

October 2022

Proposed Changes to Breeder Seed Regulations

Introduction

CSGA is requesting feedback on changes to the [Canadian Regulations and Procedures for Breeder Seed Crop Production](#), commonly referred to as the Breeder seed regulations (BSR), proposed by CSGA's Plant Breeders' Committee (PBC). The Regulatory Services Committee (RSC) will also be reviewing the proposals before a final recommendation is presented to the Board of Directors in March 2023. Some of the changes could potentially come into effect for the 2023 crop season.

The PBC has recommended changes to the requirements for the recognition of plant breeders, Breeder seed crop production and Breeder seed. The proposed changes relate to:

- a. CSGA recognition of plant breeders,
- b. formal approval of Breeder seed which has not been certified by the CSGA,
- c. requirements for both varietal and mechanical purity, disease, and germination for Breeder seed, and
- d. breeder quality management system (QMS) requirements.

As the parent seed for all other certified seed production, it is important to assure the quality of Breeder seed to ensure the advances of plant breeding innovations are realized for the benefit of Canadian agriculture. The proposed changes modernize the BSR which have not been updated since 2009. In addition to the need for some "policy" revisions, it is an opportunity to reformat the document, to update references to CSGA's digital tools and seed crop inspection by authorized seed crop inspection services, to focus on actual certification requirements, to review the QMS requirements implemented some time ago and to include *CSGA Learn's* Plant Breeder Program as a requirement for plant breeder recognition in the future.

Overview

The BSR set out the standards and certification requirements that a plant breeder and a Breeder seed crop must meet for the CSGA to approve seed as Breeder seed and to issue a Breeder seed crop certificate. This includes the professional recognition of plant breeders and several general requirements applicable to Breeder seed crop production including variety certification eligibility, application for a Breeder seed crop certificate, breeders' QMS and Breeder seed tags. Along with the crop specific sections

of Circular 6, the BSR also summarize the certification requirements that are applicable to Breeder seed crops for prior land use, crop inspection and isolation and the maximum impurity standards for both varietal and mechanical purity for both Breeder seed **crops** and Breeder **seed**, including seed testing requirements.

Breeder seed is the highest status seed crop certified by the CSGA and is used as the original parent seed to produce all other classes of pedigreed seed crops. CSGA formally approves Breeder status seed. To ensure varietal integrity through subsequent generations it is imperative that Breeder seed be produced in a manner that ensures the varietal identity and purity of the variety have been maintained. Breeder seed should also be as free as practically possible from other crop kinds, weeds seeds and disease. To support quality assurance, CSGA certified Breeder seed crops must be produced by or under the supervision of a CSGA Recognized Plant Breeder and must be produced within a third-party audited quality management system.

CSGA Recognition of Plant Breeders

Authority of Plant Breeder vs. Associate Plant Breeder

Issues: The BSR define three (3) categories for individual recognition by the CSGA including “Plant Breeder”, “Associate Plant Breeder”, and “Variety Maintainer”. However, the regulations are not clear about what authority or responsibility comes with each of those classifications e.g., who can complete an Application for a Breeder Seed Crop Certificate (Form 43).

The role of Variety Maintainers (VM) and the benefit of that classification also needs clarification. The VM category may not need to be part of the Breeder seed regulations as (currently) there is no direct correlation to plant breeder recognition or Breeder seed production.

Verification of Plant Breeder Oversight of Associate Plant Breeders

Issue: The BSR specify that an Associate Plant Breeder (APB) is “allowed to produce Breeder seed crops or inbreds for hybrid seed production, under the supervision of a fully qualified Plant Breeder recognized by the CSGA.” However, there are no policies or processes in place to administer that requirement.

Completion of Online Professional Development Program for Plant Breeders

Opportunity: To consider making completion of the online professional development program for plant breeders, called *CSGA Learn Plant Breeder Program*, mandatory in the future.

Background:

The three types or categories for individual recognition currently described in the regulations are:

CSGA Recognized Plant Breeder (RPB) - For pedigreed seed crop certification, a Plant Breeder is any person recognized as such by the Plant Breeders’ Committee of the CSGA for being knowledgeable in

the principles and practices of plant breeding and related disciplines, engaged in the selection and synthesis of varieties, and producing and maintaining the identity and purity of varieties.

