

# **INDIAN MINIMUM SEED CERTIFICATION STANDARDS**

**The Central Seed Certification Board  
Department of Agriculture & Co-operation  
Ministry of Agriculture  
Government of India  
New Delhi**

**2013**

*Compiled by*

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## **Glossary**

## **GENERAL SEED CERTIFICATION STANDARDS**

The General Seed Certification Standards are applicable to all crops which are eligible for certification, and with field and seed standards for the individual crops, shall constitute the Minimum Seed Certification Standards. The word 'Seed' or 'seeds' as used in these standards shall include all propagating materials.

### **I. Purpose of Seed Certification**

The purpose of seed certification is to maintain and make available to the public, through certification, high quality seeds and propagating materials of notified kind and varieties so grown and distributed as to ensure genetic identity and genetic purity. Seed certification is also designed to achieve prescribed standards.

### **II. Certification Agency**

Certification shall be conducted by the Certification Agency notified under Section 8 of the Seeds Act, 1966.

### **III. Certified Seed Producer**

Certified seed producer means a person/organization who grows or distributes certified seed in accordance with the procedures and standards of the certification.

### **IV. Eligibility Requirements for Certification of Crop Varieties**

Seed of only those varieties which are notified under Section 5 of the Seeds Act, 1966 shall be eligible for certification.

### **V. Classes and Sources of Seed**

#### **A. *Breeder Seed***

Breeder seed is seed or vegetative propagating material directly controlled by the originating or sponsoring plant breeder of the breeding programme or institution and/or seed whose production is personally supervised by a qualified plant breeder and which provides the source for the initial and recurring increase of Foundation seed.

Breeder seed shall be genetically so pure as to guarantee that in the subsequent generation i.e. certified Foundation seed class shall conform to the prescribed standards of genetic purity. The other quality factors of Breeder seed such as physical purity, inert matter, germination etc.

shall be indicated on the label on actual basis. The Breeder seed shall be packed and supplied by the breeders in the form and manner indicated in **Appendix-I**.

B. *Certified Seed*

Certified seed shall be the seed certified by Certification Agency notified under Section 8 of the Seeds Act, 1966 or seed certified by any Certification Agency established in any foreign country provided the Certification Agency has been reorganized by the Central Government through notification in the Official Gazette. Certified seed shall consist of two classes, namely, Foundation and Certified seed and each class shall conform to the following description:

1. Certified Foundation seed shall be the progeny of Breeder seed, or be produced from Foundation seed which can be clearly traced to Breeder seed. Thus, Foundation seed can even be produced from Foundation seed. During the production of certified Foundation seed, the following guidelines shall be observed:

- (a) Certified Foundation seed produced directly from Breeder seed shall be designated as Foundation seed stage-I;
- (b) Certified Foundation seed produced from Foundation seed stage-I shall be designated as Foundation seed stage-II;
- (c) Certified Foundation seed stage-II will not be used for further increase of Foundation seed and shall be used only for production of Certified seed class;
- (d) Minimum Seed Certification Standards shall be the same for both Foundation seed stage-I and II unless otherwise prescribed;
- (e) Certification tag shall be of white colour for both Foundation seed stage-I and II and shall contain the information as to its stage;
- (f) Production of Foundation seed stage-II shall ordinarily be adopted in respect of such crop varieties provided, when it is expressly felt by the Certification Agency that Breeder seed is in short supply;
- (g) Production of Foundation seed stage-II may be adopted for the following group of crops:
  - vegetatively propagated crops;
  - apomictically reproduced crops;
  - self-pollinated crops;
  - often cross-pollinated and cross-pollinated crops, these being gene – pools should not lose their genetic identity and purity if measures to safeguard the same are adequately taken;
  - composite and synthetics;
  - parental line increase of hybrids.

2. Production of Foundation seed stage-I and II shall be supervised and approved by the Certification Agency and be so handled as to maintain specific genetic identity and genetic purity and shall be required to conform to certification standards specified for the crop/variety being certified.
3.
  - (a) Certified seed shall be the progeny of Foundation seed and its production shall be so handled as to maintain specific genetic identity and purity according to standards prescribed for the crop being certified;
  - (b) Certified seed may be the progeny of Certified seed provided this reproduction does not exceed three generations beyond Foundation seed stage-I and
    - it is determined by the Certification Agency that genetic identity and genetic purity will not be significantly altered;
    - and when the Certification Agency is satisfied that there is genuine shortage of Foundation seed despite all the reasonable efforts made by the seed producer.
  - (c) Certification tag shall be of blue colour (shade ISI No. 104 AZURE BLUE) for Certified seed class.
  - (d) Certified seed produced from Certified seed shall not be eligible for further seed increase under certification. Certification tags for such production which is not eligible for further seed increase under certification shall be super scribed with, “not eligible for further seed increase under certification”.

## **VI. Phases of Seed Certification**

Certification shall be completed in six broad phases listed as under:

- (a) receipt and scrutiny of application
- (b) verification of seed source, class and other requirements of the seed used for raising the seed crop;
- (c) field inspections to verify conformity to the prescribed field standards;
- (d) supervision at post-harvest stages including processing and packing;
- (e) seed sampling and analysis, including genetic purity test and/or seed health test, if any, in order to verify conformity to the prescribed standards; and
- (f) grant of certificate and certification tags, tagging and sealing.

## **VII. Establishing Source of Seed**

The individual intending to produce seed under certification shall submit to the Certification Agency, one or more relevant evidence such as certification tags, seals, labels, seed containers, purchase records, sale records etc., as may be demanded by the Certification Agency during submission of the application, its scrutiny and/or during first inspection of the seed crop,

in order to confirm if the seed used for raising the crop has been obtained from the source approved by it and conforms to the provisions contained in para V. This requirement also applies to both parents in seed production involving two parental lines.

### **VIII. Field Area for Certification**

There is no minimum or maximum limit for the area offered by a person for certification, provided the certified seed production meets all the prescribed requirements.

### **IX. Unit of Certification**

For the purpose of field inspection, the entire area planted under seed production by an individual shall constitute one unit provided:

- (a) it is all under one variety;
- (b) it does not exceed ten hectares;
- (c) it is not divided into fields separated by more than fifty meters between them;
- (d) it is planted with or is meant to produce seed belonging to the same class and stage in the generation chain;
- (e) the crop over the entire area is more or less of the same stage of growth so that observations made are representative of the entire crop;
- (f) the total area planted, by and large, corresponds to the quantity of seed reported to have been used; and the Certification Agency's permission had been obtained to sow a larger area by economizing on seed rate; if that the case;
- (g) raised strictly as a single crop and never as mixed;
- (h) not so heavily and uniformly lodged that more than one third of the plant population is trailing on the ground leaving no scope for it to stand up again thus making it impossible for the Certification Agency to inspect the seed crop at the appropriate growth stage in the prescribed manner;
- (i) as far as possible, so maintained as to show adequate evidence of good crop husbandry thereby improving the reputation for certified seeds; and
- (j) not grown as inter, companion or ratoon crop unless otherwise specified in **Appendix-II**.

### **X. Use of Chemical Hybridizing Agents ('CHAs')**

- (a) In case of hybrid seed production, the seed producer can use proper Chemical Hybridising Agents ('CHAs') on seed parent (female line) in order to induce male sterility. Consequently the Minimum Seed Certification Standards specified for production of 'A' and 'B' lines shall not be applicable for the relevant hybrid.
- (b) The hybrid seed produced through the application of 'CHAs' shall be compulsorily subjected to grow-out test as a pre-requisite for grant of certificate.

## **XI. Field inspection**

- (a) The field inspection work which requires technically-trained personnel, shall be performed by the persons who have been so authorized by the Certification Agency;
- (b) Field inspection meant to verify those factors which can cause irreversible damage to the genetic purity or seed health shall be conducted without prior notice to the seed producer;
- (c) Soon after the completion of the field inspection, a copy of the report shall be handed over to the seed producer or his representative.

## **XII. Re-inspection**

Seed fields not conforming to prescribed standards for certification at any inspection, the Certification Agency shall, upon the request of seed producer and after he removes the sources of contamination in the seed field and within the prescribed isolation distances and/or the contaminated plants in the seed field (if so directed by the Certification Agency perform one or more re-inspections provided such removal can ensure conformity of the seed crop to the prescribed standards and provided further that no irreversible damage has been caused to the quality of seed by the contaminant(s). The Certification Agency may at its discretion, also perform one or more re-inspections over and above the minimum number of inspections prescribed, if considered necessary.

## **XIII. Harvesting, Threshing and Transportation**

Seed crop meeting field standards for certification shall be harvested, threshed and transported to the seed processing plant in accordance with the guidelines issued by the Certification Agency. During these operations, seed producer will take all precautions to safeguard the seed from admixture and other causes of seed deterioration.

## **XIV. Bulking**

Bulking of unprocessed seed stocks to obtain larger homogeneous seed stocks may be permitted by the Certification Agency provided the stocks to be bulked meet the following requirements.

- belong to the same certified seed producer;
- belong to the same crop, variety, class of seed and stage in the generation chain;
- were produced in the same season and under similar agro-climatic conditions;
- were subjected to certification by the same Certification Agency;
- have more or less similar physical appearance and levels of moisture;

- are adequately homogenous in composition.

## **XV. Seed Processing and Packing Schedule**

The Certification Agency shall prepare and communicate seed processing and packing schedule to all certified seed producers soon after the certification of seed crops at field stage. The seed producers shall adhere to the schedule specified by the Certification Agency. However, re-scheduling may be accepted by the Certification Agency on the request of seed producer on genuine grounds.

## **XVI. Seed Lot**

A seed lot is a physically identifiable quantity of seed which is homogeneous.

## **XVII. Lot Size**

A seed lot would represent any quantity of agricultural seeds upto a maximum of 20,000 kilogrammes for seeds of the size of rice or larger (except maize seed, seed potato, sweet potato, yams, taro and chow-chow for which the maximum size of the lot may be 40,000 kilogrammes) and 10,000 kilogrammes for seeds smaller than rice subject to a tolerance limit of 5.0%. The quantities in excess of the above maximum limits shall be sub-divided and separate lot identification shall be given. The maximum lot size of certain crops is indicated in **Appendix-V**.

## **XVIII. Construction of Seed Lot Number**

Each seed lot shall be assigned a specific number in order to facilitate maintaining its identity, tracing back to its origin, handling in stores, transit etc., accounting and inventory maintenance and referring/communicating about a certain quantity of seed. The procedure for assigning lots numbers is given in **Appendix-VI**.

## **XIX. Seed Processing**

Seed processing means cleaning, drying, treating, grading and other operations which will improve the quality of seeds. Seed from fields which conformed to the standards of certification at field stage shall, as soon as possible after the harvest will be brought at processing plant for processing. The screen aperture size specified in **Appendix-VII** and **VIII** shall be used for cleaning and grading of seeds so that typical contaminants such as weed seeds, small seeds, damaged seeds, broken and shriveled seeds, straw, chaff, leaves, twigs, stones, soil particles etc. are removed. However, the Certification Agency is authorized to deviate under exigencies to use the screen of small aperture size than specified. In such cases, the Certification Agency shall

record the reasons for reduction in the aperture of the screen. Processed seed shall not have seed of the size lower than the bottom screen used beyond 5.0% (by weight).

## **XX. Seed Treatment**

When a variety, seed of which is under certification is susceptible to a seed borne disease organism or when seed under certification is carrying a seed borne pathogen and a seed treatment is available which may control the disease or pathogen when properly applied, the Certification Agency may require such seed to undergo such treatment before Certification. In case seed is required to be treated before sowing by the user, the chemical calculated at the recommended dose shall be kept in a plastic packet and placed inside the seed container with complete direction and precautions required for treating of the seed. The information about the treatment shall also be displayed on seed containers. If the seeds have been treated, the following instructions shall also be complied with:

- (a) a statement indicating that the seed has been treated;
- (b) the commonly accepted chemical or abbreviated chemical name of the applied substance; and
- (c) if the substance of the chemical used for treatment and present with the seed is harmful to human beings or other vertebrate animals, a caution statement such as “Do not Use for Food; Feed or Oil purposes”. The caution for mercurials and similarly toxic substances shall be word “POISON” which shall be in type size, prominently displayed on the label in red.

## **XXI. Samples and Sampling of Seeds**

Soon after completion of the seed processing or after seed treatment as the case may be, the Certification Agency shall draw a representative composite sample as per procedure specified in Seed Testing Manual. The quantity of seed samples so drawn shall be sufficient to provide three samples of the size of submitted sample. The composite sample will be divided into three equal parts, and one shall be sent for analysis to a notified Seed Testing Laboratory, the second part to the seed producer and retain the third part as a guard sample.

## **XXII. Seed Analysis Report**

The Seed Testing Laboratory shall analysis the seed samples in accordance with the prescribed procedure and deliver the Seed Analysis Report to the Certification Agency as soon as may be, but not later than 30 days from the date of receipt of the samples unless the seed is subjected to such tests which require more than 30 days for completion of the test.

### **XXIII. Seed Standards of Genetic Purity**

(a) All certified seed lots shall conform to the following Minimum Standards for genetic purity unless otherwise prescribed:

Class	Standards for Minimum Genetic Purity (%)
Foundation	99.00
Certified:	
(i) Varieties, composites, synthetics & multilines	98.00
(ii) Hybrids	95.00
(iii) Hybrids of cotton, TPS, muskmelon, brinjal & tomato	90.00
(vi) Hybrid castor	85.00

(b) *Grow-out Test*

The Certification Agency shall conduct grow-out test to determine genetic purity of a seed lot whenever it is a pre-requisite for grant of the certificate and also on the seed lots where a doubt has arisen about the genetic purity. The grow-out test can be complemented by certain related laboratory tests. The grow-out test shall be conducted as per the procedure specified in **Appendix-IX**.

### **XXIV. Recleaning, Resampling and Retesting**

When a seed lot does not meet the prescribed seed standards, the Certification Agency on the request of seed producer may permit recleaning, resampling and retesting. The recleaning, resampling and retesting shall be permitted only once.

### **XXV. Seed Standards for Insect Damage**

A seed lot under certification shall not have apparent or visible evidence of damage by insects for both Foundation and Certified seed classes in excess of 1.0% for the seeds of maize and legumes and 0.50% for the seeds other than maize and legumes unless otherwise prescribed.

### **XXVI. Seed Moisture Content**

Seed standards in respect of seed moisture shall be met at the time of packing of seed.

## **XXVII. Downgrading of Seed Class**

If a seed field or a seed lot is not found meeting prescribed standards for the class for which it has been registered but conforms to the prescribed standards to the immediate lower class, the Certification Agency may accept such seed fields/seed lots for certification to the immediate lower class provided request has been made to this effect by seed producer. However, downgrading of the seed class shall not be applicable in case of hybrids and their parents.

## **XXVIII. Specification of the Certification Tag**

Size, quality, colour, lay out and contents of the certification tag shall be as specified in **Appendix-X**.

## **XXIX. Packing, Tagging, Sealing and Issuance of the Certificate**

(a) On receipt of Seed Analysis Report and the results of the grow-out test wherever prescribed, and if seed lot has met prescribed standards, the Certification Agency shall ensure packing, tagging and sealing and issuance of certificate expeditiously. An authorized official of the Certification Agency shall endorse the signature on the reverse of each certification tag and shall affix rubber stamp indicating the official's name and designation. Containers to be used for packing of the certified seeds shall be durable and free from defects.

(b) Advance tagging may be permitted at the discretion of the Certification Agency with proper safeguards.

## **XXX. Refusal for Certification**

The Certification Agency shall have the authority to refuse certification of any seed production field or any seed lot that does not conform to the Minimum Standards prescribed for that particular crop, either for field or for seed or for both. Such refusal will be subject to any appeal made to the Appellate Authority constituted under Section 11(1) of the Seeds Act, 1966. The model composition of the Appellate Authority is specified in **Appendix-XI**.

## **XXXI. Validity Period of the Certificate**

The validity period shall be nine months from the date of test at the time of initial certification. The validity period could be further extended for six months provided on retesting seed conforms to the prescribed standards in respect of physical purity, germination and insect damage for all seeds except vegetatively propagating material for which lot shall be re-examined for seed standards specified for respective crop. A seed lot will be eligible for extension of the validity period as long as it conforms to the prescribed standards. The procedure for extension of the validity period is given in **Appendix-XII**.

### **XXXII. Revocation of Certificate**

If the Certification Agency is satisfied, either on reference made to it in this behalf or otherwise that:

- (a) the certificate granted by it under Section 9(3) of the Act has been obtained by misrepresentation as to an essential fact; or
- (b) the holder of the certificate has, without reasonable cause, failed to comply with the conditions subject to which the certificate has been granted or has contravened any of the provisions of the Act or the Rules made thereunder, then, without prejudice to any other penalty to which the holder of the certificate may be liable under the Act, the Certification Agency may, after giving the holder of the certificate an opportunity of showing cause revoke the certificate, under the provisions of Section 10 of the Act.

### **XXXIII. Retention of Certification Records**

The Certification Agency shall preserve in order all the documents including the guard samples pertaining to certification of each seed lot for two years from the date of grant/ extension of the certificate and four years in respect of rejected seed crops or lots from the date of communication of rejection unless and otherwise required for longer period.

# **AGRICULTURE CROPS**

## **CHAPTER-I**

### **Seed Certification Standards for Cereals**

1. Barley
2. Barley hybrids
3. Paddy
4. Paddy hybrids
5. Wheat
6. Wheat hybrids
7. Triticale

## BARLEY (*Hordeum vulgare* L.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of barely seed.

### II. Land Requirements

Land to be used for seed production of barley shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made between the ear emergence and harvesting of the seed crop.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Barley seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3
Fields of barley with infection of Loose smut ( <i>Ustilago nuda</i> (Jens.) Rostr.) disease in excess of 0.10% and 0.50% in Foundation and Certified seed respectively	150	150

B. *Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.050	0.20
**Inseparable other crop plants	0.010	0.050
***Plants affected by seed borne diseases	0.10	0.50

\*Standards for off-types and inseparable other crops shall be met at final inspection before harvesting and for Loose smut of barley at any inspection conducted between ear emergence and harvesting.

\*\*Inseparable other crops shall be: oats, wheat, gram and triticale.

\*\*\*Seed borne disease shall be: Loose smut (*Ustilago nuda*(Jens.) Rostr.)

V. **Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	85%	85%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## **BARLEY (*Hordeum vulgare* Linn.) HYBRIDS**

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid barley seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of barley.
  - 1. *Eligibility requirements for certification*
    - (a) An inbred line to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
    - (b) Hybrid seed to be eligible for certification shall be the progeny of two approved inbred lines, one of which shall be male sterile.
  - 2. *Classes and sources of seed*
    - (a) An inbred line shall be a relatively true breeding strain resulting from self-pollination with selection.
    - (b) The foundation class seed shall consist of an approved male sterile line to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
    - (c) A male sterile line shall be a strain (A) carrying cytoplasmic-genetic male sterility, which sheds no viable pollen and is maintained by the normal sister strain (B) which is used as pollinator.
    - (d) The certified seed class shall be the hybrid seed to be planted for any use except seed production.

### **II. Land Requirements**

Land to be used for seed production of hybrid barley shall be free of volunteer plants.

### **III. Field Inspection**

A minimum of four inspections shall be made as follows:

- (1) the first inspection shall be made before flowering in order to determine isolation, presence of volunteer plants, outcrosses, planting ratio, errors in planting and other relevant factors;
- (2) the second and third inspections shall be made during flowering to check isolation, Off-types, pollen shedders in female parent and other relevant factors;
- (3) the fourth inspection shall be made at maturity and prior to harvesting to verify true nature of the plant and other relevant factors;

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

(a) Hybrid barley seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
	2	3
Fields of other varieties including commercial hybrid of the same variety	200	100
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	200	100
Field of barley with infection of Loose smut ( <i>Ustilago nuda</i> (Jens.) Rostr.) disease in excess of 0.10% and 0.50% in Foundation and Certified seed, respectively	200	150

##### B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
Off-types in seed parent	0.050	0.20
Off-types in pollinator	0.050	0.20
Pollen shedding earheads in seed parent	0.050	0.10
**Inseparable other crop plants	0.010	0.050
***Plants affected by seed borne diseases	0.10	0.50

\*Standards for inseparable other crops shall be met at final inspection and other standards shall be met at any inspection conducted between ear emergence and harvesting.

\*\*Inseparable other crops shall be : oats, wheat, gram and triticales.

\*\*\*Seed borne disease shall be: Loose smut (*Ustilago nuda*(Jens.) Rostr.)

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	85%	85%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## **PADDY (*Oryza sativa* L.)**

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of paddy seed.

### **II. Land Requirements**

Land to be used for seed production of paddy shall be free of volunteer plants.

### **III. Field inspection**

A minimum of two inspections shall be made from the time the crop approaches flowering until it is ready for harvesting.

### **IV. Field Standards**

#### *A. General requirements*

##### *1. Isolation*

Paddy seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

B. *Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.050	0.20
**Objectionable weed plants	0.010	0.020

\*Standards for Off-types and objectionable weeds shall be met at the final inspection.

\*\*Objectionable weed shall be:

Wild rice (*Oryza sativa* L. var. *fatua* Prain) (Syn. *O. sativa* L.f. *spontanea* Rosch.)

V. **Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Huskless seeds (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Total Weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	2/kg	5/kg
Seeds infected by paddy bunt ( <i>Neovossia horrida</i> (Tak.) Padwick & Azmatulla Khan. (maximum)	0.10%	0.50%
Germination (minimum)	80%	80%
Moisture (maximum)	13.0%	13.0%
For vapour-proof containers (maximum)	8.0%	8.0%

\*Objectionable weed is the same as given at IV.B above.

## **PADDY (*Oryza sativa* L.) HYBRIDS**

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid paddy seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of paddy.

#### *1. Eligibility requirements for certification*

- (a) An inbred line to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved inbred lines, one of which shall be male sterile.

#### *2. Classes and sources of seed*

- (a) An inbred line shall be a relatively true breeding strain resulting from self-pollination with selection.
- (b) The foundation class seed shall consist of an approved male sterile line to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- (c) A male sterile line shall be a strain (A) carrying cytoplasmic-genetic male sterility, which sheds no viable pollen and is maintained by the normal sister strain (B) which is used as pollinator.
- (d) The certified class seed shall be the hybrid seed to be planted for any use except seed production.

### **II. Land Requirements**

Land to be used for seed production of hybrid paddy shall be free of volunteer plants.

### **III. Field Inspection**

A minimum of four inspections shall be made as follows:

- (1) the first inspection shall be made before flowering in order to determine isolation, presence of volunteer plants, outcrosses, planting ratio, errors in planting and other relevant factors;

- (2) the second and third inspections shall be made during flowering to check isolation, Off-types, pollen shedders in female parent and other relevant factors;
- (3) the fourth inspection shall be made at maturity and prior to harvesting to verify true nature of the plant and other relevant factors;

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

- (a) Hybrid paddy seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances as specified in columns 2 and 3 of the said Table :

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties including commercial hybrid of the same variety	200	100
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	200	100

##### B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
Off-types in seed parent	0.050	0.20
Off-types in pollinator	0.050	0.20
Pollen shedding earheads in seed parent	0.050	0.10
**Objectionable weed plants	0.010	0.020

\*Standards shall be met at any inspection conducted at and after flowering.

\*\*Objectionable weed shall be: wild rice (*Oryza sativa* L. var. *fatua* Prain) (Syn. *O. sativa* L.f. *spontanea* Rosch.)



## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Huskless seeds (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Total weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	2/kg	5/kg
Seeds infected by paddy bunt ( <i>Neovossia horrida</i> (Tak.) Padwick & Azmatulla Khan) (maximum)	0.10% (by number)	0.50% (by number)
Germination (minimum)	80%	80%
Moisture (maximum)	13.0%	13.0%
For vapour-proof containers (maximum)	8.0%	8.0%

\*Objectionable weed is the same as given at IV.B above.

