of voting members who are actively involved in the production, development and/or evaluation of potential flax cultivars for Western Canada. Candidate cultivars may be entered in the trial by Canadian public institutions or private breeding institutions, through a private sector Canadian sponsor or breeder's agent.

The PRCO Operating Procedures are reviewed by the Chair of the PRCO at least every three (3) years and updated as required by the membership of the PRCO. There are Operating Procedures that are mustard-specific and Operating Procedures that are flax-specific. Flax-specific Operating Procedures are valid pending approval by a 50% plus one person majority of the PRCO flax membership in attendance at the annual meeting of the PRCO and recognition by the VRO.

Appendices to the PRCO Operating Procedures include unique procedures for flax (*Appendix D1 to D4*) that govern the conduct of Co-operative trials, collection of data and the measurement of traits of interest. These Appendices are reviewed and updated by the flax membership on an annual basis, or as required, to reflect new markets, technologies, races of pathogens or testing in new environments. Review of the Appendices will be conducted by the Chair and/or Secretary of the PRCO and then ratified by the flax voting members of the PRCO pending approval by a 50% plus one person majority of the PRCO flax membership in attendance at the annual meeting of the PRCO and recognition by the VRO.

2.1 Membership and Structure

The membership of the flax-specific PRCO consists of individuals actively engaged in the research and development, production, marketing, commercialization and processing of commodities or end-use products of flax grown in Canada. Members are recognized for their technical and/or scientific expertise for a specific crop, or the end-use products derived from the crop species within the PRCO. Flax PRCO members will vote on motions and/or resolutions at the meetings of the PRCO and any committees that are pertinent to flax.

Membership on the PRCO is reviewed annually and is subject to approval by the PRCO at the annual meeting. The PRCO Secretary may request the participation of additional PRCO members to form a Membership Committee. The Membership Committee reviews the membership list, receives requests for new members and sponsored members, and presents recommendations for new members as well as recommendations on membership issues to the PRCO members at the annual meeting. Committee members will serve on the committee for a maximum of three years however they can let their name stand to be included for subsequent terms. Flax voting members will vote on flax membership motions.

Crop-specific experts/stakeholders who are not Recommending Committee (RC) members (those who vote on variety recommendations) will be eligible to attend general meetings. To be recognized by the RC they must provide advanced written notification to the committee with a brief explanation of their credentials. A code of conduct and terms of reference will be provided.

Crop-specific experts/stakeholders will have an opportunity to be recognized by the Chair to provide constructive expert input to the voting members as needed. At the discretion of the RC, ad hoc working sub-committees can be struck. These sub-committees may be made up of either committee members and/or crop expert advisory members. Subcommittees may be established for specific purposes (eg: selection of new check varieties) for the purpose of submitting a report to the RC with recommendations to be voted on.

All applications for new membership in the PRCO must be received by the PRCO Secretary at least seven (7) days prior to the annual meeting. PRCO members in good standing can nominate new members by forwarding the name(s), affiliation(s), and co-ordinates of the nominee(s), and written justification describing the expertise of the nominee(s), to the PRCO Secretary who will communicate the information to the Membership Committee for review.

If the nomination(s) is supported by the Secretary or the PRCO Membership Committee, if convened, then the PRCO flax voting membership in attendance at the annual meeting will vote on the nomination(s) that are pertinent to flax. New member(s) will have voting status effective April 1 following the annual meeting.

In the case of members representing the seed trade, producer organizations, and provincial governments (sponsored members), the identity of the sponsored member shall be requested in writing by the PRCO Secretary at least one (1) month prior to the annual meeting of the PRCO. The identity of the sponsored member shall be provided in writing to the PRCO Secretary at least ten (10) days prior to the annual meeting of the PRCO. Once the sponsored member has been identified, the PRCO Secretary will forward the appropriate documents to the member as well as the password to access the password-protected section of the PRCO on the PGDC website (www.pgdc.ca).

Members not attending at least two (2) consecutive annual meetings of the PRCO will forfeit their membership status. Exceptions to this rule are accepted only when there is prior notification of extenuating circumstances preventing the member from attending the annual meeting.

Members of the PRCO hold concurrent membership in the Prairie Grain Development Committee (PGDC) which functions to organize the annual meeting of the PRCO and the other recommending committees, and other concurrent workshops or meetings. The Chair and Secretary of the PRCO are the PRCO representatives on the Executive of the PGDC.

The Executive of the PRCO consists of the Chair and Secretary of the PRCO. The Chair and Secretary of the PRCO will be elected from the membership of the PRCO. All Executive positions are held for a three (3) year term which commence on April 1 following the annual meeting where the position holders were elected. Terms are renewable, subject to PRCO membership approval.

In circumstances where the PRCO Chair is unavailable to act in the official capacity of the position, the Secretary will assume the role of Chair and appoint a temporary Secretary from among the membership of the PRCO. In circumstances where the Secretary is unavailable, the Chair will appoint a temporary Secretary from among the membership of the PRCO.

A Financial Auditor may be elected from the membership.

Any meeting of the PRCO will follow Robert's Rules of Order to conduct the meeting. The PRCO membership participates on the Appeals Board (Section 2.4) and the Contract Registration Committee (Section 3.2.4).

2.2 Meetings

The PRCO meets annually, usually in the second or third week of February. The normal sequence for the February meetings of the PRCO membership is as follows although logistics may result in changes:

- Executive Committee PRCO
- Membership Committee and other ad hoc Committees if required
- Entire PRCO membership annual meeting
- Executive Committee PRCO

Meetings are open to all interested parties. All guests must make a request to the PRCO Chair to attend the meetings and are to be identified at the start of the meetings. Members attending the annual meeting of the PRCO may, by a simple majority vote, create in camera portions of the meetings, as necessary.

All meetings will be conducted according to Robert's Rules of Order.

Quorum for any meetings shall be a simple majority of the total current membership of the respective committee. Quorum for the annual meeting of the PRCO shall be a simple majority of the total current PRCO membership. The only exception to these quorums is when a member has provided, to the relevant Chair, advance (7 days) notice of their absence and the extenuating circumstances that prevented their attendance at the meeting(s). In this case, the absent member will not be included in the total membership count.

Meetings of the Contract Registration Committee or Membership Committee will be held prior to the annual meeting of the PRCO if there is a reason to do so. Meetings may be called on thirty (30) days notice or less with the consensus of the membership of the committees.

An Appeals Board meeting may be held after the adjournment of the annual meeting of the PRCO in February if an appeal has been initiated and the members of the Appeals Board are available for the meeting. Other meetings of the Appeals Board may be called with the consensus of the membership of the Appeals Board. The Appellant will pay for all expenses incurred for such a meeting.

Extraordinary meetings of the PRCO may be called on thirty (30) days notice. A simple majority of the total current PRCO membership is required to call such meetings. Notice of extraordinary meetings will be communicated by facsimile, electronic mail, or telephone. The notice will be sent by the PRCO Chair or Secretary, who will record notification of receipt of the notice and tabulate the vote to support the calling of the extraordinary meeting.

2.3 Voting

Voting is normally done at the annual meeting of the PRCO. Proxy votes are not permitted.

Major motions such as recommendations, changes to procedures, membership or set aside of the rules and tabling of motions, require a 50% plus one person majority of the flax voting membership in attendance at the meeting.

Minor motions such as calling and adjourning of meetings and approval of reports, require a simple majority of the flax voting membership in attendance at the meeting.

In special circumstances, and at the discretion of the pertinent Chair, voting may be conducted using regular mail, facsimile or electronic mail. This would be considered an extraordinary meeting. Quorum for voting at such a meeting is a simple majority of the membership who:

- a) Received the motion as distributed to the membership and notification of receipt of the motion was received back to the Chair or Secretary; and
- b) Are available to submit their vote back to the PRCO Chair or Secretary in the time allocated for completion of the vote.

Voting at the annual meeting of the PRCO will be by a show of voting cards that have been prepared as per the current membership list and distributed to members at the beginning of the annual meeting. PRCO members representing the flax industry vote for support for recommending flax varieties for registration and other flax operating procedure changes only. PRCO members representing the mustard industry vote for support for recommending mustard varieties for registration and other mustard operating procedure changes only. Counting of votes will be by two (2) members of the PRCO appointed by the Chair at the start of the meeting. The members will independently count and record the votes.

If the vote count agrees between the recording members, the result will be announced. If the vote count does not agree, a recount will be done.

It is expected that all members will vote impartially.

Abstentions are expected only in the case of a previously and openly declared conflict of interest (refer to Section 6). Where the number of abstentions is equal to or greater than $\frac{1}{3}$ of the votes cast, the Chair will ask for a re-vote. If the re-vote results in the number of abstentions being equal to or greater than $\frac{1}{3}$ of the votes cast, the Chair will file a report stating that no recommendation could be made.

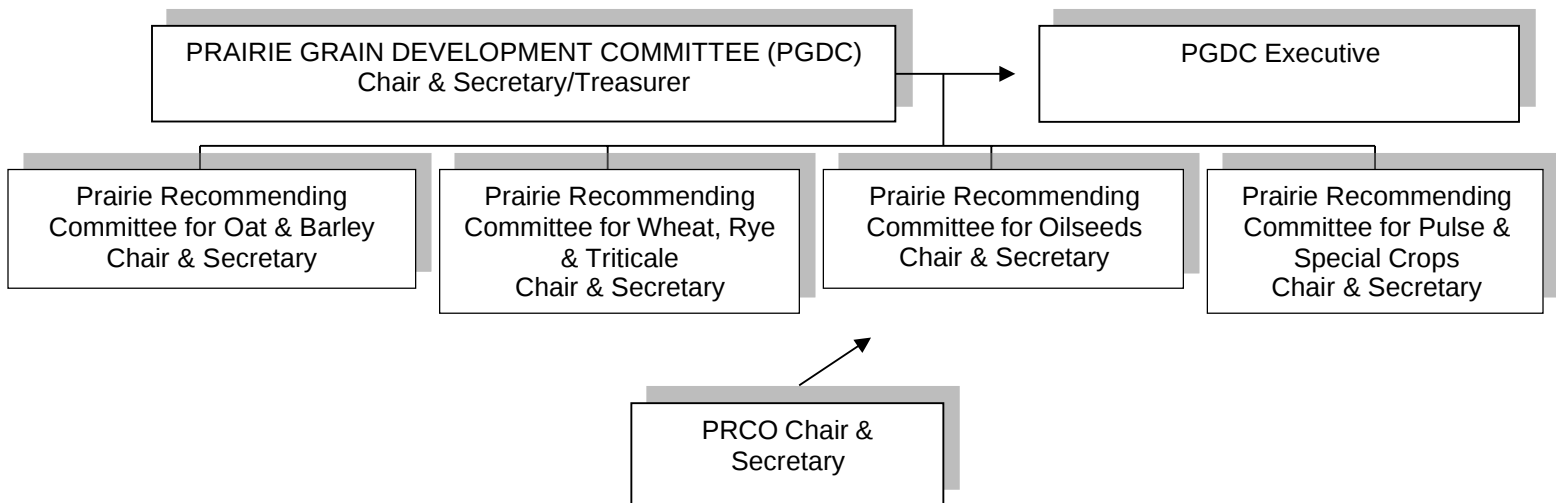
The Chair (or Acting Chair) is not entitled to a vote. The Chair may actively participate in the discussions only if the Chair steps down from that position for the duration of the discussion.