By providing peer-reviewed professional recognition of Plant Breeders' qualifications, the CSGA recognizes the Plant Breeders' ability to maintain or supervise the maintenance of Breeder seed plots. Since Breeder seed is the basis of all seed crop varieties, it is important that great care and attention be given to this critical step in the multiplication of varieties.

Associate Plant Breeder (APB) - An Associate Plant Breeder is allowed to produce Breeder seed crops or inbreds for hybrid seed production, under the supervision of a fully qualified Plant Breeder recognized by the CSGA.

Variety Maintainer (VM) - A Variety Maintainer is a special status elite parent seed or Select/Foundation Plot grower who is allowed to produce Breeder seed crops or inbreds for hybrid seed production, under the supervision of a Plant Breeder recognized by the CSGA.

Considerations:

The definitions for APB and VM speak about being allowed to produce Breeder seed, but it is not clear what being "allowed to produce" really means or if that includes completing the paperwork associated with Breeder seed production. Historically, the bottom of the hard copy F43 indicated that the form "must be completed by a CSGA Recognized Plant Breeder". It is not clear if that precludes an APB. The current electronic form has a spot for the "Plant Breeder Signature" at the bottom.

The definition of APB references working under the supervision of a "fully qualified" plant breeder. This seems to suggest that it needs to be a CSGA RPB. However, the VM definition references working "under the supervision of a plant breeder." It is not clear if that just means a RPB or if it includes an APB as well. The criteria for evaluating applicants for VM is straightforward, consisting of Select or Foundation plot production for fifteen (15) years, including five (5) years of experience producing Breeder plots for others. Although there are likely numerous seed growers who would qualify for this category, there are fewer than ten (10) active seed growers with that classification. Applications for this category are administered by CSGA staff, rather than the Plant Breeders' Committee.

Recommendations from the PBC:

1. To add text (*draft text below) to the BSR that clarifies the authority of RPB and APB, and that APB be permitted to perform certain activities if, and only if, the RPB overseeing the APB specifically authorizes them to do so, e.g., complete an Application for a Breeder Seed Crop Certificate (F43) or an Application for Variety Certification Eligibility (Form 300).
2. That references to the VM classification be removed from the BSR, providing that the classification is accommodated in another document or program e.g., Circular 6.

3. That all three modules of the *CSGA Learn Plant Breeder Program* become a mandatory requirement for individuals applying for recognition for both the RPB and APB classifications in the future. Previously recognized plant breeders should also be encouraged to complete the program.

* RPB - Recognized Plant Breeder status means that the individual is a fully qualified plant breeder who is authorized to do all activities and complete any forms or documents associated with Breeder seed production, Breeder seed approval or variety certification eligibility.

* APB - An Associate Plant Breeder (APB) may produce Breeder seed crops or inbreds for hybrid seed production under the supervision of a CSGA Recognized Plant Breeder. APB status means the applicant meets the requirements for that category but not for RPB status. This status is normally granted to someone who is close to meeting the criteria for a RPB but falls short in either education, experience, or some combination of the two. They only have the authority to do activities or complete forms, or documents associated with Breeder seed production or variety certification eligibility if the supervising RPB expressly authorizes them to do so and has confirmed that authorization with the CSGA.

Quality Management System

Issue: It has been nearly fifteen years since the plant breeder QMS requirements were put in place and they have not been reviewed since then. In addition, the CSGA has not implemented an effective monitoring and compliance system for these QMS requirements.

Background

Breeder seed crops certified by the CSGA must be produced within a third party audited QMS that meets all requirements described in the CSGA Regulations and Procedures for Breeder Seed Crop Production. The requirements include audit scope, audit frequency and auditor qualifications. The audit scope includes the elements, documents and records that are recommended in the CSGA Assessment Checklist. The requirements outline a schedule for tightened, normal or reduced frequency depending on compliance in previous audits. Most of the audits have been conducted by Canadian Seed Institute (CSI – now Seeds Canada) accredited auditors.