## WHEAT (*Triticum* spp.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of wheat seed.

### II. Land Requirements

Land to be used for seed production of wheat shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made between the ear emergence and harvesting of the seed crop.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Wheat seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3
Fields of wheat, triticale and rye with infection of Loose smut ( <i>Ustilago tritici</i> (Pers.) Jens.) disease in excess of 0.10% and 0.50% in case of Foundation and Certified seed, respectively	150	150

B. *Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.050	0.20
**Inseparable other crop plants	0.010	0.050
***Plants affected by seed borne disease	0.10	0.50

\*Standards for Off-types and inseparable other crops shall be met at the final inspection and for Loose smut shall be met at any inspection conducted between ear emergence and harvesting.

\*\*Inseparable other crops shall be: barley, oats, triticale and gram.

\*\*\*Seed borne disease shall be: Loose smut (*Ustilago tritici* (Pers.) Jens.)

V. **Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Total weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	2/kg	5/kg
Seeds infested with Nematode galls of Ear-cockle ( <i>Anguina tritici</i> Milne.) and Tundu ( <i>Corynebacterium michiganense</i> pv. <i>tritici</i> and <i>A. tritici</i> Milne. complex) (maximum)	None	None
Seeds infected by karnal bunt ( <i>Neovossia indica</i> (mitra) Mundkur) (Syn. <i>Tilletia tritici</i> (Bjerk)	0.50%	0.250%
Wint) (maximum)	(by number)	(by number)
Germination (minimum)	85%	85%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

\*Objectionable weeds shall be : wild morning glory (*Hirankhuri*) (*Convolvulus arvensis* L.) and *Gulli danda* (*Phalaris minor* Retz.)

## **WHEAT (*Triticum spp.*) HYBRIDS**

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid wheat seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of wheat.

#### *1. Eligibility requirements for certification*

- (a) An inbred line to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved inbred lines, one of which shall be male sterile.

#### *2. Classes and sources of seed*

- (a) An inbred line shall be a relatively true breeding strain resulting from self-pollination with selection.
- (b) The foundation class seed shall consist of an approved male sterile line to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- (c) A male sterile line shall be a strain (A) carrying cytoplasmic-genetic male sterility, which sheds no viable pollen and is maintained by the normal sister strain (B) which is used as pollinator.
- (d) The certified class seed shall be the hybrid seed to be planted for any use except seed production.

### **II. Land Requirements**

Land to be used for seed production of hybrid paddy shall be free of volunteer plants.

### **III. Field Inspection**

A minimum of four inspections shall be made as follows:

- (1) the first inspection shall be made before flowering in order to determine isolation, presence of volunteer plants, outcrosses, planting ratio, errors in planting and other relevant factors;

- (2) the second and third inspections shall be made during flowering to check isolation, Off-types, pollen shedders in female parent and other relevant factors;
- (3) the fourth inspection shall be made at maturity and prior to harvesting to verify true nature of the plant and other relevant factors;

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

- (a) Wheat hybrid seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances as specified in columns 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties including commercial hybrid of the same variety	200	100
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	200	100
Fields of wheat, tritcale and rye with infection of Loose smut ( <i>Ustilago tritici</i> (Pers.) Jens.) disease in excess of 0.10% and 0.50% in Foundation and Certified seed, respectively	200	150

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types in seed parent	0.050	0.20
Off-types in pollinator	0.050	0.20
Pollen shedding earheads in seed parent	0.050	0.10
**Inseparable other crop plants	0.010	0.050
***Plants affected by seed borne diseases	0.10	0.50

\*Standards for inseparable other crops shall be met at final inspection and other standards shall be met at any inspection conducted between ear emergence and harvesting.

\*\*Inseparable other crops shall be : barley, oats, triticale and gram.

\*\*\*Seed borne disease shall be: Loose smut (*Ustilago tritici* (Pers.) Jens.)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Total weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	2/kg	5/kg
Seeds infested with Nematode galls of Ear-cockle ( <i>Anguina tritici</i> Milne.) and Tundu ( <i>Corynebacterium michiganense</i> pv. <i>tritici</i> and <i>A. tritici</i> Milne. complex) (maximum)	None	None
Seeds infected by karnal bunt ( <i>Neovossia indica</i> (mitra) Mundkur) (Syn. <i>Tilletia tritici</i> (Bjerk) Wint) (maximum)	0.50% (by number)	0.250% (by number)
Germination (minimum)	85%	85%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

\*Objectionable weeds shall be : wild morning glory (*Hirankhuri*) (*Convolvulus arvensis* L.) and *Gulli danda* (*Phalaris minor* Retz.)

## TRITICALE (x *Triticosecale* (Wittmack))

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of triticale seed.

### II. Land Requirements

Land to be used for seed production of triticale shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made between the ear emergence and harvesting of the seed crop.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

(a) Triticale seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3
Fields of wheat, triticale and rye with infection of Loose smut ( <i>Ustilago tritici</i> (Pers.) Jens.) disease in excess of 0.10% and 0.50% in case of Foundation and Certified seed, respectively	150	150

B. *Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.050	0.20
**Inseparable other crop plants	0.010	0.050
Plants infected by Loose smut disease ( <i>Ustilago tritici</i> (Pers.) Jens.)	0.10	0.50
***Plants infected by Ergot disease ( <i>Claviceps perpurea</i> (Fr.) Tul.)	0.020	0.040

\*Standards for Off-types and inseparable other crops and Ergot disease (*Claviceps perpurea* (Fr.) Tul.) shall be met at the final inspection before harvesting and for Loose smut (*Ustilago tritici* (Pers.) Jens.) shall be met at any inspection conducted between ear emergence and harvesting.

\*\*Inseparable other crops shall be : oats, wheat, barley, gram and rye.

\*\*\*In case of ergot disease, the seed fields can, however, be certified if diseased plants are removed and burnt and the fields show, on re-inspection, infection not more than the maximum permissible level. Only one such re-inspection shall be permitted.

V. **Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Total weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	2/kg	5/kg
Seeds infected by Karnal bunt ( <i>Neovossia indica</i> (Mitra) Mundkur) (Syn. <i>Tilletia tritici</i> (Bjerk)	0.50%	0.250%
Wint) (maximum)	(by number)	(by number)
Ergotted seeds (maximum)	0.020%	0.040%
	(by number)	(by number)
Germination (minimum)	85%	85%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

\*Objectionable weeds shall be : wild morning glory (*Hirankhuri*) (*Convolvulus arvensis* L.) and *Gulli danda* (*Phalaris minor* Retz.)

## **CHAPTER-II**

### **Seed Certification Standards for Millets**

1. Maize Inbred lines
2. Maize Foundation single crosses
3. Maize hybrids/sweet corn hybrids
4. Maize composites, synthetics and open-pollinated varieties
5. Sorghum open-pollinated varieties
6. Sorghum hybrids
7. Pearl millet composites, synthetics and open-pollinated varieties
8. Pearl millet hybrids
9. Barnyard millet
10. Common millet
11. Finger millet
12. Italian millet
13. Kodo millet
14. Little millet

## **MAIZE (*Zea mays L.*) INBRED LINES**

### **I. Application and Amplification of General Seed Certification Standards**

A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of maize inbred lines.

B. The General Standards are amplified as follows to apply specifically to the inbred lines of maize

#### *1. Eligibility requirements for certification*

An inbred line to be eligible for certification must be from a source such that its identity may be assured and approved by the Certification Agency.

#### *2. Classes and sources of seed*

An inbred line shall be a relatively true breeding strain.

#### *3. Seed house or bin inspection*

The inbred lines shall be ear-inspected after maturity by the Certification Agency.

### **II. Land Requirements**

Land to be used for inbred line increase of maize shall be free of volunteer plants.

### **III. Field Inspection**

A minimum of four inspections shall be made in such a way that one is done before flowering and the remaining three during flowering.

### **IV. Field Standards**

#### *A. General requirements*

##### *1. Isolation*

(a) Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>
1	2
Fields of any maize with same kernel colour and texture	400
Fields of any maize with different kernel colour and texture, and teosinte	600
Fields of the same inbred line not conforming to varietal purity requirements for certification	400

(b) Differential blooming dates will be permitted for modifying isolation distances with any type of maize provided 5.0% or more of the plants in the seed parent do not have receptive silks when more than 0.20% of plants in the adjacent field(s) within the prescribed isolation distance are shedding pollen.

*B. Specific requirements*

Factor	Maximum permitted (%)*
**Offtype plants that have shed or are shedding pollen when 5.0% or more of the plants in the seed field have apparently receptive silks	0.20

\*Maximum permitted at any one inspection conducted during flowering

\*\*Sucker tassels, portions of tassels, and tassels on main plants will be counted as shedding pollen only when two inches or more of the centre spike, the side branches, or a combination of the two have the anthers exerted from the glumes and are shedding pollen.

**V. Seed Standards**

**A.** Seed ears inspected after harvest shall not contain in excess of 0.20% of offtype ears including ears with off-coloured kernels.

Factor	Standards
Pure seed (minimum)	98.0%
Inert matter (maximum)	2.0%
Other crop seeds (maximum)	5/kg
Other distinguishable varieties based on kernel colour and texture (maximum)	5/kg
Weed seeds (maximum)	None
Germination (minimum)	80%
Moisture (maximum)	12.0%
For vapour-proof containers (maximum)	8.0%

**B. Shelling**

Shelling of the seed ears will be made after obtaining approval from the Certification Agency.

**MAIZE (*Zea mays L.*) FOUNDATION  
SINGLE CROSSES**

**I. Application and Amplification of General Seed Certification Standards**

A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of maize foundation single crosses.

B. The General Standards are amplified as follows to apply specifically to the foundation single crosses of maize

*1. Eligibility requirements for certification*

A foundation single cross to be eligible for certification must be produced from two approved inbred lines, the sources of which shall assure their identity and is approved by the Certification Agency.

*2. Classes and sources of seed*

A foundation single cross shall consist of the first generation hybrid resulting from the controlled crossing of two approved inbred lines. Such foundation single cross shall be used in the production of double, three-way, top or double top crosses.

*3. Seed house or bin inspection*

The foundation single crosses shall be ear-inspected after maturity by the Certification Agency.

**II. Land Requirements**

Land to be used for seed production of maize single crosses shall be free of volunteer plants.

**III. Field Inspection**

A minimum of four inspections shall be made in such a way that one is done before flowering and the remaining three during flowering.

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

(a) Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>
1	2
Fields of any maize with same kernel colour and texture	400
Fields of any maize with different kernel colour and texture, and teosinte	600
Fields of the same single cross (code designation) not conforming to varietal purity requirements for certification	400
Fields of the other single crosses having common male parent and conforming to varietal purity requirements for certification	5
Fields of the other single crosses having common male parent and not conforming to varietal purity requirements for certification	400

(b) Differential blooming dates are permitted for modifying isolation distances, provided 5.0% or more of the plants in the seed parent do not have receptive silks when more than 0.20% of plants in the adjacent field(s) within the prescribed isolation distance are shedding pollen.

##### B. Specific requirements

Factor	Maximum permitted (%)*
Off-type plants that have shed or are shedding pollen in male parent at any one inspection during flowering when 5.0% or more of the plants in the seed field have apparently receptive silks	0.20
Tassels of the plants that have shed or shedding pollen in seed parent at any one inspection during flowering when 5.0% or more of the plants in the seed parent	0.50

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have apparently receptive silks	
Total of pollen shedding tassels including tassels that have shed pollens for all three inspections conducted during flowering on different dates	1.0
Off-types plants in seed parent at final inspection	0.20

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\*Sucker tassels, portions of tassels, and tassels on main plants shall be counted as shedding pollen only when two inches or more of the centre spike, the side branches, or a combination of the two have the anthers exerted from the glumes and are shedding pollen.

## V. Seed Standards

- A. Seed ears inspected after harvest shall not contain in excess of 0.20% of off-type ears including ears with off-coloured kernels.

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Factor	Standards
Pure seed (minimum)	98.0%
Inert matter (maximum)	2.0%
Other crop seeds (maximum)	5/kg
Other distinguishable varieties based on kernel colour and texture (maximum)	5/kg
Weed seeds (maximum)	None
Germination (minimum)	80%
Moisture (maximum)	12.0%
For vapour-proof containers (maximum)	8.0%

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### B. *Shelling*

Shelling of the seed ears will be made after obtaining approval from the Certification Agency.

## MAIZE (*Zea mays L.*)HYBRIDS

### SWEET CORN HYBRIDS

#### I. Application and Amplification of General Seed Certification Standards

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid maize seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of maize.

##### 1. *Eligibility requirements for certification*

A hybrid is one to be planted for any use except seed production. It may be any one of the following:

- (i) *Single cross*—the first generation resulting from the controlled crossing of two approved inbred lines.
- (ii) *Double cross*—the first generation resulting from the controlled crossing of two certified single crosses.
- (iii) *Three-way cross*—the first generation resulting from the controlled crossing of an approved inbred line and a certified single cross.
- (iv) *Top cross*—the first generation resulting from the controlled crossing of an approved inbred line and a certified open-pollinated variety.
- (v) *Double top cross*—the first generation resulting from the controlled crossing of a certified single cross and a certified open-pollinated variety.

##### 2. *Classes and sources of seed*

- (a) Only the class ‘certified’ shall be recognized.
- (b) A hybrid to be certified must be produced from certified foundation seed or seed stocks approved by the Certification Agency.

##### 3. *Seed house or bin inspection*

Maize hybrids shall be ear-inspected after maturity by the Certification Agency.

#### II. Land Requirements

Land to be used for seed production of maize single crosses shall be free of volunteer plants.

### III. Field Inspection

A minimum of four inspections shall be made in such a way that one is made before flowering and the remaining three during flowering.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

(a) A specific hybrid of maize shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>
1	2
*Fields of any maize with same kernel colour and texture	200
Fields of any maize with different kernel colour and texture, and teosinte	300
*Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	200
*Fields of the other hybrids having common male parent and conforming to varietal purity requirements for certification	5
*Fields of the other hybrids having common male parent and not conforming to varietal purity requirements for certification	200

\*Distances less than 200 meters may be modified by planting border rows of male parent, if the kernel colour and texture of the contaminant are the same as that of the seed parent. The number of border rows to be planted all around the seed field to modify isolation distances less than 200 meters shall be determined by the size of the field and its distance from the contaminant as shown in the Table below:

When the field area (in hectares) growing the concerned seed parent is:								Then the minimum number border rows required is:
More than upto:	4	6	8	10	12	14	16 Or over	
And the distance (in meters) of the seed parent from other maize with kernel colour and texture the same as that of the seed parent is at least:								
200.0	195.0	190.0	185.0	180.0	175.0	170.0	165.0	1
187.5	182.5	177.5	172.5	167.5	162.5	157.5	152.5	2
175.0	170.0	165.0	160.0	155.0	150.0	145.0	140.0	3
162.5	157.5	152.5	147.5	142.5	137.5	132.5	127.5	4
150.0	145.0	140.0	135.0	130.0	125.0	120.0	115.0	5
137.5	132.5	127.5	122.5	117.5	112.5	107.5	102.5	6
125.0	120.0	115.0	110.0	105.0	100.0	95.0	90.0	7
112.5	107.5	102.5	97.5	92.0	87.5	82.5	77.5	8
100.0	95.0	90.0	85.0	80.0	75.0	70.0	65.0	9
87.5	82.5	77.5	72.5	67.5	62.5	57.5	52.5	10
75.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	11
62.5	57.5	52.5	47.5	42.5	37.5	32.5	27.5	12
50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	13

This table applies to all sides of the seed field exposed to contamination, whether located directly opposite or diagonally.

- (b) Border rows must be planted in the seed field or adjacent to it, but in no case separated by more than five meters from the seed field.
- (c) Border rows must be planted at the same time as the rest of the seed field so that the flowering time of both is the same; i.e., border rows should be shedding pollen when silks in the seed parent are receptive.
- (d) Border rows must be planted all along and opposite to the contaminating maize.
- (e) There should be a reasonable stand of border rows, i.e., there must not be gaps in the border rows. Border rows must have been planted using the seed rate and spacing adopted for the seed crop.
- (f) The area planted under border rows is taken into consideration while modifying the isolation distance.
- (g) Seed fields having diagonal exposure to contaminating fields are to be planted with border rows in both directions of exposure.
- (h) If two hybrid seed fields with different pollinator parents are within the isolation distance of one another, border rows are necessary for each of them in order to avoid contamination of the respective seed parent.

- (i) Natural barriers such as tall thick trees, buildings etc., between the seed and contaminating fields shall not be a substitute to border rows.
- (j) Border rows must be planted with seed used for planting male rows in the seed field. Seed saved from male rows of the previous production of the same cross cannot be used for planting of border rows or for planting within the isolation distance.
- (k) The isolation distance continues to be 300 meters if the kernel colour or texture of the contaminating maize is different from that of the seed parent or if the contaminating field is planted with sweetcorn, popcorn or teosinte. In this case, modification of isolation distance by planting border rows will not be permitted.
- (l) Differential blooming dates are permitted for modifying isolation distances, provided 5.0% or more of the seed parent plants do not have receptive silks when more than 0.050% of plants in the field(s) within the isolation distance are shedding pollen.

**B. Specific requirements**

Factor	Maximum permitted (%)*
Offtype plants that have shed or are shedding pollen in male parent at any one inspection during flowering when 5.0% or more of the plants in the seed field have receptive silks	0.50
Tassels of the plants that have shed or shedding pollen in seed parent at any one inspection during flowering when 5.0% or more of the plants in the seed parent have receptive silks	1.00
Total of pollen shedding tassels including tassels that have shed pollens for all three inspections conducted during flowering on different dates	2.0
Off-types plants in seed parent at final inspection	0.50

\*Sucker tassels, portions of tassels, and tassels on main plants shall be counted as shedding pollen only when two inches or more of the centre spike, the side branches, or a combination of the two have the anthers exerted from the glumes and are shedding pollen.

## V. Seed Standards

A. Seed ears inspected after harvest shall not contain in excess of 0.50% of offtype ears including ears with off-coloured kernels.

Factor	Standards
Pure seed (minimum)	98.0%
Inert matter (maximum)	2.0%
Other crop seeds (maximum)	10/kg
Other distinguishable varieties based on kernel colour and texture (maximum)	10/kg
Weed seeds (maximum)	None
Germination (minimum)	90%
Moisture (maximum)	12.0%
For vapour-proof containers (maximum)	8.0%

### B. *Shelling*

Shelling of the seed ears will be made after obtaining approval from the Certification Agency.

**MAIZE (*Zea mays L.*) COMPOSITE, SYNTHETICS  
AND OPEN-POLLINATED VARIETIES**

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of composites, synthetics and open-pollinated varieties of maize.
- B. The General Standards are amplified as follows to apply specifically to composites, synthetics and open-pollinated varieties of maize.

*1. Eligibility requirements for certification*

A composite or a synthetic or an open-pollinated variety to be eligible for certification must be from such a source that its identity may be assured and approved by the Certification Agency.

*2. Seed house or bin inspection*

Composites, synthetics and open-pollinated varieties of maize shall be ear-inspected after maturity by the Certification Agency.

**II. Land Requirements**

Land to be used for seed production of maize composites, synthetics and open-pollinated varieties shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made in such a way that one is done before flowering and the remaining three during flowering.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

The seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	400	200
Fields of the same variety not conforming to varietal purity requirements for certification and teosinte	400	200

**B. *Specific requirements***

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types plants that have shed or are shedding pollen at any one inspection during flowering when 5.0% or more of the plants in the seed field have receptive silks.	1.0	1.0

**V. Seed Standards**

**A.** Seed ears inspected after harvest shall not contain in excess of 1.0% of off-type ears including the ears with off-coloured kernels.

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Other distinguishable varieties based on kernel colour and texture (maximum)	10/kg	20/kg
Weed seeds (maximum)	None	None
Germination (minimum)	90%	90%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**B. *Shelling***

Shelling of the seed ears is to be done after obtaining approval from the Certification Agency.

**SORGHUM (*Sorghum bicolor L.*)(Moench)**  
**OPEN-POLLINATED VARIETIES**  
**(Grain and dual-purpose)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of open-pollinated varieties of sorghum.

**II. Land Requirements**

Land to be used for seed production of sorghum open-pollinated varieties shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made as follows:

- (1) the first inspection shall be made before flowering in order to verify isolation, volunteer plants and other relevant factors;
- (2) the second inspections shall be made during flowering to check isolation, Off-types and other relevant factors;
- (3) the third inspection shall be made at maturity and prior to harvesting to verify true nature of plant and other relevant factors.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

- (a) The seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties of grain and dual-purpose sorghum	200	100
Fields of the same variety not conforming to varietal purity requirements for certification	200	100
Johnson grass ( <i>Baru</i> ) <i>Sorghum halpense</i> L.) Pers.)	400	400
Forage sorghum with high tillering and grassy panicle	400	400

(b) Differential blooming dates for modifying isolation distances are not permitted.

## 2. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
Off-types at any one inspection at and after flowering	0.050	0.10
*Heads infected by Kernel smut or Grain smut ( <i>Sphacelotheca sorghi</i> (Link) Clinton) and Head smut ( <i>Sphacelotheca reiliana</i> (Kuhn.) Clinton) at final inspection	0.050	0.10

\*Seed fields can, however, be certified if diseased earheads are removed and burnt and the fields show, on re-inspection, infection not more than maximum permissible level. Only one such re-inspection is permitted.

Note: Seed fields should be thoroughly rogued to remove plants infected by Sugary disease (*Sphacelia sorghi* McRae)/Ergot (*Claviceps* spp.) so that the prescribed standards are met at seed stage. However, the seed fields shall not be rejected on account of the presence of sugary/ergot infected heads.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Ergot ( <i>Claviceps</i> spp.), sclerotia, seed entirely or partially modified as sclerotia, broken sclerotia or ergotted seed ( <i>Sphacelia sorghi</i> McRae & <i>Claviceps</i> spp.) (maximum)	0.020% (by number)	0.040% (by number)
Germination (minimum)	75%	75%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## **SORGHUM (*Sorghum bicolor L.*)(Moench)**

### **HYBRIDS**

#### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid sorghum seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of sorghum.

##### *1. Eligibility requirements for certification*

- (a) An inbred line to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved inbred lines, one of which shall be male sterile.

##### *2. Classes and sources of seed*

- (a) An inbred line shall be a relatively true breeding strain resulting from self-pollination with selection.
- (b) The foundation class seed shall consist of an approved male sterile line to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- (c) A male sterile line shall be a strain (A) carrying cytoplasmic-genetic male sterility, which sheds no viable pollen and is maintained by the normal sister strain (B) which is used as pollinator.
- (d) The certified class seed shall be the hybrid seed to be planted for any use except seed production.

#### **II. Land Requirements**

Land to be used for seed production of hybrid sorghum shall be free of volunteer plants.

#### **III. Field Inspection**

A minimum of four inspections shall be made as follows:

- (1) the first inspection shall be made before flowering in order to verify isolation, volunteer plants, outcrosses, planting ratio, errors in planting and other relevant factors;
- (2) the second and third inspections shall be made during flowering to check isolation, off-types, pollen shedders, and other relevant factors;
- (3) the fourth inspection shall be made at maturity and prior to harvesting to verify true nature of plant and other relevant factors.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

(a) Hybrid sorghumseed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
	2	3
Fields of other varieties of grain and dual-purpose sorghum including commercial hybrid of the same variety	300	200
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	300	200
Fields of the other hybrids having common male parent and conforming to varietal purity requirements for certification	-	5
Fields of other hybrids having common male parent but not conforming to varietal purity requirements for certification	-	200
Johnson grass ( <i>Baru</i> ) ( <i>Sorghum halpense</i> L.) Pers.)	400	400
Forage sorghum with high tillering and grassy panicle	400	400

(b) Differential blooming dates for modifying isolation distances are not permitted.

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
	2	3
Off-types in seed parent at any one inspection at and after flowering	0.050	0.10
Off-types in pollinator at any one inspection at and after flowering	0.050	0.10

Pollen shedding heads in seed parent at any one inspection at flowering	0.050	0.10
*Heads infected by Kernel smut or Grain smut ( <i>Sphacelotheca sorghi</i> (Link) Clinton) and Head smut ( <i>Sphacelotheca reiliana</i> (Kuhn.) Clinton) in seed parent at final inspection	0.050	0.10

\*Seed fields can, however, be certified if diseased earheads are removed and burnt and the fields show, on re-inspection, infection not more than maximum permissible level. Only one such re-inspection is permitted.