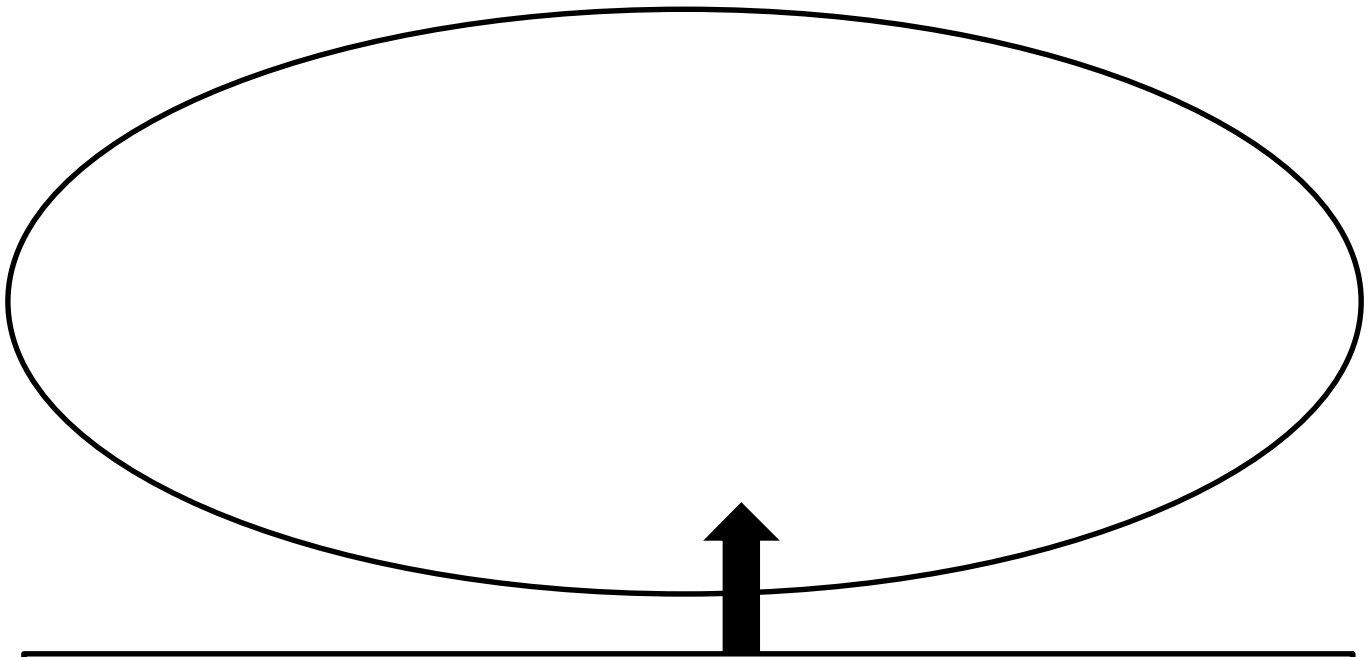
Under extenuating circumstances, it may be necessary for the PRCO to temporarily disregard its approved procedures. Any proposed suspension of procedures must be put to a vote, with a 50% plus one person majority of the flax membership in attendance required for the procedures to be suspended. The rationale for such an action and the record of the empowering vote will form part of the final decision.

Voting for consideration of a candidate cultivar will take place at the annual meeting of the PRCO. All flax members will cast a vote, including the breeder/sponsor, providing that he/she is an eligible voting member.

In order to allow sufficient time for consideration of the request to support a candidate cultivar, the members must receive the Request for Support of Registration document for a candidate cultivar at least seven (7) working days prior to the annual meeting of the PRCO.

Structure of the PRCO and relation to the PGDC





Members are expected to cast their vote based on the science of the data presented in the Request for Support of Registration document and vetting of the data by the members prior to the PRCO meeting. The vote at the annual meeting of the PRCO flax membership will be made according to the holistic attributes of the candidate cultivar.

Voting at the annual meeting of the PRCO: Based on the information provided by the Registration Trials, and on the member's area of expertise, the PRCO flax membership will consider the overall attributes and merit¹ of each flax candidate cultivar which has completed the registration testing requirements. The breeder/sponsor may present a case requesting support for the registration of the candidate cultivar. Following discussion, a motion to support the recommendation for registration of the candidate cultivar may be put forward by the breeder/sponsor. At the PRCO level of consideration of a candidate cultivar, deficiency in one characteristic of merit may be compensated for by strength in another characteristic of merit. Traits not considered for merit should not be used to influence the basis for decision of the vote for a candidate cultivar. There is an allowance to continue subjective assessment of varieties that may have unique value through 'set aside' provisions.

The PRCO Chair will call for a vote of the flax membership to be cast in one of the following categories:

- | | |
|-----------------|---|
| Support: | The candidate cultivar shows merit by having a summary of characteristics which are equal to or superior to the relevant check cultivar(s) for the traits determining merit as specified in the operating procedures developed for the relevant crop. |
| Object: | The candidate cultivar's attributes are inferior to those of the relevant check cultivar(s) for the traits determining merit as specified in the operating procedures developed for the relevant crop. |
| Abstain: | Abstentions are only expected in cases of openly declared conflicts of interest. |

¹ A candidate cultivar that shows merit is "equal to" or "superior to" relevant check cultivar(s). The phrase "equal to" is defined as not significantly different to the check mean or mean of the checks. The phrase "superior to" is defined as statistical superiority to the check mean or mean of the checks by a one-tailed test at the 95% confidence level using the pooled error mean square as the error term.

Recommendations to support the registration of a candidate cultivar are in effect for two (2) years from the adjournment of the annual meeting where the recommendation was made. The PRCO Secretary will record the results of the flax membership votes and/or recommendation and submit the documentation to the VRO within two (2) weeks from the adjournment of the annual meeting. Exceptions to this include, but are not limited to, the meetings of the Contract Registration Committee and request for support for Interim Registration. If erroneous data or omission of pertinent data is used as a basis of decision for voting on a candidate cultivar, the breeder/ sponsor must inform the PRCO Chair with an explanation and provide a new supporting document to the PRCO Executive. The PRCO Executive will determine if there was an omission or error and if this information may have affected the original decision. If it is determined that the original decision would have been affected, then the Chair will inform the PRCO flax membership of the need for a re-vote.

2.4 Appeal of PRCO Recommendation for Request of Support for Registration of a Candidate Cultivar

The PRCO recommendation for request of support for registration of a candidate cultivar may be appealed by the breeder/sponsor of the candidate cultivar. The bases of appeal of a PRCO recommendation of a candidate cultivar are:

- a) Failure of the PRCO to follow its approved Operating Procedures document and its relevant Appendices; and/or
- b) The recommendation was the result of erroneous data.

A written request to appeal the recommendation must be received by the PRCO Chair within fifteen (15) days of the close of the annual meeting of the PRCO. The appeal must indicate the basis for the appeal and include a copy of the data package for the candidate cultivar. Consideration of the appeal will be done by the Appeals Board.

The Appeals Board will consist of eight (8) individuals, representing the PRCO Executive and PRCO membership. Where there is a conflict of interest, members of the Appeals Board will appoint alternates. These alternates will be selected based on the next ascending seed number on the PRCO membership list. The PRCO Chair will preside over the meeting of the Appeals Board and the PRCO Secretary will record the minutes. The Appeals Board consists of:

- The PRCO Chair and Secretary (2 members);
- The PRCO Flax Members selected on his/her randomly generated seed number and not being part of the PRCO Executive (6 members).

The processing of the appeal may take one of the following forms as decided by the Appellant:

- a) If the members of the Appeals Board are available immediately or shortly after the adjournment of the annual meeting of the PRCO, then a meeting may be held where the Appellant will be given the opportunity to present the appeal to the Appeals Board. Documentation on the appeal will be distributed to the Appeals Board by the Appellant. Following presentation of the arguments, the Appellant will withdraw from the meeting room, the vote will be held and the Appellant will be notified upon conclusion of the meeting.

- b) If the appeal is requested after the annual meeting of the PRCO is adjourned, the appeal documentation will be circulated to the Appeals Board by the Appellant. A conference call defending the appeal may be arranged by the Appellant and the vote will be held during the conference call. The vote will only involve flax members. Alternatively, a written case defending the appeal may be provided to the Appeals Board. The vote is conducted using regular mail, facsimile or electronic mail.

Following deliberations of the Appeals Board, the Chair will call for the vote and the decision will be based on 50% plus one person majority of the Appeals Board members present. Where the number of abstentions is equal to or greater than $\frac{1}{3}$ of the votes cast, the Chair will ask for a re-vote. If the re-vote results in the number of abstentions being equal to or greater than $\frac{1}{3}$ of the votes cast, the Chair will file a report stating that no recommendation could be made. No additional appeals will be available at the Recommending Committee level.

The Appellant and members of the Appeals Board will be sent written notification of the Appeals Board decision and its rationale by April 1. All expenses incurred by the Appeals Board meeting will be paid by the Appellant.

Appeal of a PRCO Recommendation by the Contract Registration Committee

See Section 3.2.4 Contract Registration Trials.

3. REGISTRATION TRIALS

3.1 Types of Registration

In Canada, the *Seeds Act and Regulations* is the federal legislation governing the testing, inspection, quality and sale of seeds in Canada.