Considerations

The requirements described above are supplementary to CSGA's professional recognition of plant breeders. In theory, CSGA could revoke or suspend the professional recognition of a plant breeder where audits reveal serious or consistent non-compliance issues with the production of their Breeder seed, however, in practice, this has never happened.

Recently, CSGA has been reminding plant breeders to keep up to date with their audits, but in many cases, their last audit was some time ago. To date, CSGA has not developed a specific schedule outlining when each plant breeder is due for an audit.

Recommendations from the PBC:

1. CSGA should continue to require Breeder seed certified by the CSGA to be produced within a third party audited QMS.
2. The requirements for "audit frequency" should be simplified, requiring all Breeder QMS to be audited once every five (5) years.

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Approval of Breeder Seed Not Certified by the CSGA

Issues: There is a higher risk to the CFIA, the CSGA, seed growers and seed companies when Breeder seed is planted which has not been officially certified by the CSGA as having met specific minimum requirements. There is also a financial risk for the grower if the CSGA does not recognize the seed as eligible for certification.

Canadian plant breeders seeking CSGA certification of their Breeder seed produced in Canada may be at a competitive disadvantage with foreign plant breeders exporting seed to Canada without official CSGA certification as the requirements and associated costs differ.

The CSGA has not been recouping any of the costs associated with recognizing Breeder seed that has not been officially certified by the CSGA.

Background

Breeder seed is only considered Breeder seed if the CSGA recognizes it as such. Linked to recognition of the seed is the recognition of the plant breeder responsible for that seed. There are several different ways seed can be recognized by the CSGA as Breeder status seed, eligible to produce pedigreed seed crops in Canada as follows:

- 1a. CSGA recognized plant breeder completes a CSGA Application for a Breeder Seed Crop Certificate (Form 43) where a third-party has conducted an inspection and completed an official crop report; in Canada by a Licensed Seed Crop Inspector (LSCI) or outside of Canada it may be another AOSCA agency.
- 1b. The same as 1.a. except that the plant breeder conducts the inspection and is asked to complete a crop report using a template provided with the electronic Form 43.
2. CSGA recognized plant breeder signs a seed tag that includes the class, crop kind, variety name and, if available, a lot number.
3. In the case of seed produced outside of Canada by a foreign plant breeder who is not recognized by the CSGA but has signed a breeder seed tag, CSGA will get confirmation from the official certifying agency in the country/state where the seed was produced, regarding the classes they would recognize the seed as eligible to produce.

Considerations

Options 1 and 2 are available to Canadian plant breeders for seed produced in Canada or outside of Canada. However, most Canadian plant breeders see the benefits of certification and choose to have their seed certified by the CSGA, even when it is produced outside of Canada in contra season. Most breeder plots produced in Canada (about 85%), are inspected by a third-party LSCI. The seed crop must meet all CSGA certification requirements including maximum plot size, land and isolation requirements and maximum impurity standards. The seed must be tested for mechanical purity and germination as well as disease if it can be transmitted by seed. The breeder must be working within a third-party audited quality

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management system (QMS). Fees associated with CSGA certification include CSGA's plot fee (\$60/plot), inspection fees (if applicable), seed analysis fees, disease testing fees, and occasional QMS audit fees. Most foreign plant breeders producing seed for export to Canada simply sign Breeder tags. The only requirement is for the individual to be a CSGA recognized plant breeder which to date CSGA has been doing at no cost. The seed is usually coming from the U.S. and is mainly soybean (enough to plant 290 fields in 2020) and forage/turf varieties (159 perennial fields in production in 2020). The breeder is usually located in the country where the seed was produced but sometimes a breeder located in Canada signs tags for seed that has been produced by the same parent company in the U.S. or the reverse where a Breeder in the U.S. signs tags for seed that was produced in Canada.

