

## SECTION 2A

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**CERTIFIED Production of Cytoplasmic Male Sterile (CMS) HYBRID WHEAT with Blended Parent Lines**


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In this Section:

- **Wheat** includes spring and winter Wheat, Einkorn, Emmer and Spelt (unless otherwise specified). *Durum* is not included.

Section 1, *Regulations for All Pedigreed Seed Crops*, together with the following, are the regulations for CERTIFIED production of cytoplasmic male sterile (CMS) hybrid wheat with blended parent lines.

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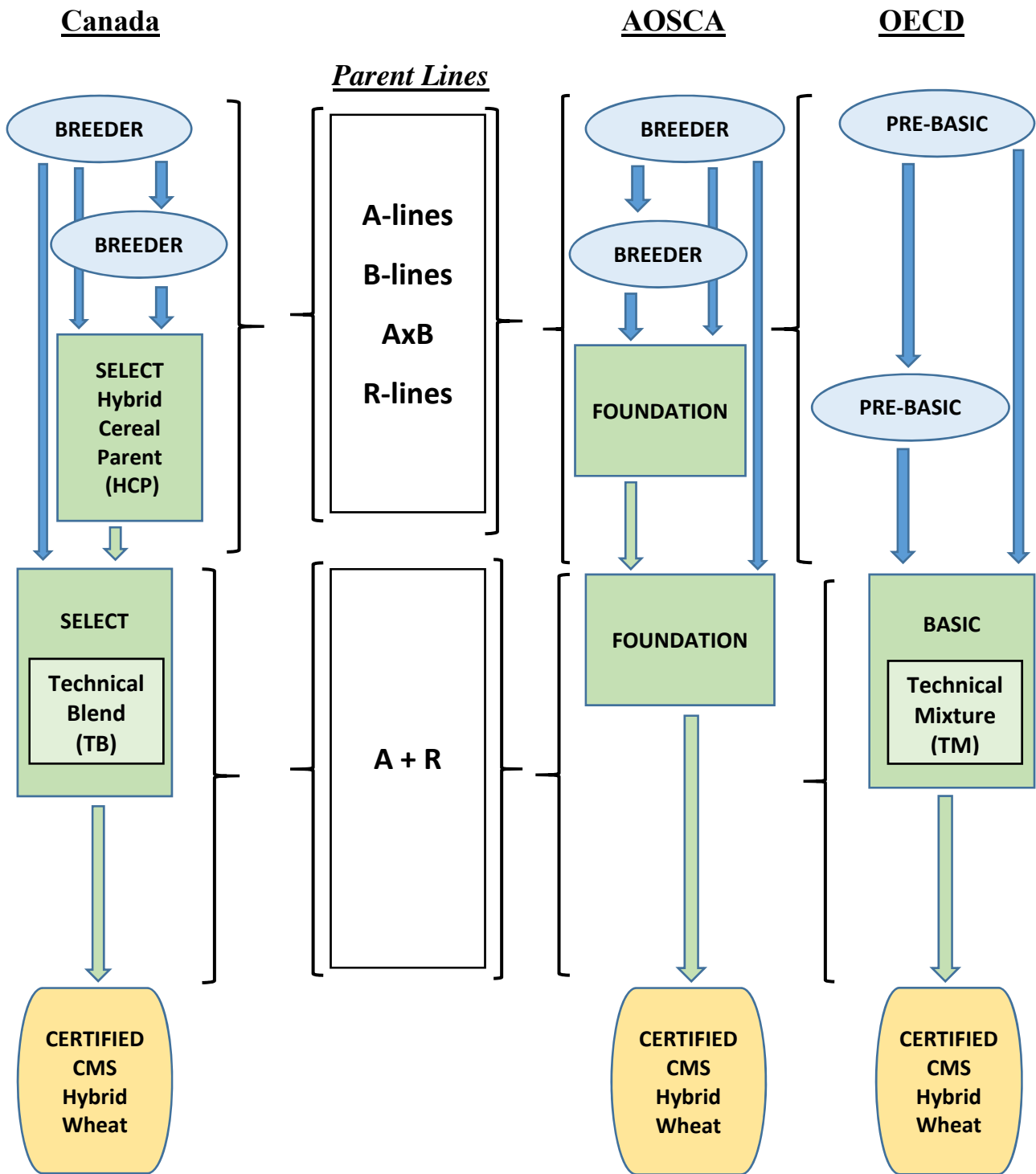
**2A.1 SEED CLASSES, GENERATIONS, DEFINITIONS and REQUIREMENTS**
**2A.1.1 Definitions:**