Flax will remain in Part I of Schedule III. As such, the registration of flax will continue to be based on recommendations from the flax voting members of the Recommending Committee officially recognized by the Minister of Agriculture and Agri-Food Canada for this purpose - the Prairie Recommending Committee for Oilseeds (PRCO).

a) National (Full) Registration²

"Unless otherwise specified in the certificate of registration, the registration is valid for all provinces and territories of Canada, until such time as the registration is cancelled or suspended, and without any restrictions on the production of the seed or commodity. Regional tests normally provide the basis for national registration. A variety is to be entered into official tests in the area(s) of anticipated adaptation. If it is supported by a recommending committee (see Section 3.3) and granted a registration, it may be imported or sold in all of Canada, except where regional restrictions apply".

b) Restricted Registration²

Restricted registration consists of Interim, Regional, or Contract Registration.

Interim Registration is used for the purpose of production of grain or other commodity for market acceptability tests; or for emergency/crisis reasons (e.g., disease). A minimum of one (1) year of evaluation in variety registration trials is required for Interim Registration. Interim Registration may be granted initially for a period of up to three (3) years, if requested by the Recommending Committee, provided the appropriate fees are submitted and that an acceptable

PRCO Operating Procedures, Revised July 2025

application package is received. Otherwise, a variety will be granted a one (1) year registration. Interim Registration may be renewed for additional periods, to a maximum total of five (5) years.

Regional Registration may be granted for crop varieties in those instances where the variety poses a potential threat to agriculture in specific regions for reasons such as seed/grain distinguishability, quality, disease or where the variety or its progeny may be detrimental to human or animal health and safety, or the environment. For Regional Variety Registration purposes, “harm” is defined as harm to the industry.

Contract Registration is used for varieties where delivery of the resulting commodity into traditional commodity channels would cause harm to those channels. Thus, a variety must demonstrate the possibility of harm if granted an unrestricted registration in order to qualify for this type of registration. The applicant must make available to the VRO, a quality control system that describes fully how any and all potentially adverse effects of the variety will be managed. In addition, the quality control system must address any regulatory concerns under the *Canada Grain Act*.

3.2 Registration Trials

3.2.1 General Guidelines

That flax retain a viable Prairie network for Coop testing of new variety candidates.

Some of the following guidelines may not apply to disease resistance testing. Guidelines for disease resistance testing are described in *Appendix D3*.

a) Purpose

Registration trials are conducted by groups of collaborating public institutions and/or by private sector companies or organizations

The purpose of registration trials is to generate relevant, unbiased and representative data on candidate cultivars and the relevant check cultivar(s). This data is provided to the PRCO or its relevant committees to provide the basis for an informed decision for consideration of candidate cultivars for registration

² Procedures for the Registration of Crop Varieties in Canada, Canadian Food Inspection Agency, Plant Production Division, Variety Registration Office, 8 July 2009, available on the CFIA website <http://www.inspection.gc.ca/plants/variety-registration-procedures/guidance-document/eng/1411564219182/1411564268800?chap=1#1c1>

The procedures and operation of registration trials for flax candidate cultivars are under the jurisdiction of the PRCO and are approved by the flax members of the PRCO. Where there is disagreement over testing protocols, admittance of a candidate to a registration trial, interpretation of data, or validity of data, the majority decision of the flax membership of the PRCO will be final.

There are different types of registration trials. Flax Co-operative trials are managed on behalf of the PRCO by Flax Test Co-ordinators and the co-operating group. Test Co-ordinators of co-operative trials are appointed by the co-operators in the trial, subject to approval by the PRCO flax membership. In addition to co-operative trials, there are Private Registration and Contract Registration trials. Upon agreement of the PRCO flax membership, new co-operative registration trials may be established. Operation and standards for new trials will be similar to existing co-operative registration trials.

Plants known to have novel traits must have been granted unconfined release status for such material by CFIA before acceptance into the Flax Co-operative Registration trial. Should it be determined that the candidate cultivar violated any protocols for isolation and containment, all resulting damages or liability will be borne by the breeder/sponsor and not the Trial Co-ordinators or Co-operators, providing that all approved Co-operative Registration Trial procedures were followed. In situations where there are concerns over material which may be considered as “Plants with Novel Traits” (PNT), the issue should be discussed with the PRCO flax membership prior to the testing of any such material in the unconfined field trials of the Co-operative Registration Trial. Where there is concern that the requirements for testing a particular candidate cultivar(s) would seriously jeopardize the normal operation of the Co-operative Registration Trial, the co-operating group may refuse entry of the candidate cultivar(s) into the Co-operative Registration Trial. In such a case, the PRCO flax membership may recommend the candidate cultivar enter into Private Registration Trials (Section 3.2.3) or Contract Registration Trials (Section 3.2.4). Candidates accepted for testing under Contract Registration Procedures will not normally be tested in Co-operative Registration Trials.

3.2.2 Co-operative Registration Trials

Traditionally, oilseed breeders, agronomists, pathologists and seed or end-use quality experts work together to evaluate candidate cultivars of flax. It is the collective responsibility of the participants in the Co-operative Registration Trials to ensure unbiased and accurate testing of the candidate cultivar(s).

Trial Co-ordinators are responsible for admission of new candidate cultivars, general co-ordination of the trial, compilation and analysis of the data, and preparation and distribution of the Co-operative Trial Reports. Co-operative Trial Reports are included in the PRCO minutes.

Co-operators are responsible for the management of the individual trial sites. All trials are managed and harvested according to the standard and sound agronomic and scientific practices as appropriate for each site. At the present time, no “special management” practices shall be performed for any candidate cultivar. If the need for special management of a cultivar candidate can be demonstrated by the breeder/sponsor, a new testing procedure may be developed. Co-operators should meet all reasonable requirements set by the Trial Co-ordinator with regard to quality, quantity and time for submission of seed, and provision of data for consideration of candidates.

a) Requirements for Entry into Flax Co-operative Trials

Merits of flax candidate(s) proposed for entry into the Co-operative Trial will be discussed by the members at the PRCO meeting and the appropriate Breeders/Test Co-ordinator. Following these discussions suitable candidate entries will be advanced in the upcoming Co-operative Trial.

Candidate cultivars entered and retained into the Flax Co-operative Trials must have sufficient merit to warrant registration testing and the consumption of limited research resources. An entry must meet the minimum criteria for agronomic, disease resistance and quality characteristics. This co-operating group and the Trial Co-ordinator have a collective responsibility to manage the Linseed Flax Co-operative trials to ensure unbiased and accurate testing of candidates.

Candidate cultivars considered for entry into the Coop should be assessed for merit as defined in Appendix-A in the Operating Procedures. Cultivars used as checks must include the designated check cultivars from the appropriate Co-operative Trial. Data is required for reaction to rust and fusarium wilt and the testing procedure outlined in *Appendix-D3* should be followed. Testing for rust and fusarium wilt can be arranged by contacting the flax pathologist at the Crop Development Centre, University of Saskatchewan; cost of such testing will follow cost recovery guidelines.

Additional data for all of the above parameters may be useful especially when it becomes necessary to eliminate entries due to lack of space in the Co-operative Trial. The maximum number of entries is limited to 36 for each Linseed Flax Co-operative Trial. In the event that requests for entry exceed that total, the members of the PRCO will determine which entries will be included. The decision will be based on the merits of the potential entries relative to the appropriate check as determined by the data submitted for the entries and on an equitable and fair allocation of entry number. Requests for entry with the necessary supporting data must be supplied to the respective Trial Co-ordinator at least one (1) week prior to the annual meeting of the PRCO.

The data collected will be submitted to, and vetted by, the Trial Co-ordinator and the Co-operators. Entries are admitted or retained based on the performance of the candidate cultivar(s) compared to the relevant check cultivars, the likelihood of their registration, consensus among the co-operators, and the decision of the Trial Co-ordinator.

If an entry that has been tested in the Co-operative Registration Trial, and has not been supported for registration, yet has been requested by the breeder/sponsor to be re-entered into a Registration Trial, permission by the PRCO is required.

Although currently Co-operative Registration Trials may be run without charge, Co-operators are reminded that testing candidate cultivars is expensive. The PRCO has the authority to institute a system of charges pending additional costs and benefits of operating the Co-operative Registration Trial. Such fees are subject to annual review. Institutions that do not make a substantial contribution towards the co-operative testing system may be charged a candidate entrance fee to help defray the costs of testing.

An offer of payment for testing does not assure entry or retention of a candidate into the Co-operative Registration Trial. A description of any such charges will be documented in the appendices as a requirement for entry. If an individual or company cannot get a candidate cultivar entered into the Co-operative Registration Trial, then the appeals mechanism provided by the PRCO Appeals Board will be used.

b). Security of Entries

Trial Co-ordinators and Co-operators will take reasonable precautions to ensure the security of entries and will not distribute seed for purposes other than registration testing without the written consent of the owner.

Breeding lines and non-released cultivars received from private or public sector plant breeders will be released only under conditions specified by the Breeder or Canadian Breeder Agent. The professional code of ethics as developed by the Cultivar Registration Committee will be strictly followed by all individuals involved in the Co-operative testing and the cultivar registration process.

c). Locations

Locations for Registration Trials are chosen to represent areas of adaptation for commercial production of flax in targeted agro-ecological zones throughout Western Canada. Refer to *Appendix D1* for locations.

d). Trial Period

All candidates must be evaluated in the Co-operative Trial for two (2) years prior to consideration by the PRCO for support for registration. A minimum of ten (10) station-years of data over a two year period is required for support for variety registration.

e). Trial Co-ordinator

The Co-ordinator of the Linseed Flax Co-operative Trial prepares lists of checks and candidate cultivars, experimental protocols and variables to be assessed (agronomic, quality and diseases) and verifies with owners of candidates. The Trial Co-ordinator organizes disease testing with the flax Plant Pathologist at the Crop Development Centre at the University of Saskatchewan, prepares randomized designs, field books, packages seed for both agronomic testing and disease evaluation, distribution of packaged seed, harvest labels, electronic files, multiplication of seed of checks and candidates, receiving, cleaning, processing grain samples, measuring seed size, preparing subsamples and composites for oil content, fatty acid composition, and protein content, conducts quality evaluation, entering, analyzing, summarizing data on agronomic traits, writing and distributing the Co-operative Trial reports. A Co-ordinator is named for the Linseed Co-operative Trial.

f).Co-operator The Co-operative trials are conducted at up to twenty (20) locations (*Appendix D1*) throughout the major growing areas of the Prairies. Individual trial management is the responsibility of the Co-operators and all trials are managed and harvested according to the standard and sound agronomic and scientific practices as appropriate for each site. At the present time, no “special management” practices can be performed for any candidate cultivar. If the need for special management of a cultivar candidate can be demonstrated by the sponsor, a new testing procedure may be developed.

g). Data Collected

Seed yields are obtained at all sites. There will be a minimum of three (3) replications per entry. Other information is collected where appropriate and feasible, including days to maturity, lodging resistance, and plant height. Seed from each plot will be sent to the Trial Co-ordinator for determination of 1000 seed weight, seed colour, oil, fatty acid, iodine number and protein content. The quality determinations are carried out by the Trial Co-ordinator using the methodology outlined in *Appendix D2*. Reaction to rust and fusarium wilt are determined by the Flax Pathologist at the Crop Development Centre at the University of Saskatchewan following procedures outlined in *Appendix D3*. Data from each Co-operator must be sent to the Co-ordinator by October 15th, in electronic form. All seed samples must be sent to the appropriate Co-operative Trial Co-ordinator by October 30th. Data/seed sent after these deadlines may not be included in the Co-operative Trial Report.

h). Experimental Design

Registration Trials shall be no larger than 36 entries, including relevant check cultivar(s) with a minimum of three (3) complete replicates. Use of recognized experimental designs that permit localized error control through the use of sub-blocks is encouraged.