In 2020, 544 fields producing either Select, Foundation, Registered or Certified seed were planted with seed with a breeder signature on the tag. This compares to 1,138 fields planted with Breeder seed that had been certified by the CSGA. Close to half of the seed where there was just a breeder signature was used to produce Registered or Certified seed and labelled with CFIA tags i.e., skipping the higher classes/generations reducing the amount of quality assurance and oversight that a variety is subject to prior to marketing as Certified seed. This is often the case in forages where the only class/generation between Breeder and Certified is Foundation and only small quantities of Foundation seed are required to produce enough Certified seed to meet demand.

Although CSGA does not recoup any of the costs for recognizing breeder seed that has not been certified, it does require resources. Seed tags must be provided for appraisal (evaluation for eligibility of the seed for certification) for any seed planted without a valid CSGA crop certificate number. Appraisal involves determining if all required information is provided on the tag (class, variety name, crop kind) whose signature is on the tag and whether the individual has been recognized by the CSGA. Additional steps may be required to determine whose signature is on the tag, to contact the official certification agency where the seed was produced if the individual has not been recognized or to get the individual started on the process to obtain recognition.

Seed tags are usually provided by the seed grower after application for certification and are usually appraised at the same time as the crop report, which for soybeans is close to when the seed crop will be harvested. This is the busiest time of year for appraisal staff, but growers also need the issue resolved quickly. Seed growers are at risk of losing a marketing opportunity if the CSGA does not recognize the seed as eligible for certification and unless CSGA recognition of the Breeder seed is sought prior to import and planting, the grower may not learn that certification will be declined until after the work has been done and the costs have already been incurred.

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Recommendations from the PBC:

1. CSGA should require a formal “application for recognition” for all Breeder seed used to plant seed crops for certification in Canada.
2. At a minimum, the information required for an “application for recognition” should include the information listed below.
 - Name of CSGA recognized plant breeder
 - Variety name and crop kind
 - Year and location where the seed was produced
 - Quantity of seed, preferably with an associated lot number
 - Declaration that the varietal identity and purity of the seed meets or exceeds the minimum standard for entry into the seed varietal certification system in Canada
 - Declaration that the seed has been tested for mechanical purity, germination, and disease (if transmitted by seed) and is free from Canadian Prohibited Noxious weed seeds
 - Agree that the seed is not eligible for demotion
3. CSGA should introduce a fee for approval of Breeder seed that has not been certified by CSGA, i.e., does not have a CSGA crop certificate number.

Seed Requirements and Standards

Varietal and mechanical purity, germination, and disease

Issues: There are no minimum standards that must be met for Breeder **seed** certification for varietal or mechanical purity, disease, or germination while there are varietal and mechanical purity, germination and (some) disease standards for subsequent generations.

It is a requirement for breeders to provide disease test results with their application for a breeder seed crop certificate for those crop kinds where there are diseases that may be transmitted by seed. However, there is no minimum standard and there are no private labs accredited to do the tests (other than true loose smut of barley). In some cases, the only lab that can perform the tests is the CFIA Plant Pathology Lab in Ottawa.

Background

The BSR do not specifically include a varietal purity standard for Breeder seed (i.e., there is a maximum impurity standard for varietal purity for the seed **crop**, but not the harvested **seed**). They do however address mechanical purity, germination and disease for the harvested seed as described below:

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12.0 SEED ANALYSIS (MECHANICAL PURITY AND GERMINATION)

A representative sample of Breeder seed **should** be submitted to an accredited seed analysis laboratory for a *Seed Testing Certificate* indicating germination and mechanical purity. These Breeder seed test results **should meet the mechanical purity and germination standards for Foundation No. 1** seed in federal Seeds Regulations. For Breeder seed of crop kinds not in *Schedule I* grade tables, a purity test is required, and actual germination should be on the seed label. **If Breeder seed does not meet Foundation No. 1 grade standards, then the distributor or recipient of Breeder seed must be advised.**

From the electronic “Form 43: Application for a Breeder Seed Crop Certificate”; note in this case it says “**must**” but only in relation to having the seed tested rather than a standard to be met:

*** Crop Kind Requirements for Diseases that may be transmitted with seed:**

- (a) Each Breeder Seed Plot should be inspected prior to harvest to determine the disease incidence and severity by the Plant Breeder or a plant pathologist familiar with the crop kind.
- (b) For *Crop Kinds listed below, a “Report on Health Condition of the Seed Sample”, relative to the seedborne diseases indicated, **must** be submitted to CSGA. A representative sample of the Breeder seed should be submitted to an accredited lab for testing. Testing is also available at the CFIA Plant Pathology Lab (address below). The CFIA Plant Pathology Lab also maintains the list of labs accredited for True Loose Smut testing for Barley and Wheat.