Note: Seed fields should be thoroughly rogued to remove plants infected by Sugary disease (*Sphacelia sorghi* McRae)/Ergot (*Claviceps* spp.) so that the prescribed standards are met at seed stage. However, the seed fields shall not be rejected on account of the presence of sugary/ergot infected heads.

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Ergot ( <i>Claviceps</i> spp.), sclerotia, seed entirely or partially modified as sclerotia, broken sclerotia or ergotted seed ( <i>Sphacelia sorghi</i> McRae & <i>Claviceps</i> spp.) (maximum)	0.020% (by number)	0.040% (by number)
Germination (minimum)	75%	75%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**PEARLMILLET( Bulrush Millet, Spiked Millet),  
(*Pennisetum americanum* (L) Leek) Composites,  
Synthetics and Open-pollinated Varieties**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of pearl millet open-pollinated varieties.

**II. Land Requirements**

Land to be used for seed production of pearl millet open-pollinated varieties shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made as follows:

- (1) the first inspection shall be made before flowering preferably within 30 days after planting to determine isolation, volunteer plants, off-types, downy mildew incidence and other relevant factors;
- (2) the second inspections shall be made during 50% flowering to check isolation, off-types, downy mildew/green ear (*Sclerospora graminicola* (Sacc.) Schroet) and other relevant factors;
- (3) the third inspection shall be made at maturity and prior to harvesting and in order to determine the incidence of downy mildew/green ear disease, ergot, grain smut and to verify true nature of plant and other relevant factors.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

- (a) Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	400	200
Fields of the same variety not conforming to varietal purity requirements for certification	400	200

(b) Differential blooming dates for modifying isolation distances are not permitted.

B. *Specific requirements*

Factor	Maximum permitted (%)*	
	Foundation	Certified
Off-types at any one inspection at and after flowering	0.050	0.10
*Plants infected by Downy mildew/Green ear ( <i>Sclerospora graminicola</i> (Sacc.) Schroet) disease at any one inspection	0.050	0.10
**Ergotted earheads ( <i>Claviceps microcephala</i> (Fr.) Tul.) at final inspection	0.020	0.040
***Earheads infected by Grain smut ( <i>Tolyposporium pencillariae</i> Brefeld and <i>T. senegalense</i> Speg.) at final inspection	0.050	0.10

\*Complete stool shall be considered as one infected unit.

\*\*Seed from such fields that have been reported to contain the ergot infection even within the prescribed limits at field stage shall be subjected to floatation treatment with brine to become eligible for certification.

\*\*\*Seed fields with incidence of grain smut more than the maximum permissible level can, however, be certified if such seed is treated with an approved organo-mercurial fungicide not earlier than a month prior to its sowing.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Ergot sclerotia, seed entirely or partially modified as sclerotia, broken sclerotia, or ergotted seed (maximum)	0.020% (by number)	0.040% (by number)
Germination (minimum)	75%	75%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**PEARLMILLET(Bulrush Millet, Spiked Millet),  
(*Pennisetum americanum* (L) Leek) HYBRIDS**

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid pearl millet seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of pearlmillet.

*1. Eligibility requirements for certification*

- (a) An inbred line to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved inbred lines, one of which shall be male sterile.

*2. Classes and sources of seed*

- (a) An inbred line shall be a relatively true breeding strain resulting from self-pollination with selection.
- (b) The foundation class seed shall consist of an approved male sterile line to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- (c) A male sterile line shall be a strain (A) carrying cytoplasmic-genetic male sterility, which sheds no viable pollen and is maintained by the normal sister strain (B) which is used as pollinator.
- (d) The certified class seed shall be the hybrid seed to be planted for any use except seed production.

**II. Land Requirements**

Land to be used for seed production of hybrid pearl millet shall be free of volunteer plants.

**III. Field Inspection**

A minimum of four inspections shall be made as follows:

- (1) the first inspection shall be made before flowering preferably within 30 days after planting in order to determine isolation, volunteer plants, outcrosses, planting ratio, errors in planting, incidence of downy mildew disease and other relevant factors;
- (2) the second and third inspections shall be made during flowering to check isolation, off-types, pollen shedders, downy mildew/green ear and other relevant factors;

(3) the fourth inspection shall be made at maturity and prior to harvesting in order to determine the incidence of downy mildew/green ear, ergot, grain smut, and to verify true nature of plant and other relevant factors.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

(a) Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants 1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties including commercial hybrid of the same variety	1000	200
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	1000	200
Fields of the other hybrids having common male parent and conforming to varietal purity requirements for certification	-	5
Fields of other hybrids having common male parent but not conforming to varietal purity requirements for certification	-	200

(b) Differential blooming dates for modifying isolation distances are not permitted.

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types in seed parent at any one inspection at and after flowering	0.050	0.10
Off-types in pollinator at any one inspection at and after flowering	0.050	0.10
Pollen shedding heads in seed parent at any one		

inspection at flowering	0.050	0.10
*Plants infected by Downy mildew/Green ear disease ( <i>Sclerospora graminicola</i> (Sacc) Schroet.) in seed parent at any one inspection	0.050	0.10
@Plants infected by Downy mildew/Green ear disease ( <i>Sclerospora graminicola</i> (Sacc) Schroet.) in pollinator at any one inspection	0.050	0.10
**Ergotted earheads ( <i>Claviceps microcephala</i> (Fr.) Tul.) in seed parent at final inspection	0.020	0.040
@@Earheads infected by grain smut ( <i>Tolyposporium penicillariae</i> Brefeld. and <i>T. senegalense</i> Speg.) in seed parent at final inspection	0.050	0.10

\*@Complete stool shall be considered as one infected unit

\*\*Seed from such fields that have been reported to contain the ergot infection even within the prescribed limits at field stage shall be subjected to floatation treatment with brine to become eligible for certification.

@@Seed fields with incidence of grain smut more than the maximum permissible level can, however, be certified if such seed is treated with an approved organo-mercurial fungicide not earlier than a month prior to its sowing.

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Ergot sclerotia, seed entirely or partially modified as sclerotia, broken sclerotia, or ergotted seed (maximum)	0.020% (by number)	0.040% (by number)
Germination (minimum)	75%	75%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**BARNYARD MILLET (*Enchinochloa colona* (L.) Link)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of barnyard millet seed.

**II. Land Requirements**

Land to be used for seed production of barnyard millet shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first during flowering and the second at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields of barnyard millet shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.050	0.10

\*Maximum permitted at final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	75%	75%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**COMMON MILLET[PROSO MILLET, HOG MILLET]  
[*Panicum miliaceum* L.]**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of common millet seed.

**II. Land Requirements**

Land to be used for seed production of common millet shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first during flowering and the second at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields of common millet shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants 1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.050	0.10

\*Maximum permitted at final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	75%	75%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**FINGER MILLET(*Eleusine coracana* L.Gaertn)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of finger millet seed.

**II. Land Requirements**

Land to be used for seed production of finger millet shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first during flowering and the second at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields of finger millet shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.050	0.10

\*Maximum permitted at final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	75%	75%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**ITALIAN MILLET[Foxtail Millet]  
[*Setaria italica*Beauv.]**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Italian millet seed.

**II. Land Requirements**

Land to be used for seed production of Italian millet shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first during flowering and the second at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields of Italian millet shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.050	0.10

\*Maximum permitted at final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	75%	75%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**KODO MILLET [*Paspalum scrobiculatum* L.]**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of kodo millet seed.

**II. Land Requirements**

Land to be used for seed production of kodo millet shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first during flowering and the second at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields of kodo millet shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.050	0.10

\*Maximum permitted at final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	75%	75%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**LITTLE MILLET**[*Panicum sumatrense* Roth. Ex.]  
**Roem. & Schult (syn. *P. miliare* Lam.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of little millet seed.

**II. Land Requirements**

Land to be used for seed production of little millet shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first during flowering and the second at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields of little millet shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.050	0.10

\*Maximum permitted at final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	75%	75%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## CHAPTER-III

### Seed Certification Standards for **Pulses**

1. Black gram
2. Bengal gram
3. Cowpea
4. Green gram
5. Horse gram
6. Indian bean
7. *Khesari* (Chickling vetch)
8. Lentil
9. Moth bean (Kidney bean)
10. Peas (Field pea and Garden pea)
11. Pigeonpea (*Arhar*)
12. *Rajmash* (French bean)

## BLACK GRAM(*Vigna mungo* (L.)Hepper)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of black gram seed.

### II. Land Requirements

Land to be used for seed production of black gram shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made, the first during flowering and the second at flowering and fruit stage.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Black gram seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

#### B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20

\*Maximum permitted at the final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seeds (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## BENGAL GRAM(*Cicer arietinum* (L))

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Bengal gram seed.

### II. Land Requirements

Land to be used for seed production of Bengal gram shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made from the time the crop approaches flowering until it is ready for harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Bengal gram seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

#### B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
Off-types	0.10	0.20

\*Maximum permitted at the final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	5/kg
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination including hard seeds (minimum)	85%	85%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**COWPEA [Asparagus bean, Yard long bean]  
 (*Vigna unguiculata* [L.] Walp.)syn. *V. sinensis* [L.]  
 Savi. ex Hassk., *V. catjang* [Burm. f] Walp.,  
*V. cylindrical* [L.] Skeels., *V. sesquipedalis* Fruhw.]**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of cowpea seeds.

**II. Land Requirements**

Land to be used for seed production of cowpea shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first before flowering and the second at flowering and fruit stage.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Cowpea seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants  1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

B. *Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20
**Plants affected by seed borne diseases	0.10	0.20

\*Maximum permitted at the final inspection

\*\*seed borne diseases are:

Ashy stem blight (*Macrophomina phaseoli* (Maub.) Ashby)

Anthrachnose (*Colletotrichum lindemuthianum* (Sacc. & Magn.) Br. & Cav.)

Ascochyta blight (*Ascochyta* spp.) (for hill areas only)

Cowpea mosaic

V. **Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	10/kg
Weed seeds (maximum)	None	10/kg
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination including hard seeds (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## GREEN GRAM(*Vigna radiata* (L.) Wilczek)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of green gram seed.

### II. Land Requirements

Land to be used for seed production of green gram shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made, the first before flowering and the second at flowering and fruit stage.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Green gram seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

#### B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20
**Plants affected by seed borne diseases	0.10	0.20

\*Maximum permitted at the final inspection

\*\*Seed borne diseases shall be: Halo blight (*Pseudomonas phasiolicola*(Burk) Dows.)

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seeds (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**HORSE GRAM(*Macrotyloma uniflorum* (Lam.) Verdc.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of horse gram seed.

**II. Land Requirements**

Land to be used for seed production of horse gram shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first during peak flowering and the second at flowering and fruit stage.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Horse gram seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20

\*Maximum permitted at the final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	10/kg
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination including hard seeds (minimum)	80%	80%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## INDIAN BEAN(*Lab lab purpureus* (L.) Sweet)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Indian bean seed.

### II. Land Requirements

Land to be used for seed production of Indian bean shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made, the first before flowering and the second at flowering and fruit stage.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Indian bean seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

#### B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20
**Plants affected by seed borne diseases	0.10	0.20

\*Maximum permitted at the final inspection

\*\*Seed borne diseases shall be:

Bacterial blight (*Xanthomonas* spp.)

Anthracnose (*Colletotrichum lindemuthianum* (Sacc. & Magn.) Brr. & Cav.)

Ascochyta blight (*Ascochyta* spp.) (for hill areas only)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination including hard seeds (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**KHESARI [CHICKLING VETCH]**  
**[*Lathyrus sativus* L.]**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of *Khesari* seed.

**II. Land Requirements**

Land to be used for seed production of *Khesari* shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first before flowering and the second at flowering and fruit stage.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

*Khesari* seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20

\*Maximum permitted at the final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seeds (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## LENTIL [*Lens culinaris* Medic.]

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of lentil seed.

### II. Land Requirements

Land to be used for seed production of lentil shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made, the first before flowering and the second at flowering and fruit stage.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Lentil seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

#### B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20

\*Maximum permitted at the final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seeds (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**MOTH BEAN (KIDNEY BEAN)**  
**(*Vigna aconitifolia* (Jacq.) Marechal)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of moth bean seed.

**II. Land Requirements**

Land to be used for seed production of mothbean shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first before flowering and the second at flowering and fruit stage.

**IV. Field Standards**

*B. General requirements*

*2. Isolation*

Moth bean seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20

\*Maximum permitted at the final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seeds (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**PEAS (FIELD PEA AND GARDEN PEA)**  
*(Pisum sativum* var. *arvense* (L.) Poir)

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of pea seed.

**II. Land Requirements**

Land to be used for seed production of pea shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first before flowering and the second at flowering and fruit stage.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Pea seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20

\*Maximum permitted at the final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	5/kg
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination including hard seeds (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**PIGEON PEA (RED GRAM)**  
(*Cajanus cajan* (L.) Millsp.)

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of pigeon pea seed.

**II. Land Requirements**

Land to be used for seed production of pigeon pea shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made in such a way that atleast one of them is made during flowering.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Pigeon pea seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	250	100
Fields of the same variety not conforming to varietal purity requirements for certification	250	100

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20

\*Maximum permitted at and after flowering

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seeds (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**RAJMASH(FRENCH BEAN) (*Phaseolus vulgaris*L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of *rajmash* seed.

**II. Land Requirements**

Land to be used for seed production of *rajmash* shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first before flowering and the second at flowering and fruit stage.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

*Rajmash* seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20
**Plants affected by seed borne diseases	0.10	0.20

\*Maximum permitted at the final inspection

\*\*Seed borne diseases shall be:

Bacterial blight (*Xanthomonas* spp.)

Anthraxnose (*Colletotrichum lindemuthianum* (Sacc. & Magn.) Br. & Cav.)

Ascochyta blight (*Ascochyta phaseolorum* (Sacc.) Michelia) (for hill areas only)

Bean mosaic (*Macrosiphum pisi* Kalt.)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	10/kg
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	7.0%	7.0%

## CHAPTER-IV

### Seed Certification Standards for **Oilseeds**

1. Castor
2. Castor hybrids
3. Castor hybrids – seed production by modified methods
4. Groundnut
5. Indian Rapeseed & Mustard
6. Linseed
7. Niger
8. Rocket Salad (*Taramira*)
9. Safflower
10. Sesame
11. Soybean
12. Sunflower
13. Sunflower hybrids

**CASTOR(*Ricinus communis* L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of castor seed.

**II. Land Requirements**

Land to be used for seed production of castor shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made from the time the crop approaches flowering until it is ready for harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Castor seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants  1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties	600	300
Fields of the same variety not conforming to varietal purity requirements for certification	600	300

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20

\*Maximum permitted at any inspection at and after flowering.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	5.0%	5.0%

## CASTOR(*Ricinus communis* L.) HYBRIDS

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid castor seed.

### II. Land Requirements

Land to be used for seed production of hybrid castor shall be free of volunteer plants.

### III. Field Inspection

A minimum of four inspections shall be made as follows:

- (1) the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, planting ratio, errors in planting, inter nodal length, stem colour, type of leaves and other relevant factors;
- (2) the second and third inspections shall be made during flowering to check isolation, Off-types, nature of bloom, petiole, leaves, raceme, sex expressivity, number of nodes to flower and other relevant factors;
- (3) the fourth inspection shall be made prior to harvesting after the seed has attained maturity so that true nature of plant can be verified.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

- (a) Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties including commercial hybrid of the same variety	600	300
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	600	300

(b) Differential blooming dates for modifying isolation distances are not permitted.

B. *Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
**Off-types including plants found to flower over the main stem	0.50	1.00
Male variants (three secondary rachis from base and above possessing only male flowers are considered as mostly male)	1.00	2.00
***Female variants (in certain cases all sex variants of dominant females, females with interspersed staminate flowers mostly female and mostly male raceme spectra involved)	1.00	2.00
Monoecious plants and the racemes reverted to monoecism on female plants before anthesis	****	2.0

\*Maximum permitted at any inspection at and after flowering.

\*\*One node less than the minimum node specified for different combiners and female lines is considered within the range. For example VP-1 (female)-12 to 20 nodes, VI-9 (Male)-12 to 18 nodes.

\*\*\*Late opening male flowers in the female plants could be removed without removing the entire raceme.

\*\*\*\*In case of female, at least 25% monoecious plants are required for pollen source.

V. A. **Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	5.0%	5.0%

- B.** All seed lots shall be subjected to grow-out test and shall conform to the following genetic purity requirements:

Class	Genetic purity (%) (Minimum)
Foundation	95.0
Certified	85.0

The observations for grow-out test shall be recorded at 30 days crop growth stage or as per the recommendation of originating breeder/institute. The minimum population size of 400 plants shall be maintained in two replicates of 200 each or four of 100 each throughout the test and each plant shall be examined individually. The reject number shall be as under:

Class	Genetic purity (%) (Minimum)	Reject number
Foundation	95.0 (5 in 100)	24/400
Certified	85.0 (15 in 100)	64/400

**CASTOR(*Ricinus communis* L.) HYBRIDS**  
**(Seed Production by Modified Method)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid castor seed.

**II. Land Requirements**

Land to be used for seed production of hybrid castor shall be free of volunteer plants.

**III. Field Inspection**

A minimum of four inspections shall be made as follows:

- (1) the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, planting ratio, errors in planting, internodal length, stem colour, type of leaves and other relevant factors;
- (2) the second and third inspections shall be made during flowering to check isolation, Off-types, nature of bloom, petiole, leaves, raceme, sex expressivity, number of nodes to flower and other relevant factors;
- (3) the fourth inspection shall be made prior to harvesting after the seed has attained maturity so that true nature of plant can be verified.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

- (a) Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties including commercial hybrid of the same variety	1000	300
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	1000	300

- (b) Differential blooming dates for modifying isolation distances are not permitted.

B. Specific requirements for VP-1 by modified method and certified hybrid seed using VP-1 produced by modified method.

Factor	Maximum permitted (%)			
	Foundation		Certified	
	Male	Female	Male	Female
**For node number on main stem	0.50	0.50	1.00	1.00
Male variants (three secondary rachis from base and above possessing only male flowers are considered as mostly male)	1.00	0.00	2.00	0.00
***Female variants (in certain cases all sex variants of dominant females, with interspersed staminate flowers mostly female and mostly male raceme spectra involved)	1.00	1.00	2.00	0.00
****Monoecious plants and the racemes reverted to monoecism on female plants before anthesis	****	0.00	2.00	0.00

\*Maximum permitted at any inspection at and after flowering.

\*\*One node less than the minimum node specified for different combiners and female lines is considered within the range. For example VP-1 (female)-12 to 20 nodes, VI-9 (Male)-12 to 18 nodes.

\*\*\*Late opening male flowering in the female plants could be removed without removing the entire raceme.

\*\*\*\*All the monoecious plants are to be totally removed before flowering of primaries and only pistillate plants are to be retained in the seed plot. The pistillate plants with interspersed staminate flowers are to be retained. The ISF is the source of pollen for fertilization. Such pistillate plants should not revert to monoecism up to 4<sup>th</sup> order of sequential spikes. The maximum early revertant (reversion to monoecism) permitted in foundation seed production plot of dominant female multiplied by modified method should be as under:

S.No.	Sequential Order	Maximum early revertant (%) (Foundation)
1.	Primary (first order)	0.0
2.	Second order revertant	0.1
3.	Third order revertant	0.2
4.	Fourth order revertant	0.5

**V. A. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	5/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	5.0%	5.0%

**VI. Grow-out Test:**

All seed lots shall be subjected to grow-out test and shall conform to the following genetic purity requirements:

Class	Genetic purity (%) (minimum)
Foundation	95.0
Certified	85.0

The observations for grow-out test shall be recorded at 30 days crop growth stage.

The minimum population size of 400 plants shall be maintained in two replicates of 200 each or four of 100 each throughout the test and each plant shall be examined individually. The reject number shall be as under:

Class	Genetic purity (%) (Minimum)	Reject number
Foundation	95.0 (5 in 100)	24/400
Certified	85.0 (15 in 100)	64/400

In female multiplied by modified method, the recovery of pistillate plants should be at least 90% and the rest 10% should include 5% off plants and 5% monoecious and early revertants.

Additional information on pick-wise Grow-out Test (GOT) to determine varietal purity at 120, 150 days and final harvest

Normally, the GOT in Gujarat is conducted in May and June and GOT results will be released by the end of July. This suits Gujarat conditions, where sowings are taken in August. In case of Southern India, the sowing will be taken in the month of June with the onset of monsoon. As single GOT is conducted after final harvest, the certified seed is not available in the market in time. In view of this, it is recommended to conduct GOT twice. First after the harvest on primaries and secondary, and the second after final harvest. The certified seed from first harvest will be made available to farmers of Andhra Pradesh by the first week of June.

**GROUNDNUT(*Arachis hypogaea*L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of groundnut.

**II. Land Requirements**

A seed crop of groundnut shall not be eligible for certification if planted on land on which the crops grown within the previous two seasons were of the same kind unless the crops grown within the previous two seasons were of the same variety and of an equivalent or higher class of certified seed and were certified.

**III. Field Inspection**

A minimum of two inspections shall be made from the time of flowering to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Groundnutseed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20

\*Maximum permitted at the final inspection.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	96.0%	96.0%
Inert matter (maximum)	4.0%	4.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum) (kernels hand shelled)	70%	70%
Moisture (maximum) (kernels hand shelled)	9.0%	9.0%
For vapour-proof containers (maximum) (kernels hand shelled)	5.0%	5.0%

**INDIAN RAPESEED AND MUSTARD(*Brassica* spp.)**  
**(Rape-Yellow sarson, Brown sarson and Toria)**  
**(Mustard – Rai)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of rapeseed and mustard.

**II. Land Requirements**

Land to be used for seed production of rapeseed and mustard shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second from flowering to fruiting and the third at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)			
	Foundation		Certified	
	Self- Compatible types	Self- Incompatible types	Self- Compatible types	Self- Incompatible type
1	2	3	4	5
Fields of the other varieties of the same spp.	200	100	50	50
Fields of the same variety not conforming to varietal purity requirements for certification	200	100	50	50
Fields of Rocket salad and any of the other species of the genus <i>Brassica</i> listed below:	50	100	25	50

*Brassica juncea* (L.) Czern and Coss. Subsp. *juncea* (syn. *B. juncea* (L.) Czern and Coss.): Indian mustard or rai or Bangla sarson.

*B. juncea* (L.) Czern and Coss. Subsp. *integrifolia* (West) Thell. (syn. *B. juncea* (L.) Czern and Coss. var. *cuneifolia* Roxb.): Vegetable mustard or rai.

*B. juncea* var. *rugosa* Roxb. : Pahadi rai.

*B. chinensis* Juslen; non Duthie and Fuller. (syn. *B. campestris* L. var. *dichotoma* Wtt.) : Brown sarson or kali sarson.

*B. napus* L. var. *glauca* (Roxb.) Schulz (syn. *B. campestris* var. *sarson prain*) : Yellow sarson or pilli sarson or sarish.

*B. napus* L. var. *napus* (syn. *B. campestris* L. var. *toria* Duth. & Full.) : Toria or rai or laha or maghi or achara rai.

*B. tournefortii* Gouan : Punjabi rai or jangli rai.

*B. nigra* (L.) Koch : True mustard or black mustard or Banarasi rai.

*B. alba* (L.) Robenh : White mustard.

*B. pekinensis* ((Lour.) Rupr. : Chinese cabbage (heading).

*B. chinensis* L. : Chinese cabbage (non-heading)

*B. rapa* L. : Turnip

#### B. *Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.50
**Objectionable weed plants	0.050	0.10

\*Maximum permitted at any inspection conducted at and after flowering in the case of off-types and the final inspection in case of objectionable weeds.

\*\*Objectionable weed shall be : Mexican prickly poppy (*Satyanashi*) (*Argemone mexicana* L.)