A lattice design will be used, but a randomized complete block design may be employed if the number of entries does not allow for a lattice design. All yield and disease trials contain a minimum of three replications. Yield trials vary from 3-8 rows, 3-10 m in length, with varying row spacing up to 30 cm. The entire plot or only the center rows may be harvested; other modifications may be made as necessary at each location. The seeding rate used for brown and yellow linseed flax entries is equivalent to 40 lbs. per acre adjusted for germination. The appropriate Trial Co-ordinator is responsible for seed set-up, randomization and supplying electronic field books to Co-operators.

i). Check Cultivars

Check cultivars are included for agronomic, quality or disease resistance purposes and normally include the best available registered cultivars for the main flax growing regions of Western Canada. Check cultivars of flax are widely grown, established cultivars, special purpose cultivars or recent cultivars of superior merit. A superior cultivar with an offsetting weakness in a particular trait (e.g., a high yielding cultivar with unusual susceptibility to fusarium wilt) may be included as a check cultivar without diminishing the selection standard for the trait in which it is deficient. Such cultivars will be specifically excluded as a check cultivar for the traits in which they are deficient at the time of their elevation to check status and all such exceptions are to be noted in the list of check cultivars.

Changes in check cultivars are determined and approved annually by the members of the PRCOflex membership and are listed in the PRCO minutes. Data collected for a check cultivar(s) prior to registration are considered to be check data.

Candidate cultivars will not be compared to other lines in the test for registration recommending purposes. The candidate cultivar will be compared specifically to the relevant check cultivar(s) of their type at the time of consideration.

N.B. During the years in the trial, an entry should be compared to the same check cultivar(s). That is, an entry in year 2 of the trial should be evaluated against the same check cultivar(s) against which it was evaluated in year 1. Refer specifically to *Appendix D1*, for current check cultivars.

j) Seed Purity of Candidate and Check Cultivars

Seed stocks for candidate and check cultivars used in the Registration Trials must be of reasonable purity. As a guideline, the standards for germination should be similar to that required for Certified Seed, as defined by the Canadian Seed Growers' Association (CSGA). Candidate cultivars may have morphological off-types, but these should not exceed 5%. Acceptable off-types are plants that exhibit phenotypes or genotypes that can be readily removed during the process of breeder seed development.

k). Seed Requirement

Approximately six kilograms of untreated seed is required for first year entry into the trial. No treated seed will be accepted in the Linseed Flax Co-operative Trials. Seed for the second year of testing is produced annually in a common increase by the Trial Co-ordinator. The appropriate Trial Co-ordinator will annually multiply seed for the second year of the Linseed Flax Co-operative Trial. All seed entered in all trials, both first and second year entries, will be tested prior to seed setup for presence/absence of CDC Triffid by the sponsor. If an entry is shown to be contaminated (positive/present) to any level for the presence of CDC Triffid, the sponsor will be asked to replace the source of seed with a clean source of seed of the entry or provide an alternative entry which has shown to be uncontaminated. Additionally, a sponsor of an entry is advised to have on hand six (6) kg seed supply in case the Co-operative Trial increase is lost.

l) Trial Inspection

It is the intent of the Co-operative Trial Co-ordinator (or her/his designate), and/or other members of the PRCO to inspect trials on an annual basis. Further, inspection of a Co-operative Registration Trial by a plant breeder or Agronomist is permissible if there is no association with the trial. Access to Co-operative Registration Trials will be granted to the Trial Co-ordinator (or her/his designate), Trial Co-operators and other parties with a *bona fide* interest in the trial. Co-operators should be contacted in advance to provide entrance to the trial site, treatment lists, randomizations and other pertinent information.

Trial sites will be considered valid when a minimum of three (3) complete replicates have been approved. If a check cultivar has only two (2) acceptable replicates in a trial, the data for that trial will be considered non-valid. Exceptions to this principle are made in the case of recognized weakness in a specific check cultivar (e.g., disease susceptibility). In addition, a trial is considered non-valid if visual inspection reveals unacceptable planting, emergence, soil gradient, pest and/or environmental problems.

Inspectors should discuss concerns for the site with the individual responsible and, if possible, agree on corrective action. A brief, critical evaluation of the site should be written, identifying the areas that required attention and the solutions discussed. These reports shall be forwarded to the Trial Co-ordinator of the Co-operative Registration Trial or the Chair for Contract and Private Registration Trials, for action, follow-up, and additional inspection if necessary. If issues are not resolved by the PRCO Chair, the concerns will be forwarded to the PRCO Executive.

m) Reporting of data

Data for each agronomic trait must be summarized on a site basis, with standard errors or least significant differences (LSDs) reported for each trait. Trial Co-ordinators must use discretion in judging acceptability of data for each trial site. A trial is considered valid if the overall coefficient of variation for yield is 15% or less; for C.V.'s over 15%, all agronomic and quality data will be eliminated for that location and year. Only in exceptional circumstances would this 15% guideline be waived.

n). Continuation of Testing

Retention of entries for further testing is subject to approval by the PRCO, especially in situations where space in the trial is limited. Judgement of merit of the entries for retention will be based on the data collected during the previous year(s) of the Linseed Flax Co-operative Registration Trials.

o). Fees

The Flax Workers Group reserves the right to charge fees for the entry of candidate cultivars, in order to cover the cost of trial management and quality analysis and disease evaluation. Such fees will be negotiated with the sponsor when necessary.

p). Disposition and Retention of Entries

The breeder/sponsor of a candidate cultivar may withdraw it at any time.

Candidate cultivars or registered cultivars are retained in the Co-operative Registration Trial based on the request of the breeder/sponsor, the approval of the Co-operators and the PRCO flax membership. Retention of candidate cultivars for a second or third year of testing should focus on performance in the Co-operative Registration Trial. Retention of an entry in the registration testing system, beyond one (1) year of the completion of its trial requirements, is at the discretion of the Flax Test Co-ordinator and is dependent on interest and availability of resources.

Exceptions to this are the testing of registered varieties which are grown throughout the targeted agro-ecological zones. Data generated by the Co-operative Registration Trial on these registered varieties may be used as performance information for provincial publications which are available to producers. In this case and dependent on size of the trials and the resources available, the decision of the Trial Co-ordinator will determine the retention of the registered varieties in the Co-operative Registration Trials.

q). Reporting of data from the Co-operative Registration Trials

The Co-operative Trial Reports (agronomic, quality and disease evaluations) should be circulated by the Trial Co-ordinator at least seven (7) days prior to the annual meeting of the PRCO.

3.2.3 Private Registration Trials

Private Registration Trials may be conducted outside of the Co-operative Testing system and must emulate the professional standards set by the comparable Co-operative Registration Trials. The company or institution conducting Private Registration Trials must obtain approval of testing protocols from the PRCO members prior to evaluation of the candidate cultivar(s), rather than at the time when support for registration is being sought. Without prior approval of the testing protocols by the PRCO members, the PRCO will not recognize the proposed Private Registration Trials.

The following rules apply to the establishment and conduct of Private Registration Trials for candidate cultivars of flax.

N.B. With respect to disease resistance and end-use quality testing, it is very important to consult with the pertinent Flax Pathologist or end-use specialist (as designated by the Chair) to determine the specific testing requirements and/or methodology prior to seeking approval of the proposed testing protocols.

a) Request for Private Registration Trials

The proposal for Private Registration Trials will be submitted to the PRCO no later than February 1 in the year of first planting to allow discussion prior to the annual meeting of the PRCO, where approval of the Trials will be requested.

The requirements indicated in Section 3.2.1 (General Guidelines) apply for Private Registration Trials with regards to the following categories: Locations, Security of Entries, Experimental Design, Check Cultivars, Seed Purity, and Inspection. In addition, the requirements for agronomy, disease and quality assessment using methodology approved for the respective Co-operative Registration Trial are required for the Private Registration Trial.

b). Request for Foreign Data

Foreign field trials and data will be considered by the Committee.

c) Time of Testing

Testing of a candidate cultivar in a Private Registration Trial shall encompass two (2) consecutive years. The minimum number of station-years for eligibility for support of variety registration is ten (10), which is the same required for candidate cultivars in the Co-operative Registration Trials for flax.

d) Reporting of Data

Annual reports of the Private Registration Trial will be distributed to the PRCO membership at least seven (7) days prior to the annual meeting of the PRCO. The PRCO membership will conduct an annual vote to accept the report data as valid, and will provide guidance to improve the trials and/or report, if necessary. Annual or revised reports of the Private Registration Trial will be made available to the Chair and Secretary for inclusion in the PRCO Minutes.

The report must be prepared in a manner similar to that used for the Co-operative Registration Trial. In addition, a brief explanation of the testing protocol for each trait measured is required to assist the PRCO membership in determining the validity of the data.

The Request for Support of Registration document for candidate cultivars which were tested in the Private Registration Trials must meet the same requirements as that of candidate cultivars tested in the Co-operative Registration Trials (Section 4).

3.2.4 Contract Registration Trials

a) Requirements for Contract Registration

Before a candidate cultivar will be considered for testing under Contract Registration procedures, the breeder/sponsor (or designate) must provide the rationale for Contract Registration. Upon informing the PRCO that a breeder/sponsor wants to test a candidate cultivar, a Contract Registration Committee will be appointed by the Chair of the PRCO. A written document addressing the following points must be received by the Contract Registration Committee at least seven (7) days prior to the annual meeting of the PRCO:

1. The candidate cultivar is considered for Contract Registration where the biochemical or biophysical characteristics of such a candidate would distinguish it from the majority of registered varieties of the same kind or species and it may have an adverse effect on the identity of those registered varieties;
2. Delivery of the resulting commodity into traditional commodity channels would cause harm to those channels. The candidate cultivar must demonstrate the possibility of harm if granted an unrestricted registration in order to qualify for this type of registration;
3. An end-user/purchaser exists for the specialty product. This is indicated by a letter of support and commitment for the candidate cultivar by the end-user/purchaser; and
4. A closed loop system for the isolation, production, transport and/or processing of the candidate cultivar must be in a Quality Control System that is reviewed and acceptable by the VRO. The closed loop system is necessary to provide assurance that “off-grade” production shall not enter the normal marketing system for the commodity crop.