Canadian Food Inspection Agency
Plant Pathology Lab
3851 Fallowfield Rd
Nepean, ON K2J 4S1
Monique.Girouard@inspection.gc.ca

*Crop Kind	Disease	Test Sample Size
BARLEY	True loose smut, <i>Ustilago nuda</i>	250 grams
CANOLA / RAPESEED	Blackleg, <i>Leptosphaeria maculans</i>	100 grams
CHICKPEAS	<i>Ascochyta rabiei</i>	400 grams
FIELD BEANS	Bacterial blight, Anthracnose	6000 seeds
FIELD PEAS	<i>Ascochyta pisi</i> , <i>Ascochyta pinodella</i> , <i>Mycosphaerella</i>	400 grams
WHEAT	True loose smut, <i>Ustilago tritici</i>	200 grams
WINTER WHEAT	Dwarf bunt, <i>Tilletia controversa</i>	200 grams

NOTE: Testing may be required for OTHER diseases as required by official certification agencies.

- (c) In crop kinds for which there are treatments to control seedborne diseases, all Breeder Seed suspected of being contaminated should be **treated**. If treatment by the Plant Breeder is not possible then requirements for seed treatment should be clearly marked on the Breeder Seed container. If disease incidence is widespread or severe, recipient(s) of Breeder Seed should be advised.

Considerations

CSGA normally receives test results for mechanical purity, disease (where applicable) and germination but would not decline certification for any of these reasons (regardless of how bad it is) as there are no actual standards that “must” be met. The one notable exception is the presence of Prohibited Noxious Weeds. If the Breeder fails to supply test results for purity or germination (rare) or, if based on the test results, the mechanical purity or germination does not meet Foundation No. 1 grade standards, or the disease test results indicate the presence of the disease, a “warning” is included on the crop certificate (examples below).

Varietal Purity	Mechanical Purity
THE SEED FROM THIS BREEDER PLOT DOES NOT MEET THE AOSCA SEED STANDARD FOR VARIETAL PURITY FOR FOUNDATION NO. 1 SEED.	SEED FROM THIS BREEDER PLOT WAS EITHER NOT TESTED FOR WEEDS AND OTHER CROP KINDS OR DID NOT MEET THE STANDARDS FOR FOUNDATION NO.1 SEED.

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Germination	Disease
SEED FROM THIS BREEDER PLOT WAS TESTED FOR GERMINATION AND EITHER DID NOT MEET THE STANDARD FOR FOUNDATION NO. 1 SEED OR THE GERMINATION TEST RESULTS WERE MORE THAN 6 MONTHS OLD WHEN THIS CERTIFICATE WAS ISSUED. PLEASE ENSURE THAT THE PURCHASER(S) ARE ADVISED OF THE GERMINATION TEST RESULTS.	SEED FROM THIS BREEDER PLOT WAS TESTED FOR SEED BORNE DISEASES AS REQUIRED BY THE CSGA. DISEASE WAS REPORTED IN THE SEEDLOT THAT WAS TESTED. PLEASE ENSURE THAT APPROPRIATE SEED TREATMENTS ARE APPLIED AND / OR NOTIFY THE PURCHASER OF THE TEST RESULTS.

The current requirements are really recommendations or reminders for the plant breeder that they should be having their Breeder seed tested and informing the buyers of the results. In some cases, disease testing may not be necessary if the disease is not found in a particular area e.g., dwarf bunt testing for winter wheat seed produced in Quebec.