**V. Seed Standards**

Factor	<i>Maximum permitted(%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	0.10%	0.50%
	(by number)	(by number)
Total weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	85%	85%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)		
Mustard	5.0%	5.0%
Rapeseed	7.0%	7.0%

\*Objectionable weed is the same as given at IV.B above.

**LINSEED(*Linum usitatissimum* L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of linseed.

**II. Land Requirements**

Land to be used for seed production of linseed shall be free of volunteer plants

**III. Field Inspection**

A minimum of two inspections shall be made, the first before flowering and the second at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	50	25
Fields of the same variety not conforming to varietal purity requirements for certification	50	25

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.05	0.10

\*Maximum permitted at the final inspection.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	80%	80%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	7.0%	7.0%

**NIGER(*Guizotia abyssinica* Cass.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of niger.

**II. Land Requirements**

Land to be used for seed production of niger shall be free of volunteer plants

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering and the second during flowering and the third at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	400	200
Fields of the same variety not conforming to varietal purity requirements for certification	400	200

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.05	0.10

\*Maximum permitted at any inspection at and after flowering.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Weed seeds (maximum)	10kg	20/kg
Germination (minimum)	80%	80%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	5.0%	5.0%

**TARAMIRA (ROCKET SALAD) :(*Eruca vesicaria* (L.)  
Cav. Subsp. *sativa* (Mill.) Thell. (syn. *Eruca sativa* Mill.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of *taramira*.

**II. Land Requirements**

Land to be used for seed production of *taramira* shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second from flowering to fruiting and the third at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	100	50
Fields of the same variety not conforming to varietal purity requirements for certification and any of the following species of the genus Brassica:	100	50

*Brassica juncea* (L.) Czern and Coss. Subsp. *juncea* (syn. *B. juncea* (L.) Czern and Coss.: Indian mustard or rai or Bangla sarson.

*B. juncea* (L.) Czern and Coss. Subsp. *integricolia* (West) Thell. (syn. *B. juncea* (L.) Czern and Coss. var. *cuneifolia* Roxb.: Vegetable mustard or rai.

*B. juncea* var. *rugosa* Roxb. : Pahadi rai.

*B. chinensis* Juslen; non Duthie and Fuller. (syn. *B. campestris* L. var *dichotoma* Wtt.) : Brown sarson or kali sarson.

*B. napus* L. var. *glauca* (Roxb.) Schulz (syn. *B. campestris* var. *sarson prain*) : Yellow sarson or pilli sarson or sarish.

*B. napus* L. var. *napus* (syn. *B. campestris* L. var. *toria* Duth. & Full.) : Toria or rai or laha or maghi or achara rai.

*B. tournefortii* Gouan : Punjabi rai or jangli rai.

*B. nigra* (L.) Koch : True mustard or black mustard or Banarasi rai.

*B. alba* (L.) Robenh : White mustard.

*B. pekinensis* ((Lour.) Rupr. : Chinese cabbage (heading).

*B. chinensis* L. : Chinese cabbage (non-heading)

*B. rapa* L. : Turnip

**B**      *Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.50
**Objectionable weed plants	0.050	0.10

\*Maximum permitted at any inspection conducted at and after flowering in the case of Off-types and at the final inspection in case of objectionable weeds.

\*\*Objectionable weed shall be : Mexican prickly poppy (*Satyanashi*) (*Argemone mexicana* L.)

**V.**              **Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Total weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	85%	85%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	5.0%	5.0%

\*Objectionable weed is the same as given at IV.B. above.

**SAFFLOWER(*Carthamus tinctorius* L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of safflower seed.

**II. Land Requirements**

Land to be used for seed production of safflower shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second from flowering and the third at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Safflower seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants 1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties	400	200
Fields of the same variety not conforming to varietal purity requirements for certification and wild safflower ( <i>Carthamus oxyacantha</i> M. Bieb.)	400	200

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.05	0.10
**Objectionable weed plants	None	None

\*Maximum permitted at any inspection at and after flowering

\*\*Objectionable weed shall be : Wild safflower (*Carthamus oxyacantha* M. Bieb.)

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Total weed seeds (maximum)	5/kg	10/kg
*Objectionable weed seeds (maximum)	None	None
Germination (minimum)	80%	80%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	7.0%	7.0%

\*Objectionable weed is the same as given at IV.B. above.

**SESAME (TIL)(*Sesamum indicum* L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of sesame seed.

**II. Land Requirements**

Land to be used for seed production of sesame shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second from flowering and the third at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Sesame seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	100	50
Fields of the same variety not conforming to varietal purity requirements for certification	100	50

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20
**Plants affected by seed borne diseases	0.50	1.0

\*Maximum permitted at any inspection conducted at and after flowering

\*\*Seed borne disease shall be: Leaf spot (*Cercospora sesame* Zimm.)

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination (minimum)	80%	80%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	5.0%	5.0%

**SOYBEAN(*Glycine max* Merr.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of soybean seed.

**II. Land Requirements**

Land to be used for seed production of soybean shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first during flowering, and the second before harvesting after the leaves have shed.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Soybeanseed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.50

\*Maximum permitted at the final inspection

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	10/kg
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	10/kg	40/kg
Germination (minimum)	70%	70%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	7.0%	7.0%

## SUNFLOWER(*Helianthus annuus* L.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of sunflower seed.

### II. Land Requirements

A seed crop of sunflower shall not be eligible for certification if planted on land on which the same kind of crop grown in the previous year unless the crop(s) grown in the previous year was of the same variety and of an equivalent or high class of certified seed and was/were certified.

### III. Field Inspection

A minimum of three inspections shall be made as follows:

- (1) The first inspection shall be made at the stage of 6-7 pairs of leaves in order to determine isolation, volunteer plants, designated disease and other relevant factors;
- (2) The second inspection shall be made during flowering to check isolation, Off-types and other relevant factors;
- (3) The third inspection shall be made at maturity and prior to harvesting to verify designated disease, true nature of plant and head, characteristics of seeds and other relevant factors.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Sunflower seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	400	200
Fields of the same variety not conforming to varietal purity requirements for certification and wild <i>Helianthus</i> spp.	400	200

B. *Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
*Off-types at and after flowering	0.10	0.20
**Objectionable weed plants at and after flowering	None	None
Plants infected by downy mildew disease ( <i>Plasmopara halstedii</i> (Farl.) Berl. & de T.) at each inspection	0.050	0.50
Plants infested with <i>Orobanche cumana</i> Guss. Non-Wallr. at final inspection	None	None

\*Sterile plants of the same variety shall not be considered as Off-types

\*\*Objectionable weed shall be : wild *Helianthus* spp.

V. **Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Huskless seeds (maximum)	2.0%	2.0%
	(by number)	(by number)
Other crop seeds (maximum)	None	None
Total weed seeds (maximum)	5/kg	10/kg
*Objectionable weed seeds (maximum)	None	None
Seeds infested with <i>Orobanche cumana</i> Guss. Non-Wallr. (Maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	7.0%	7.0%

\*Objectionable weed is the same as given at IV.B above

## SUNFLOWER(*Helianthus annuus* L.) HYBRIDS

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid sunflower seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of sunflower.

#### *1. Eligibility requirements for certification*

- (a) An inbred line to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
- (c) Hybrid seed to be eligible for certification shall be the progeny of two approved inbred lines, one of which shall be male sterile.

#### *2. Classes and sources of seed*

- (a) An inbred line shall be a relatively true breeding strain resulting from self-pollination with selection.
- (b) The foundation class seed shall consist of an approved male sterile line to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- (c) A male sterile line shall be a strain (A) carrying cytoplasmic-genetic male sterility, which sheds no viable pollen and is maintained by the normal sister strain (B) which is used as pollinator.
- (d) The certified class seed shall be the hybrid seed to be planted for any use except seed production.

### **II. Land Requirements**

A seed crop of hybrid sunflower shall not be eligible for certification if planted on land on which the same kind of crop grown in the previous year unless the crop(s) grown in the previous year was of the same variety and of an equivalent or higher class of certified seed and was/were certified.

### **III. Field Inspection**

A minimum of four inspections shall be made as follows:

- (1) the first inspection shall be made at the stage of 6-7 pairs of leaves in order to determine isolation, volunteer plants, outcrosses, planting ratio, errors in planting, designated disease and other relevant factors;

- (2) the second and third inspections shall be made during flowering to check isolation, Off-types, pollen shedders, and other relevant factors;
- (3) the fourth inspection shall be made at maturity and prior to harvesting in order to determine the designated disease, true nature of plant and head, characteristics of seeds and other relevant factors.

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants 1	Minimum distance (meters)	
	Foundation 2	Certified 3
Fields of other varieties including commercial hybrid of the same variety	600	400
Fields of the same variety (code designation) not conforming to varietal purity requirements for certification and wild <i>Helianthus</i> spp.	600	400

##### B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
*Off-types in seed parent at and after flowering	0.20	0.50
Off-types in pollinator at and after flowering	0.20	0.50
Pollen shedding heads in seed parent at flowering	0.50	1.00
**Objectionable weed plants at and after flowering	None	None
Plants infected by Downy mildew disease ( <i>Plasmopara halstedii</i> (Farl.) Berl. & de T.) at each inspection	0.050	0.50
Plants infested with <i>Orobanche cumana</i> Guss. Non-Wallr. at final inspection	None	None

\*Sterile plants of the same variety shall not be considered as Off-types

\*\*Objectionable weed shall be : wild *Helianthus* spp.

## V. Seed Standards

Factor	Standards for each class	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Huskless seeds (maximum)	2.0%	2.0%
	(by number)	(by number)
Other crop seeds (maximum)	None	None
Total weed seeds (maximum)	5/kg	10/kg
*Objectionable weed seeds (maximum)	None	None
Seeds infested with <i>Orobanche cumana</i>		
Guss. Non-Wallr. (Maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	7.0%	7.0%

\*Objectionable weed is the same as given at IV.B above

**CHAPTER-V**  
**Seed Certification Standards for Fiber Crops**

1. Cotton
2. Cotton hybrids
3. Jute

## COTTON(*Gossypium* spp.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of cotton seed.

### II. Land Requirements

Land to be used for seed production of cotton shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made from the time crop approaches flowering until it is ready for harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Cotton seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants 1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties of same spp.	50	30
Fields of the same variety not conforming to varietal purity requirements for certification	50	30
Fields of other varieties of different spp. (different ploidy levels)	5	5

#### B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20

\*Maximum permitted at any inspection at and after flowering.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	65%	65%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## VI. Ginning

Ginning of seed cotton shall be done on the gins approved by the Certification Agency.

## COTTON(*Gossypium* spp.) HYBRIDS

### I. Application and Amplification of General Seed Certification Standards

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid cotton seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of cotton.

#### 1. *Eligibility requirements for certification if male sterile lines are used for producing hybrid seed:*

- (a) An inbred line to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved inbred lines, one of which shall be male sterile.

#### 2. *Classes and sources of seed*

- (a) An inbred line shall be a relatively true breeding strain resulting from self-pollination with selection.
- (b) The foundation class seed shall consist of an approved male sterile line to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- (c) A male sterile line shall be a strain (A) carrying cytoplasmic-genetic male sterility, which sheds no viable pollen and is maintained by the normal sister strain (B) which is used as pollinator.
- (d) The certified class seed shall be the hybrid seed to be planted for any use except seed production.

### II. Land Requirements

Land to be used for seed production of hybrid cotton shall be free of volunteer plants.

### III. Field Inspection

#### A. *Foundation Seed Production*

A minimum of three inspections shall be made, the first and second during flowering and the third at maturity and prior to harvesting.

*B. Certified Seed Production*

A minimum of four inspections shall be made as follows:

- (1) the first inspection shall be made before flowering in order to verify isolation, volunteer plants, outcrosses, and other relevant factors;
- (2) the second and third inspections shall be made during flowering to verify isolation, Off-types, and other relevant factors. In case male sterile line is used for producing hybrid seed, the number of pollen shedding plants in female parent shall also be verified;
- (3) the fourth inspection shall be made during picking of cotton in female parent in order to determine that selfed bolls are eliminated and only cotton from crossed bolls is picked. This inspection is not required for the fields if a male sterile line is used.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants 1	Minimum distance (meters)	
	Foundation 2	Certified 3
Fields of other varieties of the same species including commercial hybrid of the same variety	50	30
Fields of the same variety (code designation) not conforming to varietal purity requirements for certification.	50	30
Fields of other varieties of different spp. (different ploidy levels)	5	5
Between blocks of the parental lines of the same hybrid	-	5

B. *Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
*Off-types	0.10	0.50**
***Pollen shedding plants in seed parent	0.050	0.10

\*Maximum permitted at any inspection at and after flowering

\*\*Standards shall be met separately for seed parent and pollinator.

\*\*\*It shall be applicable in case male sterile line is used for the production of hybrid seed.

V. **Seed Standards**

- (a) All certified seed lots which have been produced by adopting emasculation shall be subjected to grow-out test and shall conform to the following minimum genetic purity requirements

Class	Genetic purity (%)* (minimum)
Certified	90.0

\*During grow-out test, the off-type plants (other than selfed plants) such as segregants, outcrosses and plants of other varieties should not exceed more than 1.50% out of 10.0% plants earmarked for selfed plants.

- (b) The minimum population size of 400 plants shall be maintained in two replicates of 200 each or four of 100 each throughout the test and each plant shall be examined individually. The reject number shall be as follows:

Class	Genetic purity (%) (minimum)	Reject number
Certified	90.0 (10 in 100)	44/400

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	65%	75%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## **VI. Ginning**

Ginning of seed cotton shall be done on the gins approved by the Certification Agency.

**JUTE(*Corchorus spp.*)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of jute seed.

**II. Land Requirements**

Land to be used for seed production of jute shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made in such a way that the first inspection is done prior to flowering, the second from bud stage to peak flowering, and the third prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Jute seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties of the same species	50	30
Fields of the same variety not conforming to varietal purity requirements for certification	50	30
Fields of other species	5	5

B. *Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.50	1.0
*Plants affected by seed borne diseases	1.00	2.0

\*Maximum permitted at the final inspection.

\*\*Seed borne diseases shall be: Jute chlorosis

V. **Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	80%	80%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	7.0%	7.0%

## CHAPTER-VI

### Seed Certification Standards for **Forage Crops**

1. Berseem
2. Buffel grass & Birdwood grass
3. *Dharaf* grass
4. Dinanath grass
5. Forage sorghum including Sudan grass
6. *Gaur* (cluster bean)
7. Guinea grass
8. Indian Clover (*Senji*)
9. Lucerne
10. Marvel grass
11. Napier grass
12. Oats
13. Ricebean
14. Setaria grass
15. Stylo
16. Teosinte

## BERSEEM(*Trifolium alexandrinum* L.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of berseem seed.

### II. Land Requirements

Land to be used for seed production of berseem shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made from the time crop approaches flowering until it is ready for harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Berseem seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants 1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties	400	100
Fields of the same variety not conforming to varietal purity requirements for certification	400	100

#### B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.20	1.0
*Objectionable weed plants	None	0.050

\*Maximum permitted at and after flowering.

\*\*Objectionable weed shall be : Chicory (*Kasni*) *Chicorium intybus* L.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Total weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	5/kg	10/kg
Germination including hard seeds (minimum)	80%	80%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	7.0%	7.0%

\*Objectionable weed is the same as given at IV.B. above

**BUFFEL GRASS(*Cenchrus ciliaris*)Linn.**  
**AND**  
**BIRDWOOD GRASS(*Cenchrus setigerus*) Vahl.**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of buffel grass and birdwood grass.

**II. Land Requirements**

*A. Foundation seed*

A seed crop of buffel grass or birdwood grass shall not be eligible for certification if planted on land on which the same kind of crop was grown within the previous five crop seasons.

*B. Certified seed*

Land to be used for seed production of buffel grass and birdwood grass shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and the third at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties of the same spp.	20	10
Fields of the same variety not conforming to varietal purity requirements for certification	20	20
Fields of another <i>Cenchrus</i> sp. known to cross or suspected of being able to cross	200	100

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	1.0

\*Maximum permitted at and after flowering.

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	80.0%	80.0%
Inert matter (maximum)	20.0%	20.0%
Other crop seeds (maximum)	20/kg	40/kg
Weed seeds (maximum)	20/kg	40/kg
Germination (minimum)	30%	30%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**DHARAF GRASS(*Goria, Guria*) : *Chrysopogon fulvus*  
(Spreng) Chiov. (syn. *Pollinia fulva* Spreng.,  
*Andropogon montanus* Koen.Ex.Trin.,  
*A. monticola* Roem. et. Schult.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of *dharafgrass*.

**II. Land Requirements**

*A. Foundation seed*

A seed crop of *dharafgrass* shall not be eligible for certification if planted on land on which the same kind of crop was grown within the previous five crop seasons.

*B. Certified seed*

Land to be used for seed production of *dharafgrass* shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and the third at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties of the same species	20	10
Fields of the same variety not conforming to varietal purity requirements for certification	20	10
Fields of another <i>Chrysopogon</i> spp. known to cross or suspected of being able to cross	200	100

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	1.0

\*Maximum permitted at and after flowering.

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	80.0%	80.0%
Inert matter (maximum)	20.0%	20.0%
Other crop seeds (maximum)	20/kg	40/kg
Weed seeds (maximum)	20/kg	40/kg
Germination (minimum)	15%	15%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**DINANATH GRASS(*Pennisetum pedicellatum* Trin.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of Dinanath grass.

**II. Land Requirements**

*A. Foundation seed*

A seed crop of Dinanathgrass shall not be eligible for certification if planted on land on which the same kind of crop was grown within the previous five crop seasons.

*B. Certified seed*

Land to be used for seed production of Dinanath grass shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and the third at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties of the same species	20	10
Fields of the same variety not conforming to varietal purity requirements for certification	20	10

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	1.0

\*Maximum permitted at final inspection.

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	95.0%	95.0%
Inert matter (maximum)	5.0%	5.0%
Other crop seeds (maximum)	20/kg	40/kg
Weed seeds (maximum)	20/kg	40/kg
Germination (minimum)	50%	50%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**FORAGE SORGHUM INCLUDING SUDAN GRASS**  
(*Sorghum bicolor* (L.) Moench)

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of open-pollinated varieties of forage sorghum including sudan grass.

**II. Land Requirements**

Land to be used for seed production of forage sorghum including sudan grass shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made as follows:

- (1) the first inspection shall be made before flowering in order to verify isolation, volunteer plants and other relevant factors;
- (2) the second inspection shall be made during flowering to check isolation, Off-types, and other relevant factors;
- (3) the third inspection shall be made at maturity and prior to harvesting to verify true nature of plant and other relevant factors.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

- (a) Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties of grain and dual-purpose sorghum	200	100
Fields of the same variety not conforming to varietal purity requirements for certification	200	100
Johnson grass ( <i>Baru</i> ) ( <i>Sorghum halepense</i> (L.))	400	400

(Pers.) and other grassy *Sorghum* spp.

(b) Differential blooming dates for modifying isolation distances are not permitted.

**B. Specific requirements**

Factor	Maximum permitted (%)*	
	Foundation	Certified
Off-types at any one inspection at and after flowering	0.10	0.20
*Heads infected by Kernel smut or Grain smut ( <i>Sphacelotheca sorghi</i> (Link) Clinton and Head smut ( <i>Sphacelotheca reiliana</i> (Kuhn) Clinton) at final inspection	0.050	0.10

\*Seed fields can, however, be certified if diseased earheads are removed and burnt and the fields show, on re-inspection, infection not more than maximum permissible level. Only one such re-inspection is permitted.

Note: Seed fields should be thoroughly rogued to remove plants infected by Sugary disease (*Sphacelia sorghi* Mc Rae)/Ergot (*Claviceps* spp.) so that the prescribed seed standards are met at seed stage. However, the seed fields shall not be rejected on account of the presence of sugary/ergot infected heads.

**V. Seed Standards**

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Ergot ( <i>Claviceps</i> spp.) sclerotia, seed entirely or partially modified as sclerotia, broken sclerotia or ergotted ( <i>Sphacelia sorghi</i> Mc Rae & <i>Claviceps</i> spp.) seeds (maximum)	0.020% (by number)	0.040% (by number)
Germination (minimum)	75%	75%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**GAUR (CLUSTER BEAN)**  
(*Cyamopsis tetragonaloba* (L.) Taub.)

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of cluster bean grass.

**II. Land Requirements**

Land to be used for seed production of cluster bean shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first before flowering, the second at flowering and fruit stage.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Cluster bean seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

*B. Specific requirements*

Factor	Maximum permitted (%)*	
	Foundation	Certified
Off-types	0.10	0.20
**Plants affected by seed borne diseases	0.10	0.20

\*Maximum permitted at final inspection.

\*\*Seed borne diseases shall be :

Bacterial blight (*Xanthomonas campestris* pv *cyamopsidis* Patel, Dhande & Kulkarni)

Anthracnose (*Colletotrichum lindemuthianum* (Sacc. & Magn.) Br. & Cav.)

Ascochyta blight (*Ascochyta* spp.) (for hill areas only)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seeds(minimum)	70%	70%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## GUINEA GRASS(*Panicum maximum* Jacq.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of Guinea grass.

### II. Land Requirements

#### A. *Foundation seed*

A seed crop of Guinea grass shall not be eligible for certification if planted on land on which the same kind of crop was grown within the previous five crop seasons.

#### B. *Certified seed*

Land to be used for seed production of Guinea grass shall be free of volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during flowering and the third at maturity and prior to harvesting.

### IV. Field Standards

#### A. *General requirements*

##### 1. *Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties of the same species	20	10
Fields of the same variety not conforming to varietal purity requirements for certification	20	10
Fields of another <i>Panicum</i> spp. known to cross or suspected of being able to cross	200	100

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	1.0

\*Maximum permitted at and final flowering.

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	80.0%	80.0%
Inert matter (maximum)	20.0%	20.0%
Other crop seeds (maximum)	20/kg	40/kg
Weed seeds (maximum)	20/kg	40/kg
Germination (minimum)	20%	20%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## INDIAN CLOVER (*SENJI*) : *Melilotus* spp.

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of *senji* seed.

### II. Land Requirements

Land to be used for seed production of *senji* shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made from the time the crop approaches flowering until it is ready for harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants 1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties	50	25
Fields of the same variety not conforming to varietal purity requirements for certification	50	25

#### B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.20	1.0

\*Maximum permitted at the final inspection.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination (minimum)	65%	65%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	7.0%	7.0%

## LUCERNE (*Medicago sativa* L.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of lucerne seed.

### II. Land Requirements

Land to be used for seed production of lucerne shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made from the time the crop approaches flowering until it is ready for harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants 1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties	400	100
Fields of the same variety not conforming to varietal purity requirements for certification	400	100

#### B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.20	1.0
**Objectionable weed plants	None	0.050

\*Maximum permitted at and after flowering.

\*\*Objectionable weed shall be : Dodder (*Cuscuta* spp.)

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Total Weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	5/kg	10/kg
Germination including hard seeds (minimum)	80%	80%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	7.0%	7.0%

\*Objectionable weed is the same as given at IV.B. above.

**MARVEL GRASS(*Dichanthium annulatum* Stapf.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of marvel grass.

**II. Land Requirements**

*A. Foundation seed*

A seed crop of marvel grass shall not be eligible for certification if planted on land on which the same kind of crop was grown within the previous five crop seasons.

*B. Certified seed*

Land to be used for seed production of marvel grass shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and the third at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants  1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties of the same species	20	10
Fields of the same variety not conforming to varietal purity requirements for certification	20	10
Fields of another <i>Dichanthium</i> spp. known to cross or suspected of being able to cross	200	100

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.20	1.0

\*Maximum permitted at and after flowering.

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	90.0%	90.0%
Inert matter (maximum)	10.0%	10.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination (minimum)	40%	40%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**NAPIER GRASS(*Pennisetum purpureum* K. Schum.)**  
**including HYBRID NAPIER GRASS for example**  
**[*P. americanum* (L.) Leek.] x [*Pennisetum purpureum***  
**K. Schum.]**

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of napier grass and hybrid napier grass.
- B. The General Standards are amplified as follows to apply specifically to napier grass and hybrid napier grass.
  - 1. Foundation root slips or stem cuttings shall be the initial transplants from breeder's clones.
  - 2. Certified root slips or stem cuttings shall be the initial transplants from foundation clones.