- a) Inbred parent line or population: a relatively true breeding homozygous strain; used for parent seed crop production.
- b) A-line (female seed parent): a cytoplasmic male sterile (CMS) line which, when pollinated by an R-line (Restorer), produces hybrid seed.
- c) B-line (male parent maintainer): a male fertile line genetically identical to the A-line but with normal fertile cytoplasm; used to increase A-line seed while maintaining male sterility of the A-line.
- d) R-line (male parent restorer): a male fertile line possessing nuclear restoration genes; used as the male parent in the production of Certified hybrid seed crops.
- e) Hybrid: the first generation of a cross between two specified parent lines.

**2A.1.2 Classes and generations in the certification of CMS hybrid wheat and parent lines:**

- a) BREEDER class seed
    - used, as well as SELECT HCP class, to produce plots of A-lines, B-lines, AxB increases and R-lines;
    - produced by or under supervision of a Breeder;
    - no generation limit unless prescribed by the Breeder responsible for the variety.
  - b) SELECT Hybrid Cereal Parent (HCP) class seed
    - used, as well as BREEDER class, to produce certification of plots of A-lines, B-lines, AxB increases and R-lines;
    - produced by CSGA-accredited plot growers;
    - generation limits are prescribed by the variety description
  - c) SELECT Technical Blend (TB) class seed
    - a mixture of CMS female parent and restorer lines (A+R);
    - used to produce Certified hybrid seed crops;
    - limited to one generation of certification eligibility;
    - subject to the crop and seed certification requirements of Sections 1 and 12A.
  - d) CERTIFIED class hybrid seed
    - produced from Select Technical Blend (TB) parent seed or, if imported, from AOSCA Foundation or from OECD Basic class parent seed;
    - sold to commercial producers and not eligible for certification.
- General requirements for certification of BREEDER class plots are in the [Canadian Regulations and Procedures for Breeder Seed Crop Production](#).
  - Certification requirements for SELECT Hybrid Cereal Parent (HCP) and SELECT Technical Blend (TB) plots are in Section 12A. General requirements for Select Plots are in Section 12.
  - Certification classes in the production of CMS hybrid wheat seed are in Table 2A.1.2

**Table 2A.1.2 Certification CLASSES for CMS Hybrid Wheat and Parent Lines**



**2A.1.3** A Certified CMS hybrid wheat crop must be produced from SELECT Technical Blend (TB) class parent seed or, if imported, from AOSCA Foundation class or from OECD Basic class parent seed.

**2A.2 LAND REQUIREMENTS**

The general land requirements for all crops are set out in Section 1. In addition, the following apply to production of Certified crops of CMS hybrid wheat:

- 2A.2.1** Crops for Certified production of CMS hybrid wheat must not be planted on land which has been planted with or produced wheat or durum in the preceding year.

**2A.3 CROP INSPECTION**

The basic standards for all crops are set out in Section 1. In addition, the following apply to Certified production of CMS hybrid wheat:

- 2A.3.1** Crops for Certified production of CMS hybrid wheat must be inspected at least once by an authorized inspector after plants assume mature colour, to report off-types or other varieties. Variety descriptions may include additional requirements.

**2A.4 CROP STANDARDS**

The general isolation requirements for all crops are set out in Section 1. In addition, the following apply to production of Certified crops of CMS hybrid wheat:

**2A.4.1 Isolation Requirements**

- a) The required isolation in Table 2A.4.1 must be provided prior to flowering and crop inspection.

**Table 2A.4.1: Minimum Isolation Required**

<b>Inspected Crop</b>	<b>Other Crops</b>	<b>Isolation Distance Required</b>
<b>CMS Hybrid Wheat</b> (Spring and Winter) <b>Certified</b>	Inspected pedigreed CMS Hybrid Wheat of the same* variety	1 meter (3 feet) to a crop planted with same pollen bearing (male) parent seed, provided pedigree of parent seed planted is verified
	Barley, Buckwheat, Durum, Oat, Rye, Triticale	2 meters (6 feet)
	Different* varieties of Wheat, Non-pedigreed** Wheat	<b>100 meters</b> (330 feet) to a crop planted with different pollen bearing (male) parent

\* In hybrid crops and crops of pest tolerant varietal blends, “different” variety means a crop planted with a different pollen (male) parent seed.