Breeders/sponsors of candidate cultivars being tested under Contract Registration procedures are encouraged to contact the VRO for details on the required Quality Assurance Manual, which must be complete before registration is granted. See Appendix VIII of the Procedures for the Registration of Crop Varieties in Canada (www.inspection.gc.ca) for further information.

Upon the endorsement that testing of the cultivar under Contract Registration procedures is appropriate, the VRO will be informed of the recommendation and any additional data requirements prescribed by the Contract Registration Committee.

Contract registration is not to be used as a substitute for traditional forms of registration (full or interim) or in situations where the PRCO has objected to the registration of the candidate cultivar based on deficiency in merit. However, the PRCO may recommend that the candidate be considered for Contract Registration if the required conditions for Contract Registration can be met. In this case, an extraordinary meeting of the Contract Registration Committee may be required.

b) Contract Registration Committee

A Contract Registration Committee will exist under the auspices of the PRCO and will normally consist of five (5) members:

1. One (1) plant breeder recognized by the Canadian Seed Growers Association (CSGA) who is a member of the PRCO;
2. One (1) pathologist member of the PRCO;
3. One (1) seed quality expert who is a member of the PRCO;

4. One (1) provincial oilseed specialist; and
5. One (1) representative from a producer organization of the candidate cultivar crop species, where the producer organization is a member of the PRCO.

The Chair of the Contract Registration Committee will be chosen from among these five (5) individuals. In cases where confidentiality of data is important, and there is a conflict of interest, the owner of the proposed candidate may request an alternate member to be appointed by the remaining members of the Contract Registration Committee, provided that member meets the requirements for membership on the Committee. Members of the Contract Registration Committee will act to protect the confidentiality of data where required.

c) Contract Registration Request and Recommendation

The breeder/sponsor (or designate) of a candidate cultivar will provide the Contract Registration Committee with written notification of his/her intent to approach the PRCO or the Contract Registration Committee at least seven (7) days in advance of the annual meeting. Appropriate documentation, letters of intent and/or data summaries must be included with the notice. The breeder/sponsor of the candidate cultivar will be informed of the date and time of the Contract Registration Committee meeting and is allowed to address the committee. Following the meeting, the Contract Registration Committee will have up to ten (10) days to rule on the suitability of the candidate for testing under Contract Registration procedures, prescribe additional data requirements over the minimum specifications, or make a recommendation on the request for Contract Registration. The Contract Registration Committee may seek external advice, recognizing that confidentiality may be of extreme importance. A simple majority vote will constitute the decision of the Contract Registration Committee. Votes will be cast in two categories: "Support" or "Object".

d) Appeal of Decision of Contract Registration Recommendation

The breeder/sponsor of the candidate cultivar may contest a Contract Registration Committee decision. The basis of appeal of a PRCO Contract Registration Committee recommendation of a candidate cultivar is based on a recommendation where:

1. The Contract Registration Committee has determined that the candidate cultivar is ineligible for testing under Contract Registration procedures; and/or
2. The Contract Registration Committee has objected to the Contract Registration of the candidate cultivar.

Appeals will be conducted as outlined in the PRCO Operating Procedures for the Appeals Board. Costs incurred in convening any extraordinary meeting of the Executive shall be borne by the Appellant.

e) Conduct of Contract Registration Trials and Minimum Data Requirement

It is a condition that, upon acceptance of a candidate for testing under Contract Registration procedures, the breeder/sponsor agrees that the testing and evaluation protocols defined by the Contract Registration Committee are appropriate and that these protocols, however defined, will not justify an appeal. The following are minimum data requirements for Contract Registration of a candidate cultivar; however, the Contract Registration Committee may set additional requirements within ten (10) days following the meeting, to determine the suitability of the candidate for Contract Registration procedures.

A minimum of two (2) years of testing is required. Testing must be conducted in the region where production is intended to take place. The geographic region(s) may vary in area from all of Western Canada to a smaller region within a province. Testing will provide comparisons with

the relevant check cultivar(s) for the crop kind, as currently used in regular registration (Co-operative) testing, or as determined by the Contract Registration Committee. Agronomic performance and disease reaction data will not be considered confidential.

Agronomic data must be collected but will be used for descriptive purposes only. No minimum levels of performance are required for agronomic traits. A minimum of eight (8) station-years of agronomic data are required, with a minimum of three (3) station-years in each of two (2) calendar years. A minimum of three (3) of the eight (8) station-years of data shall be collected by an individual or organization that is independent from the breeder/sponsor, with a minimum of one (1) station-year in each of the calendar years tested. The independent test organization must be disclosed to the Contract Registration Committee prior to conducting trials for approval. An independent third party PRCO member will be identified by the Contract Registration Committee to inspect all field trials.

Disease evaluation will take place in each of two (2) years of testing and shall be conducted under the auspices of the Flax Pathologist at the University of Saskatchewan. Candidates must meet minimum disease resistance requirements in place for traditional cultivars (full registration), unless the owner of the candidate can demonstrate that susceptibility to a particular disease will not endanger production of traditional cultivars in, or adjacent to, the geographic region(s) identified for contract production.

Seed quality data will be deemed confidential. The trait deemed to cause potential harm will be evaluated in each year of testing, and compared to the relevant check cultivar(s) for the crop kind. This data will be evaluated by the Contract Registration Committee in consultation with appropriate grain quality experts if deemed appropriate or necessary. The Contract Registration Committee will respect the confidential nature of the data in soliciting expert advice. The purpose of this evaluation is to confirm that the candidate has the quality claimed by the breeder/sponsor and that such quality requires production within a closed, contract system.

All costs for data collection for Contract Registration shall be borne by the breeder/sponsor of the candidate cultivar.

Recommendations in support of Contract Registration will be made by the Contract Registration Committee and forwarded to the VRO. The VRO will examine the request and rule on the applicability of the candidate for Contract Registration.

3.3 Registration Recommendation

The PRCO flax membership will only consider a Request for Support of Registration for a candidate cultivar that has shown satisfactory performance compared to the relevant check cultivar(s) in the required amount of testing for condiment mustard and flax as prescribed in the their respective operating procedures. Exceptions to this are extraordinary circumstances where there is strong evidence of urgent, great benefit to the industry should the candidate cultivar be considered for support of some form of registration.

Interim Registration may be requested for a candidate cultivar prior to its completing the requirements for evaluation in the Co-operative Registration Trials. This request would require suspension (set aside) of PRCO procedures. This would be considered an extraordinary occurrence and the vote must pass with a 50% plus one person majority of the flax membership.

Varieties which have the potential to cause harm and for which further registration is required, may be granted Contract Registration. Contract Registration may be granted interim or permanent registration (*i.e.*, with no restriction on duration of registration) for varieties for which merit has been established.

Varieties which have the potential to cause harm and for which further registration is required, may be granted Interim Contract Registration. Interim Contract Registration may be

requested for initial periods of one (1) to three (3) years, and may be renewed for further terms to a maximum of five (5) years in total.

Renewal of Interim Contract Registration requires the recommendation of the appropriate Contract Registration Committee, approval by the VRO and a review of the Quality Management System with the appropriate audits to determine if conditions have changed significantly from the time of initial recommendation.

Recommendations to support the registration of a candidate cultivar are in effect for two (2) years from the date of the conclusion of the annual meeting of the PRCO where the recommendation was made. A recommendation for support of registration by the PRCO of a candidate cultivar does not represent a recommendation by the PRCO endorsing commercial production of the candidate cultivar. The recommendation on registration made by the PRCO is ratified by the VRO.

The breeder/sponsor must submit the request to the VRO to register a candidate cultivar within the two (2) year period. After this period, a breeder/sponsor wishing to register a candidate cultivar will require the PRCO to review the original request document and re-vote on the recommendation to support registration.

Based on the decision of the PRCO or its relevant committee, the PRCO Secretary will inform the VRO in writing of the recommendation of the PRCO regarding the candidate cultivar. Copies of this communication will be provided to the breeder/sponsor, the PRCO Chair and to the VRO.

The breeder/sponsor submits the Registration Application Form available from the VRO, or from the CFIA web site (www.inspection.gc.ca). The application, along with other required supporting documentation, reference samples and the prescribed fee, must be sent to:

Variety Registration Office
Plant Production Division
Canadian Food Inspection Agency
59 Camelot Drive
Ottawa, Ontario K1A 0Y9
Telephone: (613) 773-7148
Facsimile: (613) 773-7261
Email: vro-bev@inspection.gc.ca

Further information on Contract Registration is available on the CFIA website:
www.inspection.gc.ca

4. THE REQUEST DOCUMENT

4.1 Submission of Data for Support of Registration

a). Year and Checks

The data submitted for consideration for support for registration must include all the valid data from all the years in which the entry was included in the Flax Co-operative Trial. Candidate cultivars should be compared to the appropriate check variety within the Co-operative Trial entered. If possible, the check cultivar should have the same commercial application. During the years in the trial, an entry should be compared to the same check cultivar(s). That is, an entry in year 2 of the trial should be evaluated against the same check cultivar(s) against which it was evaluated in year 1.

b). Relevant Data

All relevant data, including screening and laboratory data judged to be acceptable and useful by the PRCO may be used in support of registration in addition to official trial data. Any replicated, pre-Co-operative field data can be attached with the Co-operative data when soliciting support for variety registration. This pre-Co-operative data will be collected and reported in the same manner as the Flax Co-operative Trial report (*i.e.*, yield, maturity, height, etc.) and entries will be compared with the same check(s) as the Co-operative Trial. Agronomic data from trials outside the Canadian flax growing areas outside of Canada will be reviewed for acceptability. When appropriate, market acceptability or pilot scale trial data are considered in support of registration; this may include letters of support from growers associations, provincial special crops or oilseeds committees, seed growers associations, contractors and buyers.

c). Performance

To obtain support for registration, the minimum standard is overall performance of equal or better than the check cultivars with which the candidate has been compared during the two (2) years of Co-operative testing (see *Appendix D4* for minimum standards). It is recognized that certain criteria are mandatory for certain regions or market classes and that minor deficiencies in certain parameters may be outweighed by advantages in others.