**II. Land Requirements**

Land to be used for seed production shall be free of volunteer plants of napier grass, hybrid napier grass and pearl millet.

**III. Field Inspection**

A minimum of two inspections shall be made, the first after 45 days of planting and the second after about 100 days of planting or before cutting of the root slips or stem cuttings to verify isolation, Off-types and other relevant factors.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	10	10
Fields of the same variety (hybrid) not conforming to varietal purity requirements for certification	10	10

**B. Specific requirements**

Factor	Maximum permitted (%)*	
	Foundation	Certified
Off-types	0.01	0.30
**Objectionable weed plants	None	None

\*Maximum permitted at final inspection.

\*\*Objectionable weeds shall be:

Canada thistle : *Cirsium arvense* (L.) Scop.

Dodder: *Cuscuta* spp.

Johnson grass (*Baru*) : *Sorghum halepense* (L.) Pers.

Quack grass (Twitch grass, Couch grass) : *Agropyron repens* (L.) P. Beauv.

Wild Morning glory (*Hirankhuri*) : *Convolvulus arvensis* L.

Note : All Off-types and objectionable weed plants shall be uprooted and removed from the seed field.

**V. Seed Standards**

(Root slips or stem cuttings)

Factor	Standards for each class	
	Foundation	Certified
Pure living root slips or stem cuttings (minimum)	99.50% (by number)	98.80% (by number)
Other living plants including their root slips and stem cuttings (maximum)	0.50 (by number)	2.0 (by number)
*Objectionable weeds (maximum)	None	None

\*Objectionable weeds are the same as given at IV.B above

**OATS(*Avena sativa* L. and *A. sterilis* L. var. *culta*)**  
(syn. *A. byzantine* C. Koch.)

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of oats seed.

**II. Land Requirements**

Land to be used for seed production of oats shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made between the ear emergence and harvesting of the seed crop.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Oats seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3
Fields of oats with infection of loose smut ( <i>Ustilago avenae</i> (Pers.) Rostr.) disease in excess of 0.10% and 0.50% in Foundation and Certified seed, respectively.	150	150

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.050	0.20
**Inseparable other crop plants	0.010	0.050
***Objectionable weed plants	0.010	0.020
****Plants affected by seed borne disease	0.10	0.50

\*Standards for Off-types, inseparable other crops and objectionable weeds shall be met at final inspection before harvesting and for loose smut of oats shall be met at any inspection conducted between ear emergence and harvesting.

\*\*Inseparable other crop plants shall be : barley, wheat, gram and triticale.

\*\*\*Objectionable weed shall be : Wild oats (*Avena fatua* L.)

\*\*\*\*Seed borne disease shall be : Loose smut (*Ustilago avenae* (Pers.) Rostr.)

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Total weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	2/kg	5/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination (minimum)	85%	85%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

\*Objectionable weed is the same as given at IV.B. above.

**RICE BEAN (REDBEAN) : *Vigna umbellata* (Thunb.)  
Ohwi & Ohashi; (syn. *Phaseolus calcaratus* Roxb.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of rice bean seed.

**II. Land Requirements**

Land to be used for seed production of rice bean shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first before flowering and the second at the flowering and fruit stage.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Rice bean seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	50	20
Fields of the same variety not conforming to varietal purity requirements for certification	50	20

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	0.20

\*Maximum permitted at the final inspection.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seeds (minimum)	70%	70%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**SETARIA GRASS(PIGEON GRASS) : *Setaria anceps***  
**Stapf. Ex. Massey.**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the setaria grass seed.

**II. Land Requirements**

*A. Foundation seed*

A seed crop of setaria grass shall not be eligible for certification if planted on land on which the same kind of crop was grown within the previous five crop seasons.

*B. Certified seed*

Land to be used for seed production of setaria grass shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and the third at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

(a) Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants 1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties	400	200
Fields of the same variety not conforming to varietal purity requirements for certification	400	200

(b) Differential blooming dates for modifying isolation distances are not permitted.

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	1.0

\*Maximum permitted at and after flowering.

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	95.0%	95.0%
Inert matter (maximum)	5.0%	5.0%
Other crop seeds (maximum)	20/kg	40/kg
Weed seeds (maximum)	20/kg	40/kg
Germination (minimum)	50%	50%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## STYLO (*Stylosanthes* spp.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the stylo seed.

### II. Land Requirements

#### A. *Foundation seed*

A seed crop of stylo shall not be eligible for certification if planted on land on which the same kind of crop was grown within the previous five crop seasons.

#### B. *Certified seed*

Land to be used for seed production of stylo shall be free of volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during flowering and the third at maturity and prior to harvesting.

### IV. Field Standards

#### A. *General requirements*

##### 1. *Isolation*

Seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	50	25
Fields of the same variety not conforming to varietal purity requirements for certification	50	25

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.10	1.0

\*Maximum permitted at and after flowering.

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	90.0%	90.0%
Inert matter (maximum)	10.0%	10.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seeds (minimum)	40%	40%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## TEOSINTE (*Euchlaena mexicana* Schard.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of teosinte seed.

### II. Land Requirements

Land to be used for seed production of teosinte shall be free of volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during peak flowering and the third at maturity and prior to harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Teosinte seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	200	100
Fields of the same variety not conforming to varietal purity requirements for certification and any type of maize	200	100

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types that have shed or are shedding pollen when 5.0% or more of the plants have receptive silks	0.10	0.50

\*Maximum permitted at and after flowering.

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	None	None
Germination (minimum)	80%	80%
Moisture (maximum)	12.0%	12.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## **CHAPTER-VII**

### Seed Certification Standards for Green manures

1. Dhaincha
2. Mesta
3. Sunnhemp

## DHAINCHA (*Sesbania aculeate*Poir)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of dhaincha seed.

### II. Land Requirements

Land to be used for seed production of dhaincha shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made, the first before flowering and the second at flowering and pod stage.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Dhaincha seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	10	5
Fields of the same variety not conforming to varietal purity requirements for certification	10	5

#### B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
Off-types	0.50	1.00

\*Maximum permitted at the final inspection.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination including hard seeds (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**MESTA (*Hibiscus* spp.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of mesta seed.

**II. Land Requirements**

Land to be used for seed production of mesta shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first at flowering and the second before harvest

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Mesta seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	50	30
Fields of the same variety not conforming to varietal purity requirements for certification	50	30
Fields of other <i>Hibiscus</i> species	5	5

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.5	1.0

\*Maximum permitted at the final inspection.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Germination including hard seeds (minimum)	75%	75%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	8.0%	8.0%

**SUNNHEMP (*Crotolaria juncea* Linn.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of sunnhemp seed.

**II. Land Requirements**

Land to be used for seed production of sunnhemp shall be free of volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first at flowering and the second before harvest.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Sunnhemp seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	250	100
Fields of the same variety not conforming to varietal purity requirements for certification	250	100

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.50	1.00

\*Maximum permitted at the final inspection.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Germination including hard seeds (minimum)	80%	80%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## **CHAPTER-VIII**

### **Seed Certification Standards for Sugar crops**

1. Sugarcane

## SUGARCANE (*Saccharum* spp. Hybrid)

### **SEED CANE STANDARDS**

Age of the seed cane crop at harvest for seed purpose shall be 6 to 8 months and 8 to 10 months for the sowing in tropics and sub-tropics, respectively, seed cane material undamaged and reasonably clean.

Each node of seed cane shall bear one sound bud. The number of nodes without sound bud shall not exceed 5.0% (by number) of the total number of buds per seed cane.

The number of buds, which have swollen up or have projected beyond one centimeter from the rind surface, shall not exceed 5.0% (by number) of the total number of buds.

#### **I. Application and Amplification of General Seed Cane Certification Standards:**

The General Seed Cane Certification Standards are basic and together with the following specific standards constitute the standards for certification of sugarcane seed cane.

The certified classes shall be produced from seed canes and/or meri-clones whose sources and identity may be assured and approved by the Certification Agency.

#### **II. Land Requirements**

- i. A seed crop of sugarcane shall not be eligible for certification if planted on land on which sugarcane was grown in the previous season.
- ii. Land/seed crop shall be kept free from sugarcane residues and drainage from other sugarcane fields.

#### **III. Heat Treatment:**

Foundation Stage (I) shall be raised from heat-treated seed cane.

#### **IV. Field Inspection**

A minimum of three inspections shall be made as under:

- 1) The first inspection shall be made at 45-60 days after planting in order to verify isolation and detect volunteer plants, designated diseases and pests and other relevant factors.
- 2) The second inspections shall be made at 120-130 days after planting to verify Off-types, designated diseases and pests and other relevant factors.
- 3) The third inspection shall be made 15 days prior to the harvesting of seed canes to verify the age of cane, off-types, designated diseases and pests and other relevant factors.

## V. Field Standards

### A. General requirements

Isolation : The sugarcane seed production fields shall be isolated from other fields with a minimum distance of 5 m to avoid mechanical mixture of other varieties.

### B. Specific requirements

Sl. No.	Factors	Stage of field inspection	Maximum permissible limits (%)	
			Foundation	Certified
i.	Off-types	I, II, III	None	None
ii.	Plants affected with designated diseases			
	Red rot	I, II, III	None	None
	Smut	I	0.02*	0.10*
		II	0.01*	0.10*
		III	None	None
	Grassy shoot	II	0.05*	0.50*
		III	None	None
	Wilt	III	0.01*	0.01*
Leaf scald	II	0.01*	0.05*	
		III	None	None
iii.	Plants affected by designated insect-pests			
	Top borer	II & III	5.0	5.0
	Internode borer	III	10.0 <sup>#</sup>	10.0
			None**	None**
	Stalk borer	III	20.0 <sup>+</sup>	20.0
None**			None**	
Plassey borer, Gurdaspur borer, Scale insect, Mealy bug	III	5.0 None**	5.0 None**	

\*Subject to immediate rouging of the whole clump.

\*\*In areas where the presence of the pest has not been recorded.

#It gives around 10% affected buds.

+It gives around 0.5% affected buds.

#### Designated Diseases shall be:

1. Red rot (*Glomerella tucumanensis* (Speg.) Arx & Muller)
2. Smut (*Ustilago scitaminea* (Sydow))
3. Wilt (*Cephalosporium sacchari* Butler)
4. Grassy shoot disease (Mycoplasma-Like-Organism)
5. Leaf scald (*Xanthomonas albilineans* (Ashby) Dowson)

**Designated Insect-Pests shall be:**

1. Top borer (*Scirpophaga excerptalis* Wlk.)
2. Internode borer (*Chilo sacchariphagus indicus* Kapur)
3. Stalk borer (*Chilo auricilius* Ddgn.)
4. Plassey borer (*Chilo tumidicostalis* Hmps. n.)
5. Gurdaspur borer (*Acigona steniellus* Hmps. n.)
6. Scale insect (*Melanaspis glomerata* Green)
7. Mealy bug (*Sacchariphagus sacchari* Cockerell)

Note:

1. All off-types and diseased plants shall be rouged out along with roots and destroyed.
2. Maximum permissible limits for the stripping of dry foliage shall be 2.0%
3. The crop should not have more than 10% lodged canes.
- Seed canes should not have nodal roots. In waterlogged areas, relaxation may be given upto a maximum of 5%.
- Moisture in seed cane should not be less than 65% on wet weight basis.
- Germinability of buds should not be less than 85%
- Physical purity of seed should be 98%.
- Genetic purity of seed should be 100%.

**CHAPTER-IX**  
Seed Certification Standards for **Narcotics**

1. Tobacco
2. Tobacco hybrids

**TOBACCO (*Nicotiana tabacum* L./*N. rustica* L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of tobacco seed.

**II. Land Requirements**

Land to be used for seed production of tobacco shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made as follows:

- (1) the first inspection shall be made before flowering in order to determine isolation, presence of volunteer plants, outcrosses, error in planting ratio and other relevant factors;
- (2) the second inspection shall be made during flowering to check isolation, Off-types, and other relevant factors;
- (3) the third inspection shall be made at maturity and prior to harvesting to verify true nature of the plants and other relevant factors.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Tobacco seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types	0.1	0.2

\*Standards shall be met at any inspection conducted at and after flowering.

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	95.0%	95.0%
Inert matter (maximum)	5.0%	5.0%
Germination (minimum)	70.0%	70.0%
Moisture (for vapour-proof containers)*	5-6%	5-6%

\*Seed to be packed in vapor proof containers only for proper storage/maintaining viability.

**TOBACCO (*Nicotiana tabacum* L./*N. rustica* L.) HYBRIDS**

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid tobacco seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of tobacco.

**II. Land Requirements**

Land to be used for seed production of hybrid tobacco shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made as follows

- (1) the first inspection shall be made before flowering in order to determine isolation, presence of volunteer plants, outcrosses, planting ratio, error in planting and other relevant factors;
- (2) the second and third inspection shall be made during flowering to check isolation, Off-types, pollen shedders in female parents and other relevant factors;
- (3) the third inspection shall be made at maturity and prior to harvesting to verify true nature of the plants and other relevant factors.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Hybrid tobacco seed fields shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 and 3 of the said Table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties including commercial hybrid of the same variety	50	30
Fields of the same variety not conforming to varietal purity requirements for certification	50	30

*B. Specific requirements*

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
Off-types in seed parent	0.05	0.2
Off-types in pollinator	0.05	0.2
Pollen shedding plants in seed parent	0.05	0.2

\*Standards shall be met at any inspection conducted at and after flowering.

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	95.0%	95.0%
Inert matter (maximum)	5.0%	5.0%
Germination (minimum)	70.0%	70.0%
Moisture (for vapour-proof containers)*	5-6%	5-6%

\*Seed to be packed in vapor proof containers only for proper storage/maintaining viability.

# **HORTICULTURAL CROPS**

## **CHAPTER-X**

### **Seed Certification Standards for Fruit Vegetables**

1. Brinjal
2. Brinjal hybrids
3. Capsicum (sweet pepper) and chilli (Hot pepper)
4. Okra
5. Rat-tail Radish
6. Tomato
7. Tomato hybrids

## BRINJAL (*Solanum melongena* L.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Brinjal seed.

### II. Land Requirements

Land to be used for seed production of Brinjal shall be free of volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second at the flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	300	150
Fields of the same variety not conforming to varietal purity requirements for certification.	300	150

## B. Specific requirements

Factor	Minimum permitted (%)*	
	Foundation	Certified
1	2	3
Off types	0.10	0.20
** Plants infected seed borne diseases.	0.10	0.20

\*Standards for Off-types shall be met at and after flowering and for seed borne disease at final inspection.

\*\*Seed borne disease shall be: *Phomopsis* blight (*Phomopsis vexans* (Sacc. & Syd.) Harter.)

## V. Seed standards

Factor	Standard for each class	
	Foundation	Certified
1	2	3
Pure Seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## **BRINJAL (*Solanum melongena* L.) HYBRIDS**

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid brinjal seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of brinjal:

#### *1. Eligibility requirements for certification*

- (a) A parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved parental lines.

#### *2. Classes and Sources of seed*

- (a) A parental line shall be a relatively true breeding strain.
- (b) The certified class seed shall be the hybrid seed to be planted for any use except seed production.

### **II. Land Requirements**

Land to be used for seed production of hybrid brinjal shall be free of volunteer plants.

### **III. Field Inspection**

#### *A. Foundation seed*

A minimum of three inspections shall be made as follows:

- 1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants and other relevant factors;
- 2. the second inspection shall be made during flowering and fruiting stage to check isolation, Off-types and other relevant factors;
- 3. the third inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

#### *B. Certified seed*

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks and other relevant factors;
2. the second and third inspections shall be made during flowering stage to check isolation, Off-types, accuracy in emasculation or effectiveness of CHAs' (Chemical Hybridising Agents' or Gametocide) if used for inducing male sterility, and other relevant factors;
3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits, and other relevant factors.

#### **IV. Field Standards**

##### **A. General requirements**

##### **1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties including commercial hybrid of the same variety	200	200
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification.	200	200
Between blocks of the parental lines in case of seed parent and pollinator are planted in separate blocks.	-	5

## B. Specific requirements

<i>Factor</i>	<i>Minimum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off types in seed parent	0.010	0.050
Off-types in pollinator	-	0.050
** Plants infected seed borne diseases.	0.10	0.50

\*Standards for Off-types shall be met at and after flowering and for seed borne disease at final inspection.

\*\*Seed borne disease shall be: *Phomopsis* blight (*Phomopsis vexans* (Sacc. & Syd.) Harter.)

## V. Seed standards

<i>Factor</i>	<i>Standard for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

(a) All certified seed lots shall be subjected to grow-out test and shall conform to the following minimum genetic purity requirements.

Class	Genetic purity(%) (Minimum)*
Certified	90.0

\*During grow-out test, the offtype plants (other than selfed plants) such as segregants, outcrosses and plants of other varieties should not exceed more than 1.5% out of the 10.0% plants earmarked for selfed plants.

(b) The minimum population size of 400 plants shall be maintained in two replicates of 200 each or four of 100 each throughout the test and each plant shall be examined individually. The reject number shall be as follows:

Factor	Genetic purity (%) (Minimum)	Reject number
Certified	90.0 (10 in 100)	44/400

**CAPSICUM (SWEET PEPPER) (*Capsicum annuum*L.) var. *grossum* Bailey)**  
**AND CHILLI (HOT PEPPER) (*Capsicum frutescens* L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Capsicum and Chilli seed.

**II. Land Requirements**

Land to be used for seed production of Capsicum and Chilli shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second at the flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields offered for certification shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	500	250
Fields of the same variety not conforming to varietal purity requirements for certification.	500	250
Fields of Capsicum from Chilli and <i>vice versa</i>	500	250

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off types	0.10	0.20
** Plants infected seed borne diseases.	0.10	0.50

\*Maximum permitted at and after flowering in the case of off-types and at the final inspection in the case of seed borne diseases.

\*\*Seed borne disease shall be:

Leaf blight: (*Alternaria solani* Sorauer.);

Anthraxnose (Ripe rot, Die back) : *Colletotrichum capsici* (Syd.) Butler & Bisby)

## V. Seed standards

Factor	Standard for each class	
	Foundation	Certified
1	2	3
Pure Seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## OKRA (BHINDI) (*Abelmoschus esculentus*(L.) Moench)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Okra seed.

### II. Land Requirements

Land to be used for seed production of Okra shall be free of volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during peak flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Okra seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	500	250
Fields of the same variety not conforming to varietal purity requirements for certification and wild Okra ( <i>A. ficulneus</i> (L.) Wt.& Arn. <i>A. manihot</i> (L.) Medic. and <i>A. moschatus</i> (L.) Medic.).	500	250

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types	0.10	0.20
** Objectionable weed plants	None	None

\*Maximum permitted at and after flowering.

\*\*Objectionable weeds shall be wild Okra: (*A. ficulneus* (L.) Wt.& Arn. *A. manihot* (L.) Medic. and *A. moschatus* (L.) Medic.).

## V. Seed standards

Factor	Standard for each class	
	Foundation	Certified
1	2	3
Pure Seed (minimum)	99.0%	99.0%
Inert matter (maximum)	1.0%	1.0%
Other crops seeds (maximum)	None	None
Total weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seeds (minimum)	65%	65%
Moisture (maximum)	10.0%	10.0%
For vapour-proof containers (maximum)	8.0%	8.0%

\*Objectionable weeds are the same as given at IV.B. above.

## RAT-TAIL RADISH (MUNGRA (*Raphanus caudatus*L.))

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of rat-tail radish seed.

### II. Land Requirements

Land to be used for seed production of rat-tail radish shall be free of volunteer plants.

### III. Field Inspection

A minimum of two inspections shall be made, the first before flowering and the second at flowering and fruit stage.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields of rat-tail radish shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1600	1000
Fields of the same variety not conforming to varietal purity requirements for certification and radish ( <i>Raphanus sativus</i> L.).	1600	1000

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off types	0.10	0.20
** Plants affected by seed borne diseases	0.10	0.50

\*Standards for Off-types shall be met at and after flowering and for seed borne diseases at final inspection.

\*\*Seed borne diseases shall be:

Black rot (*Xanthomonas campestris* pv. *Campestris* (Pamm.) Dawson);

Black leg (*Leptosphaeria maculans* (Desm. (Ces. & de Not)

## V. Seed standards

Factor	Standard for each class	
	Foundation	Certified
1	2	3
Pure Seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	70%	70%
Moisture (maximum)	6.0%	6.0%
For vapour-proof containers (maximum)	5.0%	5.0%

**TOMATO (*Lycopersicum esculentum* Mill.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of tomato seed.

**II. Land Requirements**

Land to be used for seed production of tomato shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	50	25
Fields of the same variety not conforming to varietal purity requirements for certification	50	25

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off types	0.10	0.20
** Plants affected by seed borne diseases	0.10	0.50

\*Maximum permitted at final inspection.

\*\*Seed borne diseases shall be:

Early blight (*Alternaria solani* Sorauer).

Leaf spot (*Stemphylium solani* Weber.)

Tobacco Mosaic Virus (TMV)

## V. Seed standards

Factor	Standard for each class	
	Foundation	Certified
1	2	3
Pure Seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## **TOMATO (*Lycopersicum esculentum* Mill.) HYBRIDS**

### **I. Application and amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid tomato seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of tomato.

#### **1. *Eligibility requirements for certification***

- a. An inbred/parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- b. \*Hybrid seed to be eligible for certification shall be the progeny of two approved inbred/parental lines, one of which shall be male sterile.

#### **2. *Classes and sources of seed***

- a. An inbred/parental line shall be a relatively true breeding strain resulting from self-pollination with selection.
- b. \*The foundation class seed shall consist of an approved male sterile line (genetic male sterility) to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- c. \*A male sterile line shall be a monogenic recessive strain carrying genetic male sterility, which sheds no viable pollen and is maintained by the monogenic dominant heterozygous strain and is used as maintainer in propagation blocks.
- d. The certified class seed shall be hybrid seed to be planted for any use except seed production.

\*(Applicable if male sterile line is used)

### **II. Land Requirements**

Land to be used for seed production of hybrid tomato shall be free of volunteer plants.

### III. Field Inspection

#### A. *Foundation seeds*

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, and also fertile segregants in seed parent if male sterile line is used, and other relevant factors;
3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits and other relevant factors.

#### B. *Certified seed*

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between female and male parent blocks or planting ratio as the case may be and errors in planting and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, accuracy in emasculation or fertile segregants (pollen shedding cymes which are likely to appear in 1:1 ratio) or effectiveness of Chemical Hybridising Agents' or Gametocide (CHAs') used for inducing male sterility as the case may be and other relevant factors;
3. the fourth inspections shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of fruits and other relevant factors.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3

Fields of other varieties including commercial hybrids of the same variety	200	100
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	200	100
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks	-	5

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types in seed parent	0.010	0.050
Off-types in pollinator	0.010	0.050
**Fertile segregants (Pollen shedding cymes) in seed parent	0.050	0.10
***Plants affected by seed borne diseases	0.10	0.50

\*Standards for off-types and fertile segregants (pollen shedding cymes) in seed parent shall be met at and after flowering and for seed borne diseases at final inspection.

\*\*It shall be applicable in case male sterile line is used for producing hybrid seed.

\*\*\*Seed borne diseases shall be:

Early blight (*Alternaria solani* Sorauer).

Leaf spot (*Stemphylium solani* Weber.)

Tobacco Mosaic Virus (TMV)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

- (a) All certified seed lots, which have produced by adopting emasculation and hand pollination, shall be subjected to Grow-out Test and shall conform to the following minimum genetic purity requirements.

Class	Genetic purity(%) (Minimum)*
Certified	90.0

\*During grow-out test, the offtype plants (other than selfed plants) such as segregants, outcrosses and plants of other varieties shall not exceed more than 1.50% out of the 10.0% plants earmarked for selfed plants.