Recommendations from the PBC for Breeder seed (for the harvested seed, not the crop):

1. To introduce a minimum standard for varietal purity equivalent to the Foundation standard.
2. To continue to recommend that Breeder seed meet Canada Foundation No. 1 standards for both mechanical purity and germination and require that it be labelled with the test result if the seed does not meet that standard.
3. To introduce a minimum standard for mechanical purity equivalent to the standard for Canada Certified No. 1.
4. Rather than require the submission of disease test results, revise the *Application for a Breeder Seed Crop Certificate* (F43) to include a declaration from the applicant that the Breeder seed harvested from the plot had been tested for any seed borne diseases (for the relevant crop kind) observed in the plot (either by the Recognized Plant Breeder (RPB), the Associate Plant Breeder (APB) or a plant pathologist) during field production and revise the list of seed borne diseases to include:
 - a. For Barley and Wheat - Spot blotch, *Cochliobolus sativus*
 - b. For Barley and Wheat – Fusarium Head Blight, *Fusarium graminearum*
 - c. For Oats – Loose and covered smut, *Ustilago avenae*, *Ustilago hordei*

To implement those recommendations the revised **draft text** is as follows:

Seed Requirements and Standards

Varietal Purity

- (1) Although field inspection of the seed crop remains the primary method for assessing varietal purity in Canada, the standards for variety purity of seed for Foundation, Registered and Certified status seed are those established by the Association of Official Seed Certifying Agencies (AOSCA) and published in the AOSCA Certification Handbook.
- (2) Exceptions to the AOSCA seed standards are the following maximum impurity standards for off-types and other varieties in field peas: 2/10,000 Foundation; 5/10,000 Registered; 20/10,000 Certified.
- (3) The minimum standard for varietal purity for Breeder status seed is the same as the Foundation standard for varietal purity.

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Mechanical Purity and Germination

- (1) A representative sample (sample size below) of the seed harvested must be sent to an officially recognized seed lab for testing for mechanical purity and germination.
- (2) It is recommended that Breeder seed meet the standard for Canada Foundation No. 1 for both mechanical purity and germination. If the seed does not meet that standard, then it must be labelled with the test result.
- (3) The minimum standard for mechanical purity for Breeder seed of crop kinds set out in *Schedule I* to the *Seeds Regulations* is the standard for Canada Certified No. 1.

Seedborne Diseases

- (1) For some crop kinds, where there is sufficient risk from certain seedborne diseases (list below), the seed harvested from the plot must be tested for any of those diseases that were observed in the plot during field production. Breeders must declare that the seed has been tested when they submit their *Application for a Breeder Seed Crop Certificate* (Form 43).
- (2) In crop kinds for which there are treatments to control seedborne diseases, Breeder seed should be treated when required. If treatment is not possible and disease presence is suspected, then the requirement for treatment should be clearly marked on the Breeder seed container. If disease incidence is widespread or severe, recipient(s) of the Breeder seed should be advised.
- (3) Plant breeders should also be familiar with current quarantine regulations concerning movement of seed within Canada as well as phytosanitary requirements prescribed by the CFIA for importing and exporting seed. The *Seeds Regulations* also specify standards for some crop kinds and maximum disease levels permitted in seed lots offered for sale in Canada (e.g., ergot bodies in wheat).

Crop Kind	Disease	Test Sample Size
Barley	True loose smut, <i>Ustilago nuda</i>	250 grams
Barley & Wheat	Spot blotch, <i>Cochliobolus sativus</i> Fusarium Head Blight, <i>Fusarium graminearum</i>	200 grams
Canola/Rapeseed	Blackleg, <i>Leptosphaeria maculans</i>	100 grams
Chickpeas	<i>Ascochyta rabiei</i>	400 grams
Field Beans	Bacterial blight, Anthranose	1 kg
Field Peas	<i>Ascochyta pisi</i> , <i>Ascochyta pinodella</i> , <i>Mycosphaerelia</i>	400 grams
Oat	Loose smut, <i>Ustilago avenae</i> Covered smut, <i>Ustilago hordei</i>	400 grams
Wheat	True loose smut, <i>Ustilago tritici</i>	200 grams
Winter Wheat	Dwarf bunt, <i>Tilletia controversa</i>	200 grams

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