\*\* “Non-pedigreed” means a crop that did not meet the requirements of Circular 6.

- b) Subject to sub-sections e) and f), any plants considered a source of contamination found within 3 meters (10 feet) of the inspected crop may be reason for declining certification.
- c) The entire crop must be inspected, but a portion or all of a crop may be approved for certification provided corrections for improper isolations, verified as required by CSGA, are made by:
- i) discarding contaminating wheat plants before their pollen is shed; or
  - ii) discarding, before harvest, the female parent plants improperly isolated from contaminating wheat.
- d) The first 50 meters of isolation required in Table 2A.4.1, to other varieties of wheat or non-pedigreed wheat, shall be practically free from plants that can cross pollinate with the inspected seed crop (not more than 1 plant per 100 square meters, on average) and the remaining distance shall be reasonably free from plants that can cross pollinate with the inspected crop (not more than 1 plant per 10 square meters, on average). Contaminants within the required isolation distance, depending on density, stage of maturity, location and distance from the inspected crop, may be cause for declining certification.
- e) The required isolation of 2 meters (6 feet) for mechanical purity is not required if there is a definite physical barrier, defined as a natural or artificial obstacle between two adjacent crops that prevents access and accidental harvest.

- f) Staking of a field is permitted in lieu of the 1 meter (3 feet) isolation strip required between inspected pedigreed crops of the same\* variety provided it meets the following requirements:
  - i) Stake locations must be clearly identified on map(s) provided to crop inspectors.
  - ii) Stakes must be placed no more than 100 meters apart
  - iii) Staking must be clearly visible and clearly define the border of the field at the time of inspection.

**2A.4.3 Weeds**

- a) All crops for certification must be free of Prohibited noxious weeds.
- b) Very weedy crops will be declined certification.

**2A.4.4 Border Rows**

- a) Border rows are recommended but not required. Border rows must be planted with the same seed as the pollen (male) parent rows.
- b) Border rows must be planted such that synchronous flowering occurs with receptive female parent plants of the inspected crop.

**2A.5.4 Maximum Impurity Standards**

- a) The standards in Table 2A.5.4 are the maximum levels for impurities.
- b) Any combination of impurities may be reason for declining certification.
- c) Table 2A.5.4 indicates the maximum number of plants of off-types or other varieties permitted in approximately 10,000 plants of the inspected crop. The inspector makes 6 counts (10,000 plants each) in the field to determine the number of impurities. The resulting average, for *Off-types and Other Varieties* must not exceed the maximum impurity standards in Table 2A.5.4.

**Table 2A.5.4: Maximum Impurity Standard**

Inspected Crop	Off-types and Other Varieties	Other Crop Kinds Difficult to Separate
<b>CMS Hybrid Wheat</b> (Spring and Winter) <b>Certified</b>	<b>10 per 10,000 plants*</b>	<b>5 per 10,000 plants</b>

\*Equivalent to 1 per 3000 heads when 3 heads per plant

- d) Percent hybrid seed shall not be less than 75% and shall be determined by a method approved by the CFIA. The balance of the seed is generally parent lines or their derivatives and is subject to the CSGA varietal purity seed standard for visually distinguishable impurities of not more than 0.2% other varieties (Section 1.20). Varietal impurities other than the parent lines or their derivatives shall not exceed 2%.
- e) A declaration (CSGA Form 180) stating the actual percent hybrid seed of a representative sample of the Hybrid Wheat crop, and the method of determining the percent hybrid seed, must be submitted to the CSGA prior to a crop certificate being issued. Unless otherwise specified in the variety description, the declaration of percent hybrid seed shall also provide the following information: CSGA Crop Sequence number, the test method name or number, the number of seeds tested and the confidence level of the test.

**2A.6 OTHER REQUIREMENTS**

**2A.6.1** CSGA may require submission of a seed sample for varietal identity verification testing.