- (b) The minimum population size of 400 plants shall be maintained in two replicates of 200 each or four of 100 each throughout the test and each plant shall be examined individually. The reject number shall be as follows:

Class	Genetic purity (%) (Minimum)	Reject number
Certified	90.0 (10 in 100)	44/400

## CHAPTER-XI

### Certification Standards for **Cucurbits**

1. Ash gourd
2. Bitter gourd
3. Bitter gourd hybrids
4. Bottle gourd
5. Bottle gourd hybrids
6. Chow-chow
7. Cucumber
8. Cucumber hybrids
9. Indian squash
10. Little gourd
11. Long melon
12. Muskmelon
13. Muskmelon hybrids
14. Pointed gourd
15. Pumpkin
16. Pumpkin hybrids
17. Ridge gourd
18. Ridge gourd hybrids
19. Snake gourd
20. Snap melon
21. Sponge gourd
22. Sponge gourd hybrids
23. Summer squash
24. Summer squash hybrids
25. Watermelon
26. Watermelon hybrids
27. Watermelon seedless
28. Winter squash
29. Winter squash hybrids

## **ASH GOURD (*Benincasa cerifera* Savi.)**

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of ash gourd seed.

### **II. Land Requirements**

Land to be used for seed production of ash gourd shall be free of volunteer plants.

### **III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

### **IV. Field Standards**

#### **A. General requirements**

##### **1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification	1000	500

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off types	0.10	0.20

\*Maximum permitted at and after flowering.

## VI. Seed standards

Factor	Standard for each class	
	Foundation	Certified
1	2	3
Pure Seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## **BITTER GOURD (*Momordica charantia* L.)**

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of bitter gourd seed.

### **II. Land Requirements**

Land to be used for seed production of bitter gourd shall be free of volunteer plants.

### **III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

### **IV. Field Standards**

#### **A. General requirements**

##### **1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification and from balsam apple (mokha) : <i>Momordica balsamina</i> L.; Bhat karela: (kakrol) : <i>M. cochinchinensis</i> spreng.; Jangli karela: <i>M. dioica</i> Roxb. Ex. Willd.	1000	500

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off types	0.10	0.20
**Objectionable weed plants	None	None

\*Maximum permitted at and after flowering.

\*\*Objectionable weed shall be:

Balsam apple (mokha) : *Momordica balsamina* L.;

Bhat karela: (kakrol) : *M.cochinchinensis* spreng.;

Jangli karela: *M. dioica* Roxb. Ex. Willd.

## VII. Seed standards

Factor	Standard for each class	
	Foundation	Certified
1	2	3
Pure Seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	None	None
Total weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weeds are same as given at IV.B above

## **BITTER GOURD (*Momordica charantia* L.) HYBRIDS**

### **I. Application and amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid bitter gourd seeds.
- B. General standards are amplified as follows to apply specifically to the hybrids of bitter gourd.

#### **1. *Eligibility requirements for certification***

- (a) The parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved parental lines.

#### **2. *Classes and sources of seed***

- (a) A parental line shall be a relatively true breeding strain.
- (b) The certified seed shall be hybrid seed to be planted for any use except seed production.

### **II. Land Requirements**

Land to be used for seed production of hybrid bitter gourd shall be free of volunteer plants.

### **III. Field Inspection**

#### **A. *Foundation seeds***

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, off-types, and other relevant factors;
3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**B. *Certified seed***

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks or planting ratio and errors in planting as the case may be and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, off-types, plucking of male flower buds in seed parent and other relevant factors;
3. the fourth inspections shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties including commercial hybrid of the same variety	1500	1000
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from balsam apple (Mokha) : <i>M. balsamina</i> L.; Bhat karela: (kakrol) : <i>M. cochinchinensis</i> spreng.; Jangli karela: <i>M. dioica</i> Roxb. Ex. Willd.	1500	1000

Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks and hand pollination is to be adopted	-	5
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## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types in seed parent	0.10	0.50
Off-types in pollinator	-	0.050
Male flowers shedding pollens in seed parent	-	0.10
**Objectionable weed plants	None	None

\*Maximum permitted at and after flowering

\*\*Objectionable weed shall be:

Balsam apple (mokha) : *Momordica balsamina* L.;

Bhat karela: (kakrol) : *M. cochinchinensis* Spreng.;

Jangli karela: *M. dioica* Roxb. Ex. Willd.

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Total weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weeds are the same as given at IV.B above

**BOTTLE GOURD (*Lagenaria siceraria*) (syn. *L.leucantha*Rusby)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of bottle gourd seed.

**II. Land Requirements**

Land to be used for seed production of bottle gourd shall be free of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification	1000	500

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off types	0.10	0.20

\*Maximum permitted at and after flowering.

## V. Seed standards

Factor	Standard for each class	
	Foundation	Certified
1	2	3
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

**BOTTLE GOURD (*Lagenaria siceraria* (Molina) Standl.) (syn *L. leucantha* Rusby)  
HYBRIDS**

**I. Application and amplification of General Seed Certification Standards**

A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid bottle gourd seeds.

B. General standards are amplified as follows to apply specifically to the bottle gourd hybrids.

**1. *Eligibility requirements for certification***

(a) The parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.

Hybrid seed to be eligible for certification shall be the progeny of two approved parental lines.

**2. *Classes and sources of seed***

A parental line shall be a relatively true breeding strain.

(a) The certified class seed shall be hybrid seed to be planted for any use except seed production.

**II. Land Requirements**

Land to be used for seed production of hybrid bottle gourd shall be free of volunteer plants.

**III. Field Inspection**

**A. *Foundation seeds***

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, and other relevant factors;
3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

## B. *Certified seed*

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks or planting ratio and errors in planting as the case may be, and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, plucking of male flower buds in seed parent and other relevant factors;
3. the fourth inspections shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

## IV. Field Standards

### A. General requirements

#### 1. Isolation

Seed fields of shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants 1	Minimum distance (meters)	
	Foundation 2	Certified 3
Fields of other varieties including commercial hybrid of the same variety	1500	1000
Fields of the same variety (code designation) not conforming to varietal purity requirements for certification.	1500	1000
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks and hand pollination is to be adopted	-	5

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types in seed parent	0.10	0.50
Off-types in pollinator	-	0.050
Male flowers shedding pollens in seed parent	-	0.10

\*Maximum permitted at and after flowering

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## CHOW-CHOW (CHAYOTE) (*Sechium edule* (Savi.)

### I. Application and Amplification of General Seed Certification Standards

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of chow-chow seed.
- B. The General Standards are amplified as follows to apply specifically to chow-chow.
- C. All certified classes shall be produced from the viviparous fruits whose source and identity may be assured and approved by the Certification Agency.

### II. Land Requirements

Land to be used for seed production shall be free from volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third before harvesting of the fruits.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification	1000	500

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types	0.10	0.20

\*Maximum permitted at and after flowering.

## V. Seed (Viviparous fruits) standards

The seed material (Viviparous fruits) shall be reasonably clean, healthy and shall conform to the characteristics of the variety. The fruits not conforming to varietal characteristics shall not exceed 0.10% and 0.20% (by number) for Foundation and Certification seed classes, respectively.

## CUCUMBER (*Cucumis sativus* L.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of cucumber seed.

### II. Land Requirements

Land to be used for seed production of cucumber shall be free from volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification	1000	500

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20
**Objectionable weed plants	None	None

\*Maximum permitted at and after flowering

\*\*Objectionable weed shall be: *Cucumis hardwickii* Royale

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Total weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weeds are the same as given at IV.B above

## CUCUMBER (*Cucumis sativus* L.) HYBRIDS

### **I. Application and amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid cucumber seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of cucumber.

#### **1. *Eligibility requirements for certification***

- (a) The parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved parental lines.

#### **2. *Classes and sources of seed***

- (a) A parental line shall be a relatively true breeding strain.
- (b) Homozygous gynoecious lines shall be maintained by selfing (using the pollen from the induced male flowers of the same plant) at Foundation seed stage.
- (c) The certified class seed shall be hybrid seed to be planted for any use except seed production.

### **II. Land Requirements**

Land to be used for seed production of hybrid cucumber shall be free of volunteer plants.

### **III. Field Inspection**

#### **A. *Foundation seeds***

A minimum of four inspections shall be made as follows:

- 1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants and other relevant factors;

2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, and other relevant factors;
3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**B. *Certified seed***

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks or planting ratio and errors in planting as the case may be, and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, plucking of male flower buds in seed parent and other relevant factors;
3. the fourth inspections shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants 1	Minimum distance (meters)	
	Foundation 2	Certified 3
Fields of other varieties including commercial hybrid of the same variety	1500	1000
Fields of the same variety (code designation) not conforming to varietal purity requirements for certification and from <i>Cucumis hardwickii</i> Royale .	1500	1000
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks and hand pollination is to be adopted	-	5

## B. Specific requirement

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types in seed parent	0.10	0.50
Off-types in pollinator	-	0.050
Male flowers shedding pollens in seed parent	-	0.10
***Objectionable weed plants	None	None

\*Maximum permitted at and after flowering

\*\*Monoecious and gynodioecious plants shall also be considered as Off-types if gynoecious line is used as seed parent.

\*\*\*Objectionable weed shall be : *Cucumis hardwickii* Royale.

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Total weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weed is the same as given at IV.B.

## INDIAN SQUASH (TINDA) (*Praecitrullus fistulosus* Pang.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Indian squash seed.

### II. Land Requirements

Land to be used for seed production of Indian squash shall be free from volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification	1000	500

**B. Specific requirement**

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20

\*Maximum permitted at and after flowering

**V. Seed Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

**LITTLE GOURD (SMALL GOURD, IVY GOURD) : *Coccinia grandis* (L.) Voigt (syn. *Coccinia india* Wight. & Arn., *C. cordifolia* (L.) Cogn.)**

**I. Application and Amplification of General Seed Certification standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of little gourd planting material.
- B. The General Standards are amplified as follows to apply specifically to little gourd.
- C. All certified classes shall be produced from the planting stakes (stem cutting) cut from the bed of female and male whose source and identity may be assured and approved by the Certification Agency.

**II. Land Requirements**

- (a) Land to be used for seed production of little gourd shall be free from volunteer plants. Swampy and shaded conditions may be avoided.
- (b) Avoid little gourd residue and drainage from other little gourd fields.

**III. Field Inspection**

A minimum of two inspections shall be made, the first when plants are nearly large enough after transplanting and second before cutting of the planting stakes (stem cuttings) to verify isolation, Off-types and other relevant factors.

**IV. Field Standards**

**A. General requirements**

**2. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	20	20
Fields of the same variety not conforming to varietal purity requirements for certification	20	20
Between the blocks of female and male parents	20	20

### B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20

\*Maximum permitted at final inspection

## V. Seed (Planting stakes) Standards

A. Specification in respect of size and age of the planting stakes (stem cuttings) for Foundation and Certified classes shall be as follows:

1. Age of the crop : About one year
2. Approximate diameter of the stem : 0.50 cm
3. Length of the stem : 12-15 cm

### B.

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living planting stakes (minimum)	99.50% (by number)	98.0% (by number)
Other living plants including their stem cuttings (maximum)	0.50% (by number)	2.0% (by number)

**LONG MELON (*Cucumis melo* L. var. *utilissimus* Duth. & Full.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of long melon seed.

**II. Land Requirements**

Land to be used for seed production of long melon shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at mature fruit stage and prior harvesting.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification and snapmelon phnoot : <i>Cucumis melo</i> L. var <i>momordica</i> Duth.&Full., Muskmelon ( <i>Cucumis melo</i> L. var. <i>conomon</i> Makino), <i>Cucumis prophetarum</i> ; weedmelon (Takmek) <i>Cucumis Melo</i> (L.) var. <i>agrestis</i> Naud. and other non-dessert forms of <i>Cucumis melo</i> (L.) known to cross or suspected of being able to cross.	1000	500

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off- types	0.10	0.20
**Objectionable weed plants	None	None

\*Maximum permitted at and after flowering.

\*\*Objectionable weed shall be: *Cucumis prophetarum*; Weedmelon (Takmek) : (*Cucumis melo* (L.) var. *agrestis* Naud. and other non-dessert forms of *Cucumis melo* (L.)

## VIII. Seed standards

Factor	Standard for each class	
	Foundation	Certified
1	2	3
Pure Seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	5/kg	10/kg
Total weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weeds are same as given at IV.B above

## MUSKMELON (*Cucumis melo* L.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of muskmelon seed.

### II. Land Requirements

Land to be used for seed production of muskmelon shall be free from volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at mature fruit stage and prior harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification and from longmelon ( <i>Cucumis melo</i> L. var. <i>utilissimus</i> Duth. & Full.), oriental pickling melon ( <i>Cucumis melo</i> L. var. <i>conomon</i> Makino), snapmelon phnoot: <i>Cucumis melo</i> L. var. <i>momordica</i> Duth. & Full., <i>Cucumis prophetarum</i> ; weedmelon (Takmek)( <i>Cucumis melo</i> (L.) var. <i>agrestis</i> Naud. and other non-dessert forms of <i>Cucumis melo</i> (L.) known to cross or suspected of being able to cross.	1000	500

## 2. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off- types	0.10	0.20
**Objectionable weed plants	None	None
***Plants effected by seed borne disease	0.10	0.20

\*Standards for Off-types and objectionable weeds shall be met at any inspection conducted at and after flowering and for seed borne diseases at final inspection.

\*\*Objectionable weed shall be: *Cucumis prophetarum*; Weedmelon (Takmek) : (*Cucumis melo* (L.) var. *agrestis* Naud. and other non-dessert forms of *Cucumis melo* (L.)

\*\*\*Seed borne disease shall be : Cucumber Mosaic Virus (CMV).

## IX. Seed standards

Factor	Standard for each class	
	Foundation	Certified
1	2	3
Pure Seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	5/kg	10/kg
Total weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weeds are same as given at IV.B above

## MUSKMELON (*Cucumis melo* L.) HYBRIDS

### I. Application and amplification of General Seed Certification Standards

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid muskmelon seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of muskmelon.

#### 1. *Eligibility requirements for certification*

- (a) An inbred/parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved inbred/parental lines, one of which shall be male sterile.

#### 2. *Classes and sources of seed*

- (a) An inbred/parental line shall be a relatively true breeding strain resulting from self-pollination with selection.
- \* (b) The foundation classseed shall consist of an approved male sterile line (genetic male sterility) to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- \* (c) A male sterile line shall be a monogenic recessive strain carrying genetic male sterility, which sheds no viable pollen and is maintained by the monogenic dominant heterozygous strain and is used as maintainer line in propagation blocks.
- \* (d) The certified class seed shall be hybrid seed to be planted for any use except seed production.

\*(Applicable if male sterile line is used)

### II. Land Requirements

Land to be used for seed production of hybrid muskmelon shall be free of volunteer plants.

### **III. Field Inspection**

#### **A. *Foundation seeds***

A minimum of four inspections shall be made as under:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, and also fertile segregants in seed parent if male sterile line is used;
3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to verify the true characteristics of the fruits and other relevant factors.

#### **B. *Certified seed***

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks or planting ratio as the case may be, and errors in planting;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, accuracy in emasculation (in case andromonoecous line is used) or fertile segregants (pollen shedding cymes which are likely to appear in 1:1 ratio) in case sterile line is used and other relevant factors;
3. the fourth inspections shall be made at mature fruit stage and prior to harvesting in order to verify the true characteristics of fruits and other relevant factors.

### **IV. Field Standards**

#### **A. General requirements**

##### **1. Isolation**

Seed fields of snapdragon hybrids shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants 1	Minimum distance (meters)	
	Foundation 2	Certified 3
Fields of other varieties including commercial hybrids of the same variety	1500	1000
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from longmelon <i>Cucumis melo</i> L. var. <i>utilissimus</i> Duth. & Full.), oriental pickling melon ( <i>Cucumis melo</i> L. var. <i>conomon</i> Makino), snapmelon phnoot: <i>Cucumis melo</i> L. var. <i>momordica</i> Duth. & Full., <i>Cucumis prophetarum</i> ; weedmelon (Takmek)( <i>Cucumis melo</i> (L.) var. <i>agrestis</i> Naud. and other non-dessert forms of <i>Cucumis melo</i> (L.) known to cross or suspected of being able to cross.	1500	1000
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks and hand pollination is to be adopted	-	5

## B. Specific requirement

Factor 1	Maximum permitted (%)*	
	Foundation 2	Certified 3
Off-types in seed parent	0.10	0.050
Off-types in pollinator	-	0.050
**Fertile segregants (Pollen shedding cymes) in seed parent	0.050	0.10
Male flowers shedding pollens in seed parent if andromonoecious line is used	-	0.10
@Objectionable weed plant	None	None
@@Plants affected by seed borne diseases	0.10	0.20

\*Standards for Off-types and objectionable weeds shall be met at any inspection conducted at and after flowering and for seed borne diseases at final inspection.

\*\*Applicable if male sterile line is used.

@Objectionable weed shall be : *Cucumis prophetarum* ; Weedmelon (Takmek) : *Cucumis melo* (L.) var. *agrestis* Naud. and other no-dessert forms of *Cucumis melo* (L.)

@@Seed borne disease shall be : Cucumber Mosaic Virus (CMV)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Total weed seeds (maximum)	None	None
*Objectionable weed seed (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weeds are the same as given at IV.B above

- (a) All certified class seed lots, which have been produced by adopting emasculation shall be subjected to grow-out test and shall conform to the following minimum genetic purity requirements.

Class	Genetic purity(%) (Minimum)*
Certified	90.0

\*During grow-out test, the offtype plants (other than selfed plants) such as segregants, outcrosses and plants of other varieties should not exceed more than 1.50% out of the 10.0% plants earmarked for selfed plants.

- (b) The minimum population size of 400 plants shall be maintained in two replicates of 200 each or four of 100 each throughout the test and each plant shall be examined individually. The reject number shall be as follows:

Class	Genetic purity (%) (Minimum)	Reject number
Certified	90.0 (10 in 100)	44

## **POINTED GOURD (*Trichosanthes dioica* Roxb.)**

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of pointed gourd planting material.
- B. The General Standards are amplified as follows to apply specifically to pointed gourd.
- C. All certified classes shall be produced from the planting stakes (stem cutting) cut from the bed of female and male whose source and identity may be assured and approved by the Certification Agency.

### **II. Land Requirements**

- (a) Land to be used for seed production of pointed gourd shall be free from volunteer plants. Swampy and shaded conditions may be avoided.
- (b) Avoid pointed gourd residue and drainage from other pointed gourd fields.

### **III. Field Inspection**

A minimum of two inspections shall be made, the first when plants are nearly large enough after transplanting and second before cutting of the planting stakes (stem cuttings) to verify isolation, Off-types and other relevant factors.

### **IV. Field Standards**

#### **A. General requirements**

##### **1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	20	20
Fields of the same variety not conforming to varietal purity requirements for certification	20	20
Between the blocks of female and male parents	20	20

**B. Specific requirements**

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20

\*Maximum permitted at final inspection

**V. Seed (Planting stakes) Standards**

**A.** Specification in respect of size and age of the planting stakes (stem cuttings) for Foundation and Certified classes shall be as follows:

1. Age of the crop : About one year
2. Approximate length of the stem : 60 cm

**B.**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living planting stakes (minimum)	99.50% (by number)	98.0% (by number)
Other living plants including their stem cuttings (maximum)	0.50% (by number)	2.0% (by number)



**PUMPKIN (*Cucurbita moschata* (Duch.) Poir)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of pumpkin seed.

**II. Land Requirements**

Land to be used for seed production of pumpkin shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification and from Winter squash ( <i>Cucurbitamaxima</i> Duch.), <i>Cucurbita pepo</i> Duch.) and Cushaw ( <i>Cucurbita mixta</i> Pang.)	1000	500

## B. Specific requirement

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20

\*Maximum permitted at and after flowering

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

**PUMPKIN (*Cucurbita moschata* (Duch.) Poir)**  
**HYBRIDS**

**I. Application and amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid pumpkin seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of pumpkin.

**1. *Eligibility requirements for certification***

- (a) A parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- (b) A hybrid seed to be eligible for certification shall be the progeny of two approved parental lines.

**2. *Classes and sources of seed***

- (a) A parental line shall be a relatively true breeding strain.
- (b) The certified class seed shall be hybrid seed to be planted for any use except seed production.

**II. Land Requirements**

Land to be used for seed production of hybrid pumpkin shall be free of volunteer plants.

**III. Field Inspection**

**A. *Foundation seeds***

A minimum of four inspections shall be made as follows:

- 1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants and other relevant factors;
- 2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, and other relevant factors;
- 3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

## B. *Certified seed*

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks or planting ratio and errors in planting as the case may be, and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, off-types, plucking of male flower buds in seed parent and other relevant factors;
3. the fourth inspections shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

## IV. Field Standards

### A. General requirements

#### 1. Isolation

Seed fields of shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties including commercial hybrid of the same variety	1500	1000
Fields of the same variety (code designation) not conforming to varietal purity requirements for certification and from Winter squash ( <i>Cucurbita maxima</i> Duch.), ( <i>Cucurbita pepo</i> Duch.) and Cushaw ( <i>Cucurbita mixta</i> Pang.)	1500	1000
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks and hand pollination is to be adopted	-	5

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types in seed parent	0.010	0.050
Off-types in pollinator	-	0.050
Male flowers shedding pollens in seed parent	-	0.10

\*Maximum permitted at and after flowering

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## **RIDGE GOURD (*Luffa acutangula* Roxb.)**

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of ridge gourd seed.

### **II. Land Requirements**

Land to be used for seed production of ridge gourd shall be free from volunteer plants.

### **III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

### **IV. Field Standards**

#### **A. General requirements**

##### **1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification and from sponge gourd ( <i>Luffa cylindrica</i> Roem.)	1000	500

## B. Specific requirement

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20

\*Maximum permitted at and after flowering

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

**RIDGE GOURD (*Luff acutangula* Roxb.)**  
**HYBRIDS**

**I. Application and amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid ridge gourd seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of ridge gourd.

**1. *Eligibility requirements for certification***

- (a) A parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved parental lines.

**2. *Classes and sources of seed***

- (a) A parental line shall be a relatively true breeding monoecious strain.
- (b) The certified class seed shall be hybrid seed to be planted for any use except seed production.

**II. Land Requirements**

Land to be used for seed production of hybrid ridge gourd shall be free of volunteer plants.

**III. Field Inspection**

**A. *Foundation seeds***

A minimum of four inspections shall be made as follows:

- 1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants and other relevant factors;
- 2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, and other relevant factors;

3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**B. *Certified seed***

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks or planting ratio and errors in planting as the case may be, and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, plucking of male flower buds in seed parent and other relevant factors;
3. the fourth inspections shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields of shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants 1	Minimum distance (meters)	
	Foundation 2	Certified 3
Fields of other varieties including commercial hybrid of the same variety	1500	1000
Fields of the same variety (code designation) not conforming to varietal purity requirements for certification and from sponge gourd ( <i>L. cylindrica</i> Roem.)	1500	1000
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks and hand pollination is to be adopted	-	5

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types in seed parent	0.010	0.050
Off-types in pollinator	-	0.050
Male flowers shedding pollens in seed parent	-	0.10

\*Maximum permitted at and after flowering

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

**SNAKE GOURD (*Trichosanthes anguina* L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of snake gourd seed.

**II. Land Requirements**

Land to be used for seed production of snake gourd shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification and from <i>Trichosanthes palmata</i> (L.), <i>Trichosanthes lobata</i> (L.), & Jangli chachinda (Rambel): <i>Trichosanthes cucumerina</i> (L.)	1000	500

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20
**Objectionable weed plants	None	None

\*Maximum permitted at and after flowering

\*\*Objectionable weeds shall be: *Trichosanthes palmata* (L.), *Trichosanthes lobata* (L.), & Jangli chachinda (Rambel): *Trichosanthes cucumerina* (L.)

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Total weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weeds are the same as given at IV.B above

**SNAPMELON (*Cucumis melo* var. *momordica* Duth.&Full.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of snapmelon seed.