The principle of merit, (as defined in *Appendix A*), is used by the members of the PRCO in their decision regarding the support of a candidate for registration. The candidate cultivar must demonstrate merit when compared to the check and other registered cultivars for all required traits. A candidate cultivar is considered superior if it is significantly higher yielding than the designated check cultivar for the Co-operative Trial (minimum standard). In addition, the candidate cultivar must be immune to rust and meet the minimum standards for days to maturity, lodging resistance, protein content, oil content, oil quality, thousand seed weight and resistance to fusarium wilt as indicated by the designated check cultivars (see *Appendix D4*). The candidate cultivar can be equal to the appropriate designated check cultivar in yield if the candidate is superior in oil content, oil quality, has earlier maturity or improved resistance to wilt and rust (new resistance gene or multigenic resistance), or other desirable attributes.

A candidate has merit when, considering all traits including agronomic performance, disease resistance and end-use suitability, it has the potential to provide an advantage to the producer or consumer in terms of production or marketing. The sponsor must demonstrate that the candidate cultivar has the desired end-use characteristics for its intended market class.

Producer expectations for new varieties are for agronomic performance improvements and/or improvements for end-users compared to existing varieties. New varieties that perform similar to existing varieties are not desired by producers or the seed industry.

A candidate cultivar may be supported for registration based on performance advantage in a particular area of Canada and need not excel across the whole region. For example, if a candidate cultivar performs well in the Peace River region, it should be considered for registration for that region. However, the decision to support a candidate cultivar for registration on a regional basis rests with the PRCO, and it is necessary for the sponsor to convince the members of this "special" adaptation and that sufficient data exists over enough station-years to support the case.

Producers would value ratings for issues like consistent and predictable maturity, and consistency of yield. As such, there should be consideration of compulsory ratings (not merit assessment) included in the Flax Co-op Reports for these traits. Examples of statistics that could compare Co-op entries for consistency of maturity and yield include Rank Differences S1 and variances S2 (Nassar and Huehn 1987), Eberhart/Russell (1966) Stability Regression Models and Cultivar Superiority (Performance) Measure (Lin and Binns 1988). The Trial

Coordinator(s) will select the appropriate statistic(s) to include in the Co-operative Report with regards to stability ratings for either maturity or yield.

Compulsory ratings (not merit assessment) for iron chlorosis where present would also be invaluable for producers in the Eastern Prairies. There is data collection and publication in the Flax Coop Report for pasmo (not merit assessment) and powdery mildew, when observed (merit assessment since 2017). Additional traits that are expressed under specific environments (for example soil conditions impact expression of iron chlorosis) in flax may be scored for when present by collaborators.

The Request for Support of Registration document will be concise and error free. Legible copies of the request document must be received by the voting membership of the PRCO, members of the Executive Committee of the PRCO and the Variety Registration Office, Plant Health and Production Division, Canadian Food Inspection Agency, 59 Camelot Drive, Ottawa, Ontario, K1A 0Y9, no later than the Monday, seven (7) working days prior to the start of the annual meeting of the PRCO to be considered for support for registration.

The Request for Support of Registration document may be distributed by electronic mail unless the member does not have access to an electronic mail method of communication, in which case, a paper copy will be sent by postal mail. If electronic mail distribution is used, then an acknowledgement of receipt of the correspondence should be requested when the mail is sent. The PRCO may refuse to consider a request on the grounds of late circulation, illegibility or inaccuracy.

4.2 Description of the Candidate

The Request for Support of Registration document will contain the following information describing the candidate cultivar. Where this information is omitted, justification may be required.

- The testing identification under which the candidate cultivar was tested;
- The species name and type of the candidate cultivar;
- The breeder/sponsor and/or proposer of the candidate cultivar;
- The registration category being sought (interim or full);
- A brief description of the phenotype;
- Details of parentage, derivation and selection history must be included with the phenotypic description, but exceptions may be made if they disclose information of significant technological or commercial value;
- The testing history;
- All strengths and weaknesses of the candidate cultivar;
- The expected area of adaptation;
- The expected end-use; and
- The rationale for registration.

4.3 Data Summaries

The data summaries must use all the data generated by the Registration Trials in which the candidate cultivar was evaluated, where the data was valid, accepted by the PRCO and reported in the Co-operative Registration Trial Report. The Request for Support of Registration document will contain the following summary of data supporting the request of registration:

- The individual testing years and an overall summary of agronomic performance;
- The individual testing years and an overall summary of quality characteristics; and
- The individual testing years and an overall summary of disease reactions.

A summary of end-use quality may also be included; however, the PRCO will only consider that information as supplemental information which should not influence the decision for registration.

Performance of other candidates unregistered at the time of application is not relevant, nor is the performance of previously registered cultivars not designated as check cultivars.

The manner in which data was summarized will be in accordance with accepted scientific practice, and will not conceal any weakness of the candidate. Registration Trial data may be reanalyzed, and other supporting data may be introduced in support of specific or unusual claims of performance, but this will not replace the summary that was accepted by the PRCO in the Co-operative Registration Trial Reports. The PRCO may assume that a candidate is deficient in an important trait if it is excluded from the summary.

4.4 Submission for Registration

Once a candidate cultivar has been supported for registration, both the sponsor and the PRCO Secretary submit the data summaries, along with the copies of letters of support from the PRCO, to the Variety Registration Office, Plant Production Division, Canadian Food Inspection Agency, 59 Camelot Drive, Ottawa, Ontario, K1A 0Y5.

4.5 Errors in the Request for Support of Registration Document

If the Request for Support of Registration document or the Co-operative Registration Trial Reports have missing or erroneous data, or omission of pertinent data is used as a basis of decision, the breeder/sponsor may call for a re-vote on the revised data package. This request must be submitted in writing, to the PRCO Chair, accompanied by an explanation and a new Request for Support of Registration document. The PRCO will determine if there was omission or erroneous data and if this information could have changed the original decision. If there is majority agreement among the PRCO Executive, the PRCO Chair will then inform the membership and a re-vote will be conducted. If the annual meeting of the PRCO has concluded, then the re-vote will be carried out using regular mail, facsimile or electronic mail. The PRCO Secretary will distribute the information, collect the voting records, and report to the PRCO Chair who will inform the breeder/sponsor. All documentation for this process will be provided to the VRO along with the results of the re-vote.

4.6 Definition of Merit

To receive support for registration, a candidate cultivar must show merit. A candidate cultivar that shows merit is “equal to”, or “superior to” relevant check cultivar(s). The phrase “equal to” is defined as statistically no different to the check mean or mean of the checks by a one-tailed test at the 95% confidence level using the pooled error mean square as the error term. The phrase “superior to” is defined as statistical superiority to the check mean or mean of the checks by a one-tailed test at the 95% confidence level using the pooled error mean square as the error term.

4.7 Supplementary Data

Data collected external to the Registration Trials may be included in the Request for Support of Registration document to improve the case for registration or substantiate claims of specific or unusual performance. Data generated outside the prairie region of Canada or other relevant source will be considered a supplement to the registration trial data, not a substitute for it. Registration Trial data and supplementary data must be presented in separate tables and labeled appropriately. A motion to accept the supplementary data as part of the Request for Support of Registration must be passed by a 50% plus one person majority of the flax membership.

5. POLICY ON RELEASE OF INFORMATION

5.1 PRCO Operating Procedures

Operating Procedures used by the PRCO will be available from the Secretary of the PRCO on request directed from the PRCO Chair. This document is available in the Oilseeds Section of the PGDC website.

5.2 PRCO Co-operative Test Reports

Reports of the PRCO will be available to all registrants of the meeting, usually for a fee. A disclaimer indicating the restricted distribution of the report and limitations of the data will be included on each document. These documents are available in the password protected section of the website a week prior to the annual meeting and are often circulated to the membership via email.

Developers, owners and marketing institutions may only use the data generated on their lines and relevant check cultivar(s). Comparisons may only be made with check cultivars in the trials in which the candidate was evaluated.

Data must be used in entirety (*i.e.*, all valid trial sites).

Data for candidates supported for registration may be used in “provincial government variety guides” without request for permission.

The PRCO Co-operative Test Reports will be placed on the password-protected PRCO section of the PGDC website following the annual meeting of the PRCO.

5.3 PRCO Minutes

The PRCO Minutes will be placed on the password-protected PRCO section of the PGDC website following the annual meeting of the PRCO. Included in the Minutes will be the Minutes of the meetings held by the any of the ad hoc committees and the Minutes of the annual meeting of the PRCO (including PRCO voting results for each candidate cultivar).

Disclaimer to be published with the PRCO Minutes:

“The data contained in this document is the copyright property of the Prairie Recommending Committee for Oilseeds (PRCO). The information contained herein may not be reproduced, published or disseminated in any form other than in its entirety, without the express written consent of the PRCO Chair. The data contained in this document are collected from several sources. The PRCO does not guarantee the veracity of subsets of these data. The members/experts of the PRCO evaluate the merit of genotypes/candidate cultivars using a pool of performance parameters collected over several years and multiple locations.

Any subset of these data cannot be considered a reliable indication of overall merit. Requests for permission to use portions of this document must be forwarded, in writing, to the PRCO Chair.”

Guidelines to the PRCO Chair in granting permission to use portions of the PRCO data:

- a) Permission to use data subsets will be refused in situations where, in the considered opinion of the Chair, the data will be presented in a misleading manner.
- b) The data for the checks is considered public domain and a request for use will be approved unless it conflicts with point (a).
- c) The use of data specific to entries may be approved with the express written consent of the relevant breeder/sponsor.
- d) The Chair, in granting permission to use the data, will consider and respect information that is proprietary.

6. CONFLICT OF INTEREST

One of the mandates of the PRCO is the responsibility to advise on the performance of lines in test and make recommendations to the VRO. While members are expected to vote impartially, abstaining from a vote is appropriate when sound ethical judgment indicates a “Conflict of Interest”.

According to Dr. Michael McDonald, Director of the Centre for Applied Ethics at the University of British Columbia, “a Conflict of Interest arises when an individual acting in an official capacity (public official, employee, professional, etc.) has private or personal interests sufficient to appear to influence the objective exercise of their duties. Conflicts of Interest interfere with professional responsibilities by clouding objective, professional judgment.

