

Guidelines for Certified Seed Production of Feminized Hemp Seed Varieties and Hybrids

1. Definition of Feminized Hemp Seed Variety

1.1 Feminized hemp seeds (FHS) produce only female plants. They are generated by the fertilization of flowers on a dioecious female plant with pollen from the same plant or another female plant that has been induced to produce pollen (“masculinized”).

1.2 Only one class of pedigreed seed production, Certified, is recognized for FHS variety production.

1.3 The variety description of any FHS variety is of the Certified generation. FHS produced from a dioecious variety is not considered seed of the parental variety.

1.4 There are several types of FHS varieties, depending on the parental material used.

2. Definition of Hybrid

A hybrid is the progeny of two different phenotypes, one of which is the pollen parent and the other the seed-bearing parent. These may be FHS varieties or fully fertile hybrid varieties, depending on the seed production protocol.

3. Definition of Types of Parental Germplasm and Propagation Methods

Parent material may be (1) vegetative propagating material (cloned plants), (2) seed-derived dioecious female parent plants or (3) seed-derived feminized plants. In the case of non-FHS hybrids, male dioecious plants may serve as the pollen parent. Seed production protocols include maintenance of the parental germplasm and the procedures used to generate the Certified seed.

3.1 Clonal parental genotypes

Clonal parental genotypes (clones) are maintained through vegetative propagation. The Plant Breeder is responsible for the maintenance of this germplasm and must provide adequate information to positively identify each genotype.

Three mating designs are recognized:

3.1.1 Feminized single genotype

A single genotype is vegetatively propagated, some nodes are masculinized and the pollen from these flowers is used to fertilize the female flowers.

3.1.2 Feminized polycross

A number of genotypes are vegetatively propagated and then incorporated into a polycross, with an equal number of each parental genotype allowed to intercross with all other genotypes. A few nodes on each plant are masculinized. An equal quantity of seed from each parental genotype is bulked to ensure genetic stability. FHS varieties produced in this manner will be considered synthetic varieties.

3.1.3 Feminized hybrid

A parental genotype is vegetatively propagated, and one or more plants are masculinized. This genotype will be identified as the (male) pollen parent. Clones of a different, untreated genotype will be designated as the (female) seed parents. Seed is harvested from the clones of the non-masculinized (female only) genotype. An equal amount of seed from each seed parent is bulked to form the seed lot.

3.2 Seed-derived parent material

Dioecious hemp varieties can be used as parent seed material for FHS varieties/hybrids. All males and any monoecious off-types must be removed prior to flowering. In the case of FHS varieties, a specified number of female plants of the same or another variety must be masculinized. In the case of a hybrid variety, male plants of another variety can be used as the pollen parent.

The protocol for selecting plants to be used as pollen parents for FHS varieties must be stated in the variety description and adhered to in each seed production cycle in order to maintain varietal stability. Protocols could include treating a defined portion of randomly selected plants (e.g. every tenth plant) or having separate rows of pollen and seed parents.

Parent material can be commercial hemp varieties or material used exclusively for FHS/hybrid production approved by the CSGA.

Only seed of Breeder and Foundation classes can be used to produce FHS varieties/hybrids.

3.3 Feminized parent

Feminized seed can be used as parent reproductive material (pollen parent, where masculinized, and/or seed parent) for one generation if the first generation was certified by the CSGA as meeting Breeder or Foundation seed crop certification standards.

The Plant Breeder or Variety Maintainer must ensure that plants designated as pollen parents are chosen randomly and that no artificial selection is imposed when masculinizing those plants.

4. Eligibility for Certification

An application for determination of variety certification eligibility shall be made to the CSGA. It shall include a description of the FHS variety/hybrid and of its parent material. Distinguishing morphological, physiological, cytological, chemical or other characteristics that establish the identity of the variety shall be provided.

There shall be a comprehensive description of the protocols for maintaining the parent material and ensuring its stability.

A sample of 500 seeds of the FHS variety/hybrid shall be sent to the CFIA for variety verification purposes.

Supplemental molecular data supporting the identity of the variety may be submitted.

5. Land/Growth Facility Requirements

All types of FHS varieties/hybrids can be produced in a contained growth facility (growth room, greenhouse, polyhouse) or in the field.

5.1 Growth facility

The growth facility must contain only plants used in the Certified seed production. There must be a period of 60 days between successive productions of Certified seed, unless the same pollen parent is used, in which case the interval is 10 days.

5.2 Field production

Seed crops of FHS varieties/hybrids must not be planted on land which in the previous three years grew a crop of hemp.

6. Crop Inspection

For all types of FHS/hybrid production, it is the seed grower's responsibility to ensure that the crop is inspected twice by an authorized inspector, once just prior to any pollen release, and once when the pollination period is complete (all male flowers have shed their pollen).

7. Crop Standards

7.1 Presence of male and monoecious plants

All true male (XY chromosomes) and monoecious plants must be removed from the parent material prior to the first inspection (prior to any pollen shed) for all FHS varieties. Monoecious or male dioecious plants may be pollen parents for a hybrid variety.

7.2 Abnormal vegetative reproductive material

Any vegetative reproductive material which differs significantly in appearance from the average of the parental reproductive material, is likely a somaclonal variant ('sport') and must be removed prior to the first inspection (prior to any pollen shed).

7.3 Off-types in seed derived parental material

Plants not conforming to the norm of the variety may be considered off-types. The maximum number of off-types permitted is 1 in 100 plants of the seed parent.

7.4 Growth facility production

Growth facilities must have an isolation distance of at least 4800 m from any contaminating pollen sources. An isolation distance of 800 m is required from other growth facilities which contain different pollen parent plants. These requirements can be adjusted provided there is adequate pollen control pursuant to an agreement with the CSGA.

7.5 Field production

All field production of Certified FHS/hybrids must have an isolation distance of at least 4800 m from any contaminating pollen sources.

8. Additional Requirements

8.1 Quality Management System (QMS)

A CSGA recognized Plant Breeder's documented QMS is required for production of Certified seed of FHS varieties/hybrids. The QMS seed production protocols must address all the certification requirements for FHS/hybrid production, be approved by the CSGA and audited by an independent third-party.

8.2 Description of Variety

Plants of each candidate variety must be grown at three different locations or facilities for confirmation that the variety conforms to the variety description and is distinguishable, relatively uniform and stable. Results from these trials, conducted under the supervision of the Plant Breeder, must be submitted as part of the application for variety certification eligibility.

8.2.1 THC

The total potential THC (THC + THCA) level must be below 0.3% when plants of the FHS variety/hybrid are sampled three weeks prior to harvest. Refer to Health Canada's "Policy for the Management of Industrial Hemp Varieties on the List of Approved Cultivars" for growing, sampling and testing requirements.

8.2.2 Cannabinoid profiles and other chemo-typing may be submitted in support of the description of the FHS variety/hybrid.

8.3 Seed Varietal Purity Standards

There is insufficient information currently available to determine with any certainty the appropriate levels of varietal purity for FHS and hybrid varieties. As FHS varieties are intended to be grown in the absence of pollen, any male plants are particularly undesirable. It may, however, be practically impossible to produce seed lots with no males and/or no monoecious plants. Until there is more detailed information the following will serve as guidelines:

1. The maximum number of male (XY) individuals in a Certified seed lot of an FHS variety is 3/10,000 plants.
2. The maximum number of monoecious (XX) individuals in a Certified seed lot of an FHS variety is 5/10,000 plants.
3. The minimum varietal purity of a Certified seed lot of a hybrid variety is 97 percent.