**II. Land Requirements**

Land to be used for seed production of snapmelon shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification and from muskmelon ( <i>Cucumis melo</i> L. var. <i>utilissimus</i> Duth.&Full) oriental pickling melon ( <i>Cucumis melo</i> (L.) var. <i>conomon</i> Makino), <i>Cucumis prophetarum</i> : weedmelon (Takmek) <i>Cucumis melo</i> (L.) var. <i>agrestis</i> Naud.) and other non-dessert forms or <i>Cucumis melo</i> (L.) known to cross or suspected of being able to cross	1000	500

## B. Specific requirement2

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types	0.10	0.20
**Objectionable weed plants	None	None

\*Maximum permitted at and after flowering

\*\*Objectionable weeds shall be: *Cucumis prophetarum*; Weedmelon (Takmek) *Cucumis melo* (L.) var. *agrestis* Naud., and other non-dessert forms of *Cucumis melo* (L.)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Total weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weeds are the same as given at IV.B above

**SPONGE GOURD (*Luffa cylindrica* Roem.; syn. *Luffa aegyptica* Mill.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of sponge gourd seed.

**II. Land Requirements**

Land to be used for seed production of sponge gourd shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification and from ridge gourd ( <i>Luffa acutangula</i> Roxb.)	1000	500

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20

\*Maximum permitted at and after flowering

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

**SPONGE GOURD (*Luffa cylindrica* Roem.; syn. *L. aegyptica* Mill.)**  
**HYBRIDS**

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid sponge gourd seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of sponge gourd.

**1. *Eligibility requirements for certification***

- (a) A parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved parental lines.

**2. *Classes and sources of seed***

- (a) A parental line shall be a relatively true breeding monoecious strain.
- (b) The certified class seed shall be hybrid seed to be planted for any use except seed production.

**II. Land Requirements**

Land to be used for seed production of hybrid sponge gourd shall be free of volunteer plants.

**III. Field Inspection**

**A. *Foundation seeds***

A minimum of four inspections shall be made as follows:

- 1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants and other relevant factors;
- 2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, and other relevant factors;

3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**B. *Certified seed***

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks or planting ratio and errors in planting as the case may be, and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, plucking of male flower buds in seed parent and other relevant factors;
3. the fourth inspections shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields of shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants 1	Minimum distance (meters)	
	Foundation 2	Certified 3
Fields of other varieties including commercial hybrid of the same variety	1500	1000
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from ridge gourd ( <i>Luffa acutangula</i> Roxb.)	1500	1000
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks and hand pollination is to be adopted	-	5

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types in seed parent	0.010	0.050
Off-types in pollinator	-	0.050
Male flowers shedding pollens in seed parent	-	0.10

\*Maximum permitted at and after flowering

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## SUMMER SQUASH (*Cucurbita pepo* Duch.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of summer squash seed.

### II. Land Requirements

Land to be used for seed production of summer squash shall be free from volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification and from ( <i>Cucurbita moschata</i> (Duch. Poir) cushaw ( <i>Cucurbita mixta</i> Pang.), and winter squash ( <i>C. maxima</i> Duch.)	1000	500

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20
**Plants affected by seed borne diseases	0.10	0.50

\*Standards for Off-types shall be met at and after flowering and for seed borne disease at final inspection.

\*\*Seed borne disease shall be: Cucumber Mosaic Virus (CMV), Watermelon Mosaic Virus.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## SUMMER SQUASH (*Cucurbita pepo* Duch.) HYBRIDS

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid summer squash seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of summer squash.

#### **1. *Eligibility requirements for certification***

- (a) A parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved parental lines.

#### **2. *Classes and sources of seed***

- (a) A parental line shall be a relatively true breeding strain.
- (b) The certified class seed shall be hybrid seed to be planted for any use except seed production.

### **II. Land Requirements**

Land to be used for seed production of hybrid summer squash shall be free from volunteer plants.

### **III. Field Inspection**

#### **A. *Foundation seeds***

A minimum of four inspections shall be made as follows:

- 1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants and other relevant factors;
- 2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, and other relevant factors;

3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**B. *Certified seed***

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks or planting ratio and errors in planting as the case may be, and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, plucking of male flower buds in seed parent and other relevant factors;
3. the fourth inspections shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields of shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties including commercial hybrid of the same variety	1500	1000
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from ( <i>Cucurbita moschata</i> (Duch.) Poir.), cushaw ( <i>Cucurbita mixta</i> Pang.), and winter squash ( <i>C. maxima</i> Duch.)	1500	1000
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks and hand pollination is to be adopted	-	5

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types in seed parent	0.010	0.050
Off-types in pollinator	-	0.050
Male flowers shedding pollens in seed parent	-	0.10
**Plants affected by seed borne diseases	0.10	0.50

\*Standards for Off-types and male flowers shedding pollens in seed shall be met at and after flowering and for seed borne disease at final inspection.

\*\*Seed borne disease shall be: Cucumber Mosaic Virus (CMV), Watermelon Mosaic Virus.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## WATERMELON (*Citrullus lanatus* (Thunb.) Matsumura et. Nakai)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of watermelon seed.

### II. Land Requirements

Land to be used for seed production of watermelon shall be free from volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification and wild watermelon (Indrayan) : <i>Citrullus colocynthis</i> L.	1000	500

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types	0.10	0.20
**Objectionable weed plants	None	None

\*Maximum permitted at and after flowering.

\*\*Objectionable weed shall be : wild watermelon (Indrayan): *Citrullus colocynthis* L.

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Total Weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weed is the same as given at IV.B above

## **WATERMELON (*Citrullus lanatus* (Thunb.) Matsumura et. Nakai) HYBRIDS**

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid watermelon seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of watermelon.

#### **1. *Eligibility requirements for certification***

- (a) A parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved parental lines.

#### **2. *Classes and sources of seed***

- (a) A parental line shall be a relatively true breeding strain.
- (b) The certified class seed shall be the hybrid seed to be planted for any use except seed production.

### **II. Land Requirements**

Land to be used for seed production of hybrid watermelon shall be free of volunteer plants.

### **III. Field Inspection**

#### **A. *Foundation seeds***

A minimum of four inspections shall be made as follows:

- 1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants and other relevant factors;
- 2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, and other relevant factors;

3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**B. *Certified seed***

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks or planting ratio and errors in planting as the case may be, and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, plucking of male flower buds in seed parent and other relevant factors;
3. the fourth inspections shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields of shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants 1	Minimum distance (meters)	
	Foundation 2	Certified 3
Fields of other varieties including commercial hybrid of the same variety	1500	1000
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from wild watermelon (Indrayan) : <i>Citrullus colocynthis</i> L.	1500	1000
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks and hand pollination is to be adopted	-	5

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types in seed parent	0.010	0.050
Off-types in pollinator	-	0.050
Male flowers shedding pollens in seed parent	-	0.10
**Objectionable plants	None	None

\*Maximum permitted at and after flowering.

\*\*Objectionable weed shall : wild watermelon (Indrayan): *Citrullus colocynthis* L.

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Total Weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weed is the same as given at IV.B above

**SEEDLESS WATERMELON (*Citrullus lanatus* (Thunb.) Matsumura et. Nakai)  
HYBRIDS**

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid seedless watermelon seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of seedless watermelon.

**1. *Eligibility requirements for certification***

- (a) A parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved parental lines one of which to be used as a seed parent shall be tetraploid (4x).

**2. *Classes and sources of seed***

- (a) A parental line shall be a relatively true breeding strain.
- (b) The Foundation class seed shall consist of an approved tetraploid (4x) parental line to be used as a seed parent and an approved parental line (2x) to be used as pollinator for the purpose of producing seed for seedless watermelon.
- (c) The Certified class seed shall be tetraploid (4x)

**II. Land Requirements**

Land to be used for seed production of hybrid seedless watermelon shall be free from volunteer plants.

**III. Field Inspection**

**A. *Foundation seeds***

A minimum of four inspections shall be made as follows:

- 1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants and other relevant factors;

2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, and other relevant factors;
3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**B. *Certified seed***

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks or planting ratio and errors in planting as the case may be, and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, plucking of male flower buds in seed parent and other relevant factors;
3. the fourth inspections shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields of shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants 1	Minimum distance (meters)	
	Foundation 2	Certified 3
Fields of other varieties including commercial hybrid of the same variety	1500	1000
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from wild watermelon (Indrayan) : <i>Citrullus colocynthis</i> L.	1500	1000
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks and hand pollination is to be adopted	-	5

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types in seed parent	0.010	0.050
Off-types in pollinator	-	0.050
Male flowers shedding pollens in seed parent	-	0.10
**Objectionable weed plants	None	None

\*Maximum permitted at and after flowering.

\*\*Objectionable weed shall : wild watermelon (Indrayan): *Citrullus colocynthis* L.

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Total Weed seeds (maximum)	None	None
*Objectionable weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weed is the same as given at IV.B above

**(a) Ploidy Test**

All the certified class seed shall be subjected to ploidy test on the laboratory and shall conform to the following minimum genetic purity requirement.

Class of Seed	Genetic purity (%) (Minimum)
Certified	95

## WINTER SQUASH (*Cucurbita maxima* Duch.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of winter squash seed.

### II. Land Requirements

Land to be used for seed production of winter squash shall be free from volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at the mature fruit stage and prior to harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification and from Pumpkin ( <i>Cucurbita moschata</i> (Duch.) Poir.), and summer squash ( <i>C. pepo</i> Duch.)	1000	500

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20

\*Maximum permitted at and after flowering

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## WINTER SQUASH (*Cucurbita maxima* Duch.) HYBRIDS

### I. Application and Amplification of General Seed Certification Standards

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid winter squash seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of winter squash.

#### 1. *Eligibility requirements for certification*

- (a) A parental line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved parental lines.

#### 2. *Classes and sources of seed*

- (a) A parental line shall be a relatively true breeding strain.
- (c) The certified class seed shall be hybrid seed to be planted for any use except seed production.

### II. Land Requirements

Land to be used for seed production of hybrid winter squash shall be free from volunteer plants.

### III. Field Inspection

#### A. *Foundation seeds*

A minimum of four inspections shall be made as follows:

- 1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants and other relevant factors;
- 2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, Off-types, and other relevant factors;

3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**B. *Certified seed***

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, demarcation between seed parent and pollinator blocks or planting ratio and errors in planting as the case may be, and other relevant factors;
2. the second and third inspections shall be made during flowering and fruiting stage to check isolation, off-types, plucking of male flower buds in seed parent and other relevant factors;
3. the fourth inspection shall be made at mature fruit stage and prior to harvesting in order to determine the true characteristics of the fruits.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields of shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties including commercial hybrid of the same variety	1500	1000
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from Pumpkin <i>Cucurbita moschata</i> (Duch.) Poir., and summer squash ( <i>C. pepo</i> Duch.)	1500	1000
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks and hand pollination is to be adopted	-	5

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types in seed parent	0.010	0.050
Off-types in pollinator	-	0.050
Male flowers shedding pollens in seed parent	-	0.10

\*Standards for Off-types and male flowers shedding pollens in seed shall be met at and after flowering and for seed borne diseases at final inspection.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## **CHAPTER-XII**

### **Seed Certification Standards for Cole crops**

1. Cabbage
2. Cauliflower(heading broccoli) and Broccoli (Sprouting broccoli)
3. Chinese cabbage (heading & non heading)
4. Knol-Khol (Khol rabi)
5. Cabbage, cauliflowers, broccoli, knol-khol and chinese cabbage foundation single crosses
6. Cabbage, cauliflower broccoli, knol-khol and chinese cabbage hybrids

**CABBAGE (*Brassica oleracea* L.) capitata L.**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of cabbage seed.

**II. Land Requirements**

Land to be used for seed production of cabbage shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before the marketable stage of heads, the second when heads have formed and the third at the flowering stage.

**IV. Field Standards**

**A. General requirements**

**2. Isolation**

Cabbage seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1600	1000
Fields of the same variety not conforming to varietal purity requirements for certification and from the following varieties of <i>Brassica oleracea</i> (L)	1600	1000

- Brassica oleracea* (L.) var. *oleracea* : wild cabbage.
- B. oleracea* (L.) var. *ramosa* DC : branching bush kale.
- B. oleracea* (L.) var. *millecapitata* (Lev.) Helm: thousand headed kale.
- B. oleracea* (L.) var. *gemmifera* DC : Brussels sprouts
- B. oleracea* (L.) con var. *acephala* DC : fodder kale (karamsag)

- B. oleracea* (L.) var. *viridis* L. : collards, s tree kale  
*B. oleracea* (L.) var. *gongylodes* L. : Kohl rabi or knol-khol  
*B. oleracea* (L.) var. *costata* DC: Portugal cabbage, tronchuda kale  
*B. oleracea* (L.) var. *subauda* L. : savoy cabbage  
*B. oleracea* (L.) var. *italica* Plenck : broccoli (Sprouting broccoli).  
*B. oleracea* (L.) var. *botrytis* L : cauliflower (heading broccoli).

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types	0.10	0.20
**Plants affected by seed borne disease	0.10	0.50

\*Standards for Off-types shall be met at and after flowering and for seed borne diseases at final inspection.

\*\*Seed borne disease shall be:

Black leg (*Leptosphaeria maculans* (Desm) Ces & De Not.)

Block rot (*Xanthomonas campestris* pv. *campestris* (Pamm.) Dawson)

Soft rot (*Erwinia carotovora* (L.R. Jones)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	5.0%	5.0%

**CAULIFLOWER (HEADING BROCCOLI) : *Brassica oleracea* (L.) var. *botrytis* L.**

**AND**

**BROCCOLI (SPROUTING BROCCOLI) : *Brassica oleracea* (L.) var. *italica* Plenck**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of cauliflower and broccoli.

**II. Land Requirements**

Land to be used for seed production of cauliflower and broccoli shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before the marketable stage of heads, the second when heads have formed and the third at the flowering stage.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1600	1000
Fields of the same variety not conforming to varietal purity requirements for certification and from the following varieties of <i>Brassica oleracea</i> (L)	1600	1000
<i>Brassica oleracea</i> (L.) var. <i>oleracea</i> : wild cabbage.		

- B. oleracea* (L.) var. *capitata* L. : cabbage  
*B. oleracea* (L.) var. *ramosa* DC : branching bush kale.  
*B. oleracea* (L.) var. *millecapitata* (Lev.) Helm: thousand headed kale.  
*B. oleracea* (L.) var. *gemmifera* DC : Brussels sprouts  
*B. oleracea* (L.) con var. *acephala* DC : fodder kale (karamsag)  
*B. oleracea* (L.) var. *viridis* L. : collards,s tree kale  
*B. oleracea* (L.) var. *gongylodes* L. : Kohl rabi or knol-khol  
*B. oleracea* (L.) var. *costata* DC: Portugal cabbage, tronchuda kale  
*B. oleracea* (L.) var. *subauda* L. : savoy cabbage

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types	0.10	0.20
**Plants affected by seed borne disease	0.10	0.50

\*Standards for Off-types shall be met at and after flowering and for seed borne diseases at final inspection.

\*\*Seed borne disease shall be:

Black leg (*Leptosphaeria maculans* (Desm) Ces & De Not.)

Block rot (*Xanthomonas campestris* pv. *campestris* (Pamm.) Dawson)

Soft rot (*Erwinia carotovora* (L.R. Jones)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	65%	65%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	5.0%	5.0%

**CHINESE CABBAGE (HEADING & NON-HEADING) : *Brassica pekinensis* (Lour.)  
Rupr.& b *Brassica chinensis* L.**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Chinese cabbage seeds.

**II. Land Requirements**

Land to be used for seed production of Chinese cabbage shall be free from of volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before the marketable stage of heads, the second when heads have attained the marketable stage and the third at the flowering stage.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties of the same species	1600	1000
Fields of the same variety not conforming to varietal purity requirements for certification and from any of the other species of genus <i>Brassica</i> listed below:	1600	1000

*Brassica rapa* (L.) var. : turnip

*B. napus* (L.) var. *napobrassica* (L.) Peterm : rutabaga (swede).

*B. juncea* (L.) Czern & Coss. subsp. *juncea* : Indian mustard or rai or bangla sarson  
*B. juncea* (L.) Czern & Coss. subsp. *integrifolia* (Westn Thell) : vegetable mustard or rai  
*B. juncea* var. *rugosa* (Roxb.) : Pahadi rai  
*B. chinensis* Juslen non Duthie & Fuller : brown sarson or kali sarson  
*B. napus* L. var. *glauca* (Roxb.) Schulz : yellow sarson or pilli sarson or sarish  
*B. napus* : Laha or maghi or achari rai  
*B. tournefortii* Gouan : Punjabi rai or jangli rai  
*B. nigra* (L.) Koch : true mustard or black mustard or banarasi rai  
*B. alba* (L.) Robenh: white mustard

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types	0.10	0.20
**Plants affected by seed borne disease	0.10	0.50

\*Standards for Off-types shall be met at and after flowering and for seed borne diseases at final inspection.

\*\*Seed borne disease shall be:

Block rot (*Xanthomonas campestris* pv. *campestris* (Pamm.) Dawson)

Black leg (*Leptosphaeria maculans* (Desm) Ces & De Not.)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	5.0%	5.0%

**KNOL-KHOL (KHOL RABI) : *Brassica oleracea* (L.) var. *gongyloides* L.**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of knol-khol seed.

**II. Land Requirements**

Land to be used for seed production of knol-khol shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before the marketable stage of knobs, the second when knobs have formed and the third at the flowering stage.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Cabbage seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1600	1000
Fields of the same variety not conforming to varietal purity requirements for certification and from the following varieties of <i>Brassica oleracea</i> (L.)	1600	1000

*Brassica oleracea* (L.) var. *oleracea* : wild cabbage.

*B. oleracea* (L.) var. *capitata* L. : cabbage

*B. oleracea* (L.) var. *ramosa* DC : branching bush kale.

*B. oleracea* (L.) var. *millecapitata* (Lev.) Helm: thousand headed kale.

*B. oleracea* (L.) var. *gemmifera* DC : Brussels sprouts

- B. oleracea* (L.) con var. *acephala* DC : fodder kale (karamsag)  
*B. oleracea* (L.) var. *viridis* L. : collards, tree kale  
*B. oleracea* (L.) var. *costata* DC: Portugal cabbage, tronchuda kale  
*B. oleracea* (L.) var. *subauda* L. : savoy cabbage  
*B. oleracea* (L.) var. *italica* Plenck: broccoli (Sprouting broccoli)  
*B. oleracea* (L.) var. *botrytis* L.: cauliflower (heading broccoli)

## B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types	0.10	0.20
**Plants affected by seed borne disease	0.10	0.50

\*Standards for Off-types shall be met at and after flowering and for seed borne diseases at final inspection.

\*\*Seed borne disease shall be:

Black leg (*Leptosphaeria maculans* (Desm) Ces & De Not.)

Block rot (*Xanthomonas campestris* pv. *campestris* (Pamm.) Dawson)

Soft rot (*Erwinia carotovora* (L.R. Jones)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	5.0%	5.0%

**FOUNDATION SINGLE CROSSES OF  
CABBAGE (*Brassica oleracea* (L.) *capitata* L.;  
CAULIFLOWER (*Brassica oleracea* (L.) var. *botrytis* L.);  
BROCCOLI (*Brassica oleracea* (L.) var. *italica* Plenck);  
KNOL-KHOL (*Brassica oleracea* (L.) var. *gongylodes* L.);  
And  
CHINESE CABBAGE (HEADING & NON-HEADING (*Brassica pekinensis* (Lour.)  
Rupr.&b *Brassica chinensis* L.)**

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of seeds of foundation single crosses of cabbage, cauliflower, broccoli, knol-khol and Chinese cabbage (heading and non-heading)
- B. The General standards are amplified as follows to apply specifically to the foundation single crosses of cabbage, cauliflower, broccoli, knol-khol and Chinese cabbage (heading and non-heading).

**1. *Eligibility requirements for certification***

A foundation single cross to be eligible for certification must be produced from two approved inbred lines both of which shall be self-incompatible but cross-compatible, the sources of which shall assure their identity and are approved by the Certification Agency.

**2. *Classes and sources of seed***

- (a) A foundation single crosses shall consist of the first generation hybrid resulting from the controlled crossing of the two approved self-incompatible but cross-compatible inbred lines. The foundation single crosses may be of three types depending upon the procedure of seed production;
- seeds of only female parent are harvested and certified;
  - seeds of both parents are harvested separately and certified;
  - seeds of both the parents are harvested, mixed together and certified.
- (b) The foundation single cross shall be used for production of hybrid seed.

## II. Land Requirements

Land to be used for seed production of foundation single crosses of cabbage, cauliflower, broccoli, knol-khol and Chinese cabbage (heading and non-heading) shall be free from volunteer plants.

## III. Field Inspection

A minimum of three inspections shall be made as follows:

1. the first inspection shall be made before flower stalk development to check isolation, Off-types including type of heads (curds or knobs), outcrosses, planting ratio, and other relevant factors;
2. the second inspection shall be made during flowering to check isolation, Off-types and other relevant factors;
3. the third inspection shall be made at maturity and prior to harvesting to check Off-types, seed borne diseases and other relevant factors.

## IV. Field Standards

### A. General requirements

#### 1. Isolation

Seed fields of foundation single cross of the seed crops mentioned in the column 1 of the Table below shall be isolated from the contaminants shown in column 2 of the Table below by the distances specified in column 3 of the said Table.

Seed Crop	Contaminants	Minimum distance (meters)
1	2	3
Cabbage	Fields of other varieties including same single cross hybrid	1600
	Fields of the same single cross/hybrid (code designation) not conforming to varietal purity requirements for certification and from the following varieties of <i>Brassica oleracea</i> (L.)	
	<i>Brassica oleracea</i> (L.) var. <i>oleracea</i> : wild cabbage.	
	var. <i>ramosa</i> DC : branching bush kale.	
	var. <i>millecapitata</i> (Lev.) Helm: thousand headed kale.	1600
	var. <i>gemmifera</i> DC : Brussels sprouts	
	con var. <i>acephala</i> DC : fodder kale (karamsag)	

var. *viridis* L. : collards, tree kale  
var. *gongylodes* L. : Khol rabi or knol-khol;  
var. *costata* DC: Portugal cabbage, tronchuda kale  
var. *subauda* L. : savoy cabbage  
var. *italic* Plenck: broccoli (Sprouting broccoli) and  
var. *botrytis* L.: cauliflower (heading broccoli)

Cauliflower & broccoli	Fields of other varieties including same single cross hybrid	1600
	Fields of the same single cross/hybrid (code designation) not conforming to varietal purity requirements for certification and from <i>B. oleracea</i> var. <i>capitata</i> L.: cabbage, and the varieties of <i>B. oleracea</i> (L.) listed for cabbage except <i>B. oleracea</i> var. <i>botrytis</i> (L.): cauliflower and <i>B. oleracea</i> var. <i>italica</i>	1600
Plenck Broccoli Knol-khol hybrid	Fields of other varieties including the same single cross-hybrid	1600
	Fields of the same single cross/hybrid (code designation) not conforming to varietal purity requirements for certification and from <i>B. oleracea</i> var. <i>capitata</i> (L.) : cabbage and the varieties of <i>Brassica oleracea</i> (L.) : listed for cabbage except <i>B.oleracea</i> var. <i>gongylodes</i> (L.) : knol-khol	1600
Chinese cabbage (heading and non-heading)	Fields of other varieties of the same species including heading and non-heading of the same single cross hybrid	1600
	Fields of the same single cross/hybrid (code designation) not conforming to varietal purity requirements for certification and from the other species of genus <i>Brassica</i> listed below: <i>Brassica rapa</i> (L.) : turnip <i>B. nupus</i> (L.) var. <i>napobrassica</i> (L.) Peterm; rutabaga (swede). <i>B. juncea</i> (L.) Czern & Coss. Subsp. <i>juncea</i> : Indian mustard or rai or bangle sarson. <i>B. juncea</i> (L.) Czern & Coss. Subsp. <i>integrifolia</i> (West) Thell: vegetable mustard or rai. <i>B. juncea</i> var. <i>rugosa</i> (Roxb) : Pahadi rai <i>B. chinensis</i> Juslen non Duthie & Fuller : brown sarson or kali sarson <i>B. napus</i> L. var. <i>glauca</i> (Roxb.) Schulz : yellow sarson or	1600

pilli sarson or sarish.