The key elements in defining a Conflict of Interest are:

1. Private or personal interest: The pursuit of private or personal interests does not create a conflict of interest unless it occurs during the exercise of official capacity.
2. Exercise of official capacity: Duties and obligations that are part of an office or official capacity must prevail over private or personal interests.
3. Responsibility to use objective professional judgment: Professionals are expected to provide sound, objective and independent advice. Factors that interfere (or appear likely to interfere) with professional objectivity are a matter of legitimate concern to those who rely on this advice.

In addition to actual conflicts of interest, apparent and potential conflicts should be avoided. An Apparent Conflict of Interest is a situation in which a reasonable person would believe that the professional's judgment is likely to be compromised. A Potential Conflict of Interest is a situation that could develop into an actual conflict of interest.

The key in discovering a personal conflict of interest is to determine if the situation is likely to interfere, or appears to interfere, with the independent judgment expected in performing one's official duties. Trust is the core issue. Conflicts of Interest involve an abuse (actual or potential) of the trust that people have in professionals. In addition to direct damage to particular clients and employers, Conflicts of Interest injure the entire profession by reducing the confidence that people have in professionals.”

When a personal Conflict of Interest is recognized, the ethical responses are:

1. Reveal your private interest to the relevant parties.
2. Remove yourself from the decision making process or advice-giving role.

APPENDIX A - DEFINITIONS

Acronyms:

CFIA	Canadian Food Inspection Agency
CSGA	Canadian Seed Growers Association
PGDC	Prairie Grain Development Committee
PRCO	Prairie Recommending Committee for Oilseeds
VRO	Variety Registration Office of the CFIA

Candidate cultivars: Candidate cultivars are lines which are being evaluated according to the rules specified by the Operating Procedures of the PRCO and for which Request for Support of Registration documents may be submitted to the VRO following recommendation for registration at the annual meeting of the PRCO or by the Contract Registration Committee of the PRCO.

Check cultivars: Check cultivars (or checks) are widely grown, established cultivars, special purpose cultivars or recent cultivars of superior merit of flax against which the performance of candidate cultivars is assessed. A superior cultivar with an offsetting weakness in a particular trait may be included as a check without diminishing the selection standard for the trait in which it is deficient. Such cultivars will be specifically excluded as a check for the traits in which they are deficient.

Co-operators: Co-operators are scientists or field trial managers responsible for conducting the various tests, or breeders/sponsors submitting candidate cultivars to the Co-operative Registration Trial.

Co-ordinators: Co-ordinators are appointed by the Co-operators in the trial, subject to approval by the PRCO. Test Co-ordinators are responsible, in consultation with the Co-operators, for deciding on admission of new candidates, general co-ordination of the trial, compilation and analysis of the data, and preparation and distribution of the Co-operative Trial Report.

Co-operative Trials: Co-operative Trials are replicated yield trials grown at testing sites representing areas of adaptation for commercial production of flax in targeted agro-ecological zones throughout Western Canada. Co-operative Trials are conducted by groups of collaborating public institutions and/or by private companies or organizations.

Co-operative Trial: A co-operative Trial is the collective of the Co-operative Trials for flax, and the data generated from the entries grown at these individual testing sites.

Extraordinary Vote: An extraordinary vote may be held as a result of extenuating circumstance at a time other than the annual meeting of the PRCO membership. In this case, the vote will be conducted using regular mail, facsimile or electronic mail.

Flax Workers Group: Made up of voting members of PRCO who are actively involved in the production, development and/or evaluation of potential flax cultivars for Western Canada.

PRCO Members: Membership in the PRCO consists of individuals actively engaged in the research and development, production, marketing, commercialization and processing of commodities or end-use products of flax or condiment mustard grown in Canada. Only flax
PRCO Operating Procedures, Revised July 2025

membership on PRCO shall vote on flax operating procedures or support for registration regarding flax candidate cultivars.

In the case of seed trade and producer organizations (associations or commissions), the member must be elected by a democratic process within their organization, and as such, are accountable to the organization for their actions. Only one individual will act as member on behalf of the organization they are representing.

Organizations or private companies may be Canadian or foreign-owned, provided that they are directly involved in the processing and/or development and marketing of the Canadian flax crops, the commodities produced from or the end-use products derived from these crops.

Proponent/Applicant: Breeders, developers and importers of new plant lines and varieties.

Merit: Merit is the worth or excellence of a candidate cultivar in comparison to the check cultivar with regards to traits that will make the cultivar beneficial for a particular use in a specific production area of Canada. A candidate cultivar that shows merit is “equal to” or “superior to” relevant check cultivar(s). The phrase “equal to” is defined as not significantly different to the check mean or mean of the checks by a one-tailed test at the 95% confidence level using the pooled error mean square as the error term. The phrase “superior to” is defined as statistical superiority to the check mean or mean of the checks by a one-tailed test at the 95% confidence level using the pooled error mean square as the error term.

Plants with Novel Traits (PNTs): A PNT is defined as a plant that contains a trait which is both new to the Canadian environment and has the potential to affect the specific use and safety of the plant with respect to the environment and human health. These traits can be introduced using biotechnology, mutagenesis, or conventional breeding techniques and have some potential to impact weediness, gene flow, plant pest potential, non-target organisms, or biodiversity.(refer to CFIA- Plant Biosafety Office- www.inspection.gc.ca)

Registration: The act of recording a new name or epithet with a registration authority.

Recommending Committee⁴: All committees that recommend varieties for registration must be officially recognized by the Minister of Agriculture and Agri-Food Canada for this purpose. Appendix IX of the Procedures for the Registration of Crop Varieties in Canada lists the currently recognized committees. The names and addresses of the contact persons for each recommending committee is available on the CFIA website at: <http://www.inspection.gc.ca/english/plaveg/variety/vartoce.shtml>.

The recommending committees are responsible for:

- Formulating testing procedures that are appropriate for their crop(s) including a mechanism for verification of trials/validation of data;
- Regularly reviewing the testing procedures to ensure that they reflect acceptable scientific practices; and
- Ensuring that reference varieties are current and fairly represent the requirements of Canadian agriculture.

⁴ CFIA, Variety Registration Office, Procedures for the Registration of Crop Varieties in Canada, 8 July 2009.

Registration Trials: Registration Trials are replicated, multi-location experiments designed to evaluate agronomic performance (e.g., flowering, maturity, lodging, plant height and seed yield). Seed collected from these experiments are analyzed for seed quality traits. Response to disease is assessed in replicated disease nurseries or using a recognized laboratory test.

Seed number: Seed number is a generated number assigned annually to members of the PRCO.

Variety: A variety denotes a group of cultivated plants, including hybrids constituted by controlled cross-pollination, that: a) are distinguished by common morphological, physiological, cytological, chemical or other characteristics, and, b) retain their characteristics when reproduced. A variety must therefore be distinguishable, uniform, and stable.

Variety Registration: The act of recording a new name or epithet of a variety with a registration authority.

Appendix B: Authority Provided under Section 65.1 in the Seeds Regulations

RECOMMENDING COMMITTEES

65.1 (1) The Minister shall approve, for Canada or a region of Canada, a committee to establish and administer protocols for testing the varieties of a species, kind or type of crop listed in Part I of Schedule III, to determine the merit of the varieties and to make recommendation respecting their registration if

- (a) The members of the committee have the knowledge and expertise required to establish and administer testing protocols for varieties of that species, kind or type of crop;
- (b) The members of the committee have the knowledge and expertise required to determine the merit of the varieties of that species, kind or type of crop;
- (c) The testing protocols established by the committee are appropriate for that species, kind or type of crop, are practical and are based on scientific principles;
- (d) The procedures established by the committee for determining the merit of varieties of that species, kind or type of crop are appropriate for that purpose and are based on scientific principles;
- (e) The operating procedures established by the committee will ensure that its functioning is transparent and that varieties are dealt with in a fair and consistent manner; and
- (f) No other committee is approved as a recommending committee for that species, kind or type of crop for Canada or the region.

(2) The Minister shall approve, for Canada or a region of Canada, a committee to establish and administer protocols for the testing the varieties of a species, kind or type of crop listed in Part II of Schedule III and to make recommendations respecting their registration if

- (a) The members of the committee have the knowledge and expertise required to establish and administer testing protocols for varieties of that species, kind or type of crop;
- (b) The testing protocols established by the committee are appropriate for that species, kind or type of crop, are practical and are based on scientific principles;
- (c) The operating procedures established by the committee will ensure that its functioning is transparent and that varieties are dealt with in a fair and consistent manner; and
- (d) No other committee is approved as a recommending committee for that species, kind or type of crop for Canada or the region.

(3) In carrying out its functions, a recommending committee must apply the testing protocols it has established, act in accordance with its operating procedures and, in the case of a committee approved under subsection (1), apply the procedures it has established to determine the merit of varieties.

(4) For the purposes of subsections 67(1) and 67.1(1), the recommendation of a recommending committee must be based on the following;

- (a) In the case of a species, kind or type of crop that is listed in Part I of Schedule III, the results of testing the variety in accordance with the relevant testing protocols and a determination of whether the variety has merit; and
- (b) In the case of a species, kind or type of crop that is listed in Part II of Schedule III, the results of testing the variety in accordance with the relevant testing protocols.

Appendix C: Eligibility Requirements for Variety Registration

67.1(1) A variety of a species, kind or type of crop that is listed in Part I of Schedule III is eligible for registration if

- (a) The variety has merit;
- (b) The variety has been tested in accordance with testing protocols of a recommending committee;
- (c) The recommending committee has made a recommendation respecting registration of the variety;
- (d) The variety or its progeny is not detrimental to human or animal health and safety or the environment when grown and used as intended;
- (e) The representative reference sample of the variety does not contain off-types or impurities in excess of the Association's standards for varietal purity;
- (f) The variety meets the standards for varietal purity established by the Association or these Regulations for a variety of that species, kind or type;
- (g) The variety is distinguishable from all other varieties that were or currently are registered in Canada;
- (h) The variety name is not a registered trademark in respect of the variety;
- (i) The variety name is not likely to mislead a purchaser with respect to the composition, genetic origin or utility of the variety;
- (j) The variety name is not likely to be confused with the name of a variety that was or currently is registered;
- (k) The variety name is not likely to offend the public;
- (l) No false statement or falsified document and no misleading or incorrect information have been submitted in support of the application for registration; and
- (m) The information provided to the Registrar is sufficient to enable the variety to be evaluated.

(2) A variety of a species, kind or type of crop that is listed in Part II of Schedule III is eligible for registration if the requirements for eligibility set out in paragraphs (1) (b) to (m) are met.

(3) A variety of a species, kind or type of crop that is listed in Part III of Schedule III is eligible for registration if the requirements for eligibility set out in paragraphs (1) (d) to (m) are met.

APPENDIX D1 - Agronomic Evaluation for the Linseed Flax Co-operative Trials

Linseed Flax Co-operative Trial (Brown and Yellow)

A. Co-ordinator: **Dr. Bunyamin Tar'an**
Crop Development Centre
University of Saskatchewan
51 Campus Drive
Saskatoon, Saskatchewan
S7N 5A8
Tel: (306) 966-2130
Fax: (306) 966-5015
Email: bunyamin.taran@usask.ca

B. Check Cultivars:

Flax - AAC Bright, CDC Glas, (Coop and SVPG check)

C. Trial Sites:

1. Co-operative Trial

Zone 1- Black & Grey Soil Zones (Longer Growing Season)

Manitoba – Melita (WADO), Carberry (CMCDC), Hamiota (AgQuest), Rosenort (Taproot)
Saskatchewan – Indian Head (AAFC), Redvers (SERF)

Zone 2 – Brown Soil Zone

Saskatchewan –Saskatoon (U of S), Scott (AAFC), Avonlea (Palliser Triangle Research Inc.), Swift Current (WCA)
Irrigated – Outlook 1 (ICDC), SK, Lethbridge (Farming Smarter), AB

Zone 3 – Black and Grey Soil Zone (Shorter Growing Season)

Manitoba – Arborg (PESAI), Roblin (PCDF),
Saskatchewan –Codette (DAG), Melfort (U of S & NARF) Alberta – Vegreville (Alberta Innovates), AB, Fort Vermillion (MARA)

D. Measurement and Rating Scale:

Yield - Yield at each station will be calculated and expressed in three ways:

1. >00 kg/ha
2. % of CDC Glas
3. Rank of entries calculated

Maturity – days from time of seeding to 75% brown boll stage.

Height of main stem - cm

Lodging: 1–9 (1 = no lodging; 9 = completely lodged)

Seed weight - g/1000 seeds

E. Sites for measurement of:

Yield and Maturity: All sites.

Height and Seed Weight: All sites.

Lodging: All sites reporting significant lodging.

Where a location has a C.V. for yield over 15%, no other trait analysis will be conducted on that location.

APPENDIX D2 - Quality Evaluation for the Linseed Flax Co-operative Trials

Oil Content:	NI Oil Content is determined by near infrared measurements calibrated against the Ankom Extraction System. Results are reported as percent, calculated to a moisture-free basis.
Fatty Acid Composition:	Determined by gas liquid chromatography of the fatty acid esters following a modification of procedures cited by Ichihara and Fukubayashi (2010) and Brinks et al. (2013).
Alpha Linolenic Acid:	Determined by gas liquid chromatography of the fatty acid esters following a modification of procedures cited by Ichihara and Fukubayashi (2010) and Brinks et al. (2013).
Iodine Number:	Calculated from fatty acid composition according to AOCS Cd 1c-85 or NIR.
Oil-Free Protein Content:	NI Protein Content is determined by NIR on the seed; NIR calibrated against the Dumas Combustion Method and is expressed on an N x 6.25, whole seed dry basis and on an oil-free meal basis.

For oil content, fatty acid composition, iodine number and protein content determinations, individual plots are used.

Linseed Flax Co-operative Trial

Sites for measurement of Oil Content, Fatty Acid Composition, Alpha Linolenic Acid, Iodine Number and Protein Content of the Seed and the Meal:

Up to 8 sites representative of each agro-ecological zone.

Where a location has a C.V. for yield over 15%, oil content, fatty acid analysis, alpha linolenic acid content, iodine number and protein content will not be conducted on that location.

APPENDIX D3 - Disease Evaluation of the Linseed Flax Co-operative Trials

Procedures for Rust Evaluation

Experimental lines are evaluated for rust reaction, in comparison to standard cultivars, at the seedling stage under controlled growth room conditions of 16 hour photoperiod and day night temperature of 22°/18°C. A total of 300 to 400 2-week old seedlings from each entry are artificially inoculated with the local rust race 371 using 1 g/L of spore suspension in a light petroleum oil (Novec 7100). The inoculated seedlings are incubated under conditions of high relative humidity at 18°C for 24 hours and then uncovered and left in the same growth room. Scoring is done ten (10) days after inoculation using the infection type reactions (IT) as follows:

0 = No sign of infection	Immune
; = Fleck, hypersensitive reaction	Highly Resistant
1 = Very small pustule <0.5 mm in diameter	Resistant
2 = Small pustule 0.5-<1.0 mm in diameter	Moderately Resistant
3 = Pustule of 1.0-1.5 mm in diameter	Susceptible
4 = Large pustule > 1.5 mm in diameter	Susceptible

Seedlings are classified into three categories: immune (IT 0 & ;), resistant (IT 1 & 2) and susceptible (IT 3 & 4). The percentages of each category in experimental entries segregating for rust reaction are calculated and reported.

The minimum requirement for rust reaction, to support the recommendation for registration of candidate cultivars, is immune reaction (immune or hypersensitive with up to 2% resistant reaction) to the most recent predominant local race(s) of rust.

Procedures for Fusarium Wilt Evaluation

Experimental lines are evaluated for their reaction to fusarium wilt, in comparison to standard cultivars, in wilt infested field nurseries located at the Research Centre in Morden and at the Crop Development Centre, University of Saskatchewan. The entries are planted in 2-row plots in a randomized complete block design with at least three (3) replicates. Rows are 2.5 m long and

0.3 m apart. The susceptible cultivar Novelty is planted after every six (6) rows to indicate the level of disease and uniformity of inoculum in the soil. Planting is usually done during the last week of May to the first week of June.

Scoring for wilt reaction is based on a combination of wilt symptoms and plant vigour assessments which include discoloration of leaves, reduction in height, reduction in branching, percentage of severely infected and dead plants using a scale of 0 to 9 as follows:

- 0 = No sign of wilt, the most vigorous.
- 1 = Vigorous, yellowing on 0-5% of the leaves
- 2 = Vigorous, yellowing on 5-10% of leaves.
- 3 = Slight reduction in vigour, yellowing on 10-20% of leaves, slight reduction in height or branching. No severely wilted or dead plants.
- 4 = Moderate vigour, yellowing on 20-40% of leaves, moderate reduction in height or branching and/or <1% severely wilted or dead plants.
- 5 = Moderate vigour, yellowing on 40-60% of leaves, moderate reduction in height

- or branching and/or 1–10% severely wilted or dead plants.
- 6 = Poor vigour, yellowing on >60% of leaves, moderate reduction in height or branching and/or 10–30% severely wilted or dead plants.
- 7 = Poor vigour, yellowing, severe reduction in height or branching and/or 30–60% severely wilted or dead plants.
- 8 = Very poor vigour, severe reduction in height or branching and/or 60–90% severely wilted or dead plants.
- 9 = All plants severely wilted or dead.

This assessment is carried out three (3) times during the growing season; at the seedling stage 5 to 6 weeks after planting (early July), at the early flowering stage (end of July), and at the green boll stage (mid-August). The reactions of the entries to fusarium wilt are summarized as mean values of the three scores of the three (3) replicates at both locations. The mean values of reactions to fusarium wilt in current year of testing and the preceding year are presented. The 2-year means are also calculated and the final evaluation of the experimental lines is based on their performance in the two (2) years as well as the 2-year means in comparison with the check cultivars. In addition to the check cultivars indicated in *Appendix D1*, AC Emerson will also be included in the wilt tests.

The minimum standard requirement for fusarium wilt reaction, to support the recommendation for registration of cultivars from the Brown Linseed Flax and the Yellow Linseed Flax Co-operative Trials is a moderately resistant reaction. The mean score of the wilt reaction of the cultivar Norlin represents the minimum standard for Brown Linseed Flax cultivars whereas the minimum standard for wilt reaction for Yellow Linseed Flax cultivars is the cultivar AAC Bright. The two year mean score for wilt of the candidate cultivar will be compared to the two year mean score for wilt of the check variety. The candidate cultivar must have a two year mean score that is significantly greater than the two year mean score of the check variety to not achieve minimum standard for wilt resistance.

Other Diseases

Powdery Mildew: This disease has occasionally been observed in Western Canada since it was first discovered in 1997. Some flax cultivars have demonstrated a good level of resistance to this disease and the breeders are encouraged to incorporate and strive to maintain resistance to powdery mildew in new flax varieties. It is recommended that one of the disease nurseries to include check varieties for powdery mildew. (Flanders as the reference check, Adelie as the resistant check and Aurore as the susceptible check). Rating for powdery mildew will be done for candidate lines and the checks whenever this disease is observed.

Pasmo: This is the most prevalent disease on flax in Western Canada. Present flax cultivars are susceptible to this disease. No minimum standards are established for this disease. The Flax Breeding Program in collaboration with the Flax Pathology Program at the Crop Development Centre, University of Saskatchewan are currently working to improve the resistance to pasmo for both brown and yellow linseed flax cutlivars. Pasmo rating of candidate lines including the check varieties (CDC Bethune and CDC Glas) are included in the annual Cooperative Report.

Other diseases including stem break/browning, anthracnose, alternaria blight, basal stem blight, aster yellows and root rot/seedling blight are of minor importance and there are no guidelines or standard requirements for these diseases in the evaluation of candidate cultivar.

APPENDIX D4 - Minimum Standards for Linseed Flax Cultivar Registration

Agronomic

Yield – Statistically not significantly less than the check cultivar CDC Glas for brown seed coat flax and AAC Bright for yellow seed coat flax.

Maturity – Statistically not significantly later than AAC Bright in zones 1, 2 & 3.

Seed weight – Statistically not significantly lower than CDC Glas.

Lodging resistance – Statistically not significantly higher than AAC Bright.

Quality

Oil content – Statistically not significantly lower than the check cultivar CDC Glas.

Oil quality (iodine number) – Statistically not significantly lower than check cultivar CDC Glas.

Oil quality (alpha-linolenic acid) – Statistically not significantly lower than check cultivar CDC Glas.

Oil-free protein content – Statistically not significantly lower than check cultivar CDC Glas.

Seed coat color – Brown for brown linseed, yellow for yellow linseed.

Disease resistance

Rust – Immune, with up to 2% resistant, to race 371.

Fusarium wilt – Moderate resistance, statistically not significantly higher the check cultivar NorLin for brown seed coat flax and AAC Bright for yellow seed coat flax.

Powdery mildew - must not be significantly more susceptible than Flanders.