*B. napus* L. var. *napus* : laha or maghi or achari rai.

*B. tournefortii* Gouan : Punjabi rai or jangli rai.

*B. nigra* (L.) Koch : true mustard or black mustard or Banarasi rai.

*B. alba* (L.) Robenh : white mustard

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## B. Specific requirements

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Factor	<i>Maximum permitted (%)</i>	
	1	2
Off-types in each parent at and after flowering		0.010
Plants affected by seed borne diseases at final inspection		0.10

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\*Seed borne diseases shall be:

For cabbage, cauliflower, broccoli and knoll-khol:

Black leg (*Leptosphaeria maculans* (Desm) Ces & De Not.)

Block rot (*Xanthomonas campestris* pv. *campestris* (pamm.) Dawson)

Soft rot (*Erwinia carotovora* (L.R. Jones)

For Chinese cabbage (heading and non-heading)

Black leg (*Leptosphaeria maculans* (Desm) Ces & De Not.)

Block rot (*Xanthomonas campestris* pv. *campestris* (pamm.) Dawson)

## V. Seed Standards

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Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	6.0%	6.0%

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**HYBRIDS OF**  
**CABBAGE (*Brassica oleracea* (L.) *capitata* L.);**  
**CAULIFLOWER (*Brassica oleracea* (L.) var. *botrytis* L.);**  
**BROCCOLI (*Brassica oleracea* (L.) var. *italica* Plenck);**  
**KNOL-KHOL (*Brassica oleracea* (L.) var. *gongylodes* L.);**  
**And**  
**CHINESE CABBAGE (HEADING & NON-HEADING (*Brassica pekinensis* (Lour.)**  
**Rupr.&b *Brassica chinensis* L.)**

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrids of cabbage, cauliflower, broccoli, knol-khol and Chinese cabbage (heading and non-heading)
- B. The General standards are amplified as follows to apply specification to the hybrids of cabbage, cauliflower, broccoli, knol-khol and Chinese cabbage (heading and non-heading).

**1. Eligibility requirements for certification**

- (a) A hybrid is one to be planted for any use except seed production. It may be anyone of the following:
- (i) Single cross – the first generation resulting from the controlled crossing of the two approved self-incompatible but cross-compatible inbred lines. It may be of three types depending upon the procedure of seed production;
- seeds of only female parent are harvested and certified;
  - seeds of both parents are harvested separately and certified; and
  - seeds of both the parents are harvested together, mixed and certified.
- (ii) Double cross – the first generation resulting from the controlled crossing of the two approved self-incompatible but cross-compatible single crosses.
- (iii) Three way cross – the first generation resulting from controlled crossing of an approved inbred line and certified single cross being self-incompatible individually but cross compatible to each other.

**2. Classes and sources of seed**

- a. Only the class “Certified” shall be recognized
- b. A hybrid to be certified must be produced from certified Foundation seed or seed stocks approved by the Certification Agency.

## II. Land Requirements

Land to be used for seed production of the hybrids of cabbage, cauliflower, broccoli, knol-kohl and Chinese cabbage (heading and non-heading) shall be free from volunteer plants.

## III. Field Inspection

A minimum of three inspections shall be made as follows:

1. the first inspection shall be made before flower stalk development to check isolation, Off-types including type of heads (curds or knobs), outcrosses, planting ratio, and other relevant factors;
2. the second inspection shall be made during flowering to check isolation, Off-types and other relevant factors;
3. the third inspection shall be made before harvesting to check Off-types, seed borne diseases and other relevant factors.

## IV. Field Standards

### (A) General requirements

#### 1. Isolation

Seed fields of hybrids of the seed crops mentioned in column 1 of the Table below shall be isolated from the contaminants shown in column 2 of the Table below by the distances specified in column 3 of the said Table.

Seed Crop	Contaminants	Minimum distance (meters)
1	2	3
Cabbage	Fields of other varieties including commercial hybrid of the same variety	1600
	Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from the following varieties of <i>Brassica oleracea</i> (L.) <i>Brassica oleracea</i> (L.) var. <i>oleracea</i> : wild cabbage. var. <i>ramosa</i> DC : branching bush kale. var. <i>millecapitata</i> (Lev.) Helm: thousand headed kale.	1600

var. *gemmifera* DC : Brussels sprouts  
 con var. *acephala* DC : fodder kale (karamsag)  
 var. *viridis* L. : collards, tree kale  
 var. *gongylodes* L. : Khol rabi or knol-khol;  
 var. *costata* DC: Portugal cabbage, tronchuda kale  
 var. *subauda* L. : savoy cabbage  
 var. *italic* Plenck: broccoli (Sprouting broccoli) and  
 var. *botrytis* L.: cauliflower (heading broccoli)

Cauliflower & broccoli	Fields of other varieties including commercial hybrid of the same variety	1600
	Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from <i>B. oleracea</i> var. <i>capitata</i> L.: cabbage, and the varieties of <i>B. oleracea</i> (L.) listed for cabbage except <i>B. oleracea</i> var. <i>botrytis</i> (L.): cauliflower and <i>B. oleracea</i> var. <i>italica</i>	1600
Plenck: Broccoli Knol-khol hybrid	Fields of other varieties including commercial hybrid of the same variety	1600
	Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from <i>B. oleracea</i> var. <i>capitata</i> (L.) : cabbage and the varieties of <i>Brassica oleracea</i> (L.) : listed for cabbage except <i>B. oleracea</i> var. <i>gongylodes</i> (L.) : knol-khol	1600
Chinese cabbage (heading and non-heading)	Fields of other varieties including commercial hybrid of the same variety	1600
	Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from the other species of genus <i>Brassica</i> listed below: <i>Brassica rapa</i> (L.) : turnip <i>B. napus</i> (L.) var. <i>napobrassica</i> (L.) Peterm; rutabaga (swede). <i>B. juncea</i> (L.) Czern & Coss. Subsp. <i>juncea</i> : Indian mustard or rai or bangle sarson. <i>B. juncea</i> (L.) Czern & Coss. Subsp. <i>integrifolia</i> (West) Thell: vegetable mustard or rai. <i>B. juncea</i> var. <i>rugosa</i> (Roxb) : Pahadi rai <i>B. chinensis</i> Juslen non Duthie & Fuller : brown sarson or	1600

kali sarson  
*B. napus* L. var. *glauca* (Roxb.) Schulz : yellow sarson or pilli sarson or sarish.  
*B. napus* L. var. *napus* : laha or maghi or achara rai.  
*B. tournefortii* Gouan : Punjabi rai or jangli rai.  
*B. nigra* (L.) Koch : true mustard or black mustard or Banarasi rai.  
*B. alba* (L.) Robenh : white mustard

## B. Specific requirement

Factor	Maximum permitted (%)	
	1	2
Off-types in each parent at and after flowering		0.050
Plants affected by seed borne diseases at final inspection		0.50

\*Seed borne diseases shall be:

For cabbage, cauliflower, broccoli and knol-khol:

Black leg (*Leptosphaeria maculans* (Desm) Ces & De Not.)

Block rot (*Xanthomonas campestris* pv. *campestris* (pamm.) Dawson)

Soft rot (*Erwinia carotovora* (L.R. Jones)

For Chinese cabbage (heading and non-heading)

Black leg (*Leptosphaeria maculans* (Desm) Ces & De Not.)

Block rot (*Xanthomonas campestris* pv. *campestris* (pamm.) Dawson)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	7.0%	7.0%
For vapour-proof containers (maximum)	5.0%	5.0%

## **CHAPTER –XIII**

### **Seed Certification Standards for Green/Leafy Vegetables**

1. Amaranth (Chaulai), Amaranth (tender) and Amaranth (Grain)
2. Asparagus
3. Celery
4. Fenugreek (Kasuri Methi & Methi)
5. Lettuce
6. Parsley
7. Spinach and spinach beet

**AMARANTH – CHAULAI (*Amaranthus blitum* L.var. *oleracea* Duthie)**  
**AMARANTH (TENDER) – BARICHAULAI (*Amaranthus tricolor* L.)**  
**AMARANTH (GRAIN) – CHAULAI (*Amaranthus cruentus* L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of amaranth seed.

**II. Land Requirements**

Land to be used for seed production of amaranth shall be free from volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first before flowering and the second during flowering stage.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Amaranth seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	400	200
Fields of the same variety not conforming to varietal purity requirements for certification and wild amaranth ( <i>Kantewali chaulai</i> ): ( <i>Amaranthus spinosus</i> L.)	400	200

### ***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20
**Objectionable weed plants	0.010	0.020

\*Maximum permitted at and after flowering.

\*\*Objectionable weed shall be :

wild amaranth (*Kantewali chaulai*): (*Amaranthus spinosus* L.)

### **I. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	95.0%	95.0%
Inert matter (maximum)	5.0%	5.0%
Other crop seeds (maximum)	5/kg	10/kg
Total weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weed is the same as given at IV. B. above.

## ASPARAGUS (*Asparagus officinalis* L.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of asparagus seed.

### II. Land Requirements

Land to be used for seed production of asparagus shall be free from volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first at crowing stage, the second during flowering and fruiting stage and the third at maturity and prior to harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	500	300
Fields of the same variety not conforming to varietal purity requirements for certification	500	300

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20

\*Maximum permitted at and after flowering.

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	96.0%	96.0%
Inert matter (maximum)	4.0%	40%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

**CELERY (*Apium graveolens* (L.) var. *dulce* (Mill.) DC.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of celery seed.

**II. Land Requirements**

Land to be used for seed production of celery shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering the second during flowering and fruiting stage and the third at maturity and prior to harvesting.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	500	300
Fields of the same variety not conforming to varietal purity requirements for certification and from celeriac (turnip – rooted celery): <i>Apium graveolens</i> (L.) var. <i>rapaceum</i> DC.	500	300

**B. Specific requirements**

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20
**Plants affected by seed borne diseases	0.10	0.50

\*Maximum permitted at and after flowering in the case of Off-types and at the final inspection in case of seed borne diseases.

\*\*Seed borne diseases shall be:

Leaf blight (*Septoria apiicola* Speg.)

Root rot (*Phoma apiicola* Kleb. )

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	7.0%	7.0%

**FENUGREEK (KASURI METHI) (*Trigonella corniculata* L.),  
METHI (*Trigonella foenumgracum* L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of Kasuri methi and methi.

**II. Land Requirements**

Land to be used for seed production of Kasuri methi and methi shall be free from volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first before flowering, the second at the flowering and fruit stage.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields offered for certification shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	50	25
Fields of the same variety not conforming to varietal purity requirements for certification	50	25

**B. Specific requirements**

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20
**Objectionable weed plants	0.010	0.020

\*Maximum permitted at the final inspection.

\*\*Objectionable weed shall be: Senji (*Melilotus* spp.)

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	10/kg
Total weed seeds (maximum)	10/kg	10/kg
*Objectionable weed seeds (maximum)	2/kg	5/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination including hard seed (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weed is the same as given at IV. B. above.

## LETTUCE (*Lactuca sativa* L.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Lettuce seed.

### II. Land Requirements

Land to be used for seed production of Lettuce shall be free from volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made, the first before heads have formed in heading types, and before full grown stage in non-heading types, the second when heads have formed in heading types, and at full grown stage in non-heading types and the third at flowering stage.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Lettuce seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	100	50
Fields of the same variety not conforming to varietal purity requirements for certification and wild lettuce ( <i>Lactuca scariola</i> L.).	100	50

**B. Specific requirements**

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20
**Objectionable weed plants	0.010	0.020
***Plants affected by seed borne disease	0.10	0.50

\*Maximum permitted at the final inspection.

\*\*Objectionable weed shall be: wild lettuce (*Lactuca scariola* L.).

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Total weed seeds (maximum)	5/kg	10/kg
*Objectionable weed seeds (maximum)	2/kg	5/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

\*Objectionable weed is the same as given at IV. B. above.



**PARSLEY (*Petroselinum crispum* (Mill.) Nym.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of parsley seed.

**II. Land Requirements**

Land to be used for seed production of parsley shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at maturity and prior to harvesting.

**IV. Field Standards**

*A. General requirements*

*1. Isolation*

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	500	300
Fields of the same variety not conforming to varietal purity requirements for certification	500	300

**B. Specific requirements**

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Off-types	0.10	0.20
**Plants affected by seed borne disease	0.10	0.50

\*Standards for Off-types shall be met at and after flowering and for seed borne diseases at final inspection.

\*\*Seed borne disease shall be: Leaf spot (*Septoria petroselini* Desm.)

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	65%	65%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	7.0%	7.0%

**SPINACH (*Spinacia oleracea* L.) AND SPINACH  
BEET (*Beta vulgaris* (L.) var. *flavescens* DC.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of spinach and spinach beet.

**II. Land Requirements**

Land to be used for seed production of spinach and spinach beet shall be free from volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made, the first before flowering, and the second at flowering stage.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1600	1000
Fields of the same variety not conforming to varietal purity requirements for certification.	1600	1000
Fields of the swiss chard (chard, sea kale beet, silver beet): <i>Beta vulgaris</i> Linn. var. <i>cicla</i> Moq., sugar beet ( <i>Beta vulgaris</i> L.) and garden beet (beet root, mangels or		

stock beet): <i>Beta vulgaris</i> (L.) var. <i>rubra</i>		
Moq. for spinach beet only	1600	1000

**B. Specific requirements**

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Off-types	0.10	0.20

\*Maximum permitted at and after flowering.

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	96.0%	96.0%
Inert matter (maximum)	4.0%	4.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## **CHAPTER-XIV**

### **Seed Certification Standards for Bulb Crops**

1. Garlic
2. Multiplier onion (potato onion)
3. Onion
4. Onion hybrids

## **GARLIC (*Allium sativum* L.)**

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of garlic seeds.
- B. The General Standards are amplified as follows to apply specifically to garlic.
- C. All certified classes shall be produced from the cloves obtained from the bulbs whose source and identity may be assured and approved by the Certification Agency.

### **II. Land Requirements**

Land to be used for seed production of garlic shall be free from volunteer plants.

### **III. Field Inspection**

A minimum of two inspections shall be made as follows;

- 1. The first inspection shall be made when plants are large enough to verify isolation, Off-types including and other relevant factors.
- 2. The second inspection shall be made when leaves begin to fall and before lifting of bulbs to verify isolation, Off-types and other relevant factors.

### **IV. Field Standards**

#### ***A. General requirements***

##### ***1. Isolation***

Seed fields of garlic shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	5	5
Fields of the same variety not conforming to varietal purity requirements for certification	5	5

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Off-types	0.10	0.20

\*Maximum permitted at final inspection.

Note: All offtype plants should be rogued out along with bulbs.

**V. Seed (Planting stakes) Standards**

1. The average diameter of each bulb shall not be less than 2.5 cm or 25 gm in weight.
2. The seed material shall be reasonably clean, healthy and firm and shall conform to the varietal characteristics of the variety. The bulbs not conforming to varietal characteristics shall not exceed 0.10% and 0.20% (by number) for Foundation and Certified seed classes respectively.
3. Cut, bruised, cracked, immature or those damaged by insects, slugs or worms shall not exceed more than 2.0% (by weight).

**MULTIPLIER ONION (POTATO ONION)**  
*(Allium cepa var. aggregatum Don.)*

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of multiplier onion.
- B. The General Standards are amplified as follows to apply specifically to multiplier onion.
- C. All certified classes shall be produced from the bulbs (bulblets) whose source and identity may be assured and approved by the Certification Agency.

**II. Land Requirements**

Land to be used for seed production of multiplier onion shall be free from volunteer plants.

**III. Field Inspection**

A minimum of two inspections shall be made as follows;

- 1. The first inspection shall be made when plants are large enough to verify isolation, Off-types including bolters and other relevant factors.
- 2. The second inspection shall be made when leaves begin to fall and before lifting of bulbs to verify isolation, Off-types and other relevant factors.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields of multiplier onion shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	5	5
Fields of the same variety not conforming to varietal purity requirements for certification	5	5

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Off-types	0.10	0.20

\*Maximum permitted at final inspection.

Note: All offtype plants should be rogued out along with bulbs.

**V. Seed Standards**

1. The average diameter of each bulb shall not be less than 2cm
2. The seed material shall be reasonably clean, healthy and firm and shall conform to the varietal characteristics of the variety. The bulblets not conforming to varietal characteristics shall not exceed 0.10% and 0.20% (by number) for foundation and certified seed classes respectively.
3. Cut, bruised, cracked, immature or those damaged by insects, slugs or worms shall not exceed more than 2.0% (by weight.)
4. Maximum tolerance limit of bulblets showing visible symptoms caused by the diseases indicated in the table below shall be as follows

<i>Diseases</i>	<i>Maximum permissible limits</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Bacterial Brown rot: ( <i>Pseudomonas aeruginosa</i> (Schroeter) Migula)	None	None
Bacterial soft rot: ( <i>Erwinia carotovora</i> (L.R. Jones)	None	None
Basal rot: ( <i>Fusarium oxysporum</i> f. <i>cepae</i> (Hanazwa)	None	None

## ONION (*Allium cepa* L.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of onion seed.

### II. Land Requirements

Land to be used for seed production of onion seed shall be free from volunteer plants.

### III. Field Inspection

#### A. *Mother bulb production stage*

A minimum of two inspections shall be made as follows;

1. The first inspection shall be made after transplanting of seedlings in order to determine isolation, volunteer plants Off-types including bottlers and other relevant factors.
2. The second inspection shall be made after the bulbs have been lifted to verify the true characteristics of bulbs.

#### B. *Seed production stage*

A minimum of four inspections shall be made as follows;

1. The first inspection shall be made before flowering in order to determine isolation, volunteer plants Off-types including bottlers and other relevant factors.
2. The second and third inspections shall be made during flowering to check isolation, Off-types and other relevant factors
3. The fourth inspection shall be made at maturity to verify the true nature of plant and other relevant factors.

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

Onion seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2,3,4 and 5 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>			
	<i>Mother bulb production stage</i>		<i>Seed production stage</i>	
	<i>Foundation</i>	<i>Certified</i>	<i>Foundation</i>	<i>Certified</i>
1	2	3	4	5
Fields of other varieties	5	5	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification	5	5	1000	500

##### B. Specific requirements

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Bulbs not conforming to the varietal characteristics	0.10% (by number)	0.20% (by number)
**Off-types	0.10%	0.20%

\*Maximum permitted at second inspection at mother bulb production stage.

\*\*Maximum permitted at and after flowering at seed production stage

## V. Seed Standards

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## ONION (*Allium cepa* L.) HYBRIDS

### I. Application and Amplification of General Seed Certification Standards

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid onion seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of onion:

#### 1. *Eligibility requirements for certification*

- (a) An inbred line to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved inbred lines, one of which shall be male sterile.

#### (2) *Classes and Sources of seed*

- (a) An inbred line shall be a relatively true breeding strain resulting from self-pollination with selection.
- (b) The Foundation class seed shall consist of an approved male sterile line to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- (c) A male sterile line shall be a strain (A) carrying cytoplasmic genetic male sterility, which sheds no viable pollen and is maintained by the normal sister strain (B) which is used as pollinator
- (d) The Certified class seed shall be the hybrid seed to be planted for any use except seed production.

## **II. Land Requirements**

Land to be used for seed production of hybrid onion seed shall be free from volunteer plants.

## **III. Field Inspection**

### *A. Mother bulb production stage*

A minimum of two inspections shall be made as follows;

1. The first inspection shall be made after transplanting of seedlings in order to determine isolation, volunteer plants Off-types including bolters and other relevant factors.
2. The second inspection shall be made after the bulbs have been lifted to verify the true characteristics of bulbs.

### *B. Seed production stage*

A minimum of four inspections shall be made as follows;

1. The first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, planting ratio, error in planting and other relevant factors.
2. The second and third inspections shall be made during flowering to check isolation, pollen shedding umbels, off-types and other relevant factors
3. The fourth inspection shall be made at maturity to verify the true nature of umbels and other relevant factors.

## **IV. Field Standards**

### *A. General requirements*

#### *1. Isolation*

Seed fields offered for certification shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2,3,4 and 5 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>			
	<i>Mother bulb production stage</i>		<i>Seed production stage</i>	
	<i>Foundation</i>	<i>Certified</i>	<i>Foundation</i>	<i>Certified</i>
1	2	3	4	5
Fields of other varieties including commercial hybrid of the same variety	5	5	1200	600
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	5	5	1200	600
Fields of the other varieties of different skin color	-	-	1500	750
Fields of the other hybrids having common male parent and conforming to varietal purity requirements for certification	5	5	-	-

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Bulbs not conforming to varietal characteristics	0.010% (by number)	0.050% (by number)
Off-types (umbels) in seed parent at and after flowering	0.010%	0.050%
Off-types (umbels) in pollinator at and after flowering	0.010%	0.050%

Pollen shedding (umbels) in seed parent at flowering	0.050%	0.10%
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\*Maximum permitted at second inspection at mother bulb production stage.

## V. Seed Standards

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## **CHAPTER-XV**

### **Seed Certification Standards for Tubers & Rhizomes**

1. Lesser Yam
2. Ginger
3. Potato
4. True potato seed (TPS) hybrids
5. Taro (Arvi)
6. Turmeric

## LESSER YAM (*Dioscorea esculenta* (Lour.) Burkill)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of lesser yam.

### II. Land Requirements

Land to be used for seed production of lesser yam shall be free from volunteer plants. Swampy and shaded conditions may be avoided.

### III. Field Inspection

A minimum of three inspections shall be made, the first after about 90 days, the second after about 150 days and the third after about 200 days of planting or at appropriate growth stage depending on the crop duration of the variety concerned to verify off types and other relevant factors.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	5	5
Fields of the same variety not conforming to varietal purity requirements for certification	5	5

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.050	0.10
Plants infested with scale insects	None	None

\*Standards for Off-types shall be met at final inspection and for the designated insects at each inspection.

*Note:*

1. All Off-types and plants infested with scale insects shall be rogued out alongwith the tubers and destroyed
2. Gaps in the seed field shall not be more than 10.0%

**V. Seed Standards**

A. Specification for Foundation and Certified classes shall be as under:

1. Seed size (weight of the tuber): 100-150 gm.
2. In a seed lot, tubers not conforming to specific size shall not exceed more than 5.0% (by number).
3. The seed material shall be reasonably clean, healthy and shall conform to the characteristics of the variety. The tubers not conforming to the varietal characteristics shall not exceed 0.050% and 0.10% (by number) for foundation and certified seed classes respectively.
4. Cut, bruised, unshapy, cracked tubers or tubers damaged by insects (other than scale insects) slugs or worms shall not exceed more than 1.0% (by weight).
5. Maximum tolerance limit of tubers showing visible symptoms of infestation caused by scale insects will be as follows:

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Tubers infested with scale insects	None	None

## GINGER (*Zingiber officinale* Rose)

### I. Application and Amplification of General Seed Certification Standards

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of seed ginger.
- B. The general standards are amplified as follows to apply specifically to ginger
- C. All certified classes shall be produced by vegetative propagation of underground rhizome, whose source and identity may be assured and approved by the certification agency.

### II. Land Requirements

- Partial shade with gentle sloppy landscape
- Soil should be loose, friable and offer minimum resistance to rhizome development. Soil depth 30 cm or more, high organic matter and pH of 6-6.5 are favorable. Virgin forest soil particularly after deforestation is ideal.
- Planting should be avoided if soil is infested with *Pythium* sp., *Pseudomonas solanacearum*, and *Meloidogyne incognita*.
- Land to be used for seed/planting material production of ginger shall be free from volunteer plants.

### III. Field Inspection

A minimum of four inspections shall be made as follows:

- A. The first inspection shall be made at the time of planting variety isolation, rhizome rot, seed piece weight and spacing.
- B. The second inspection shall be made about 45-125 days after planting to check germination, sprouting, rhizome rot and shoot borer incidence.
- C. The third inspection shall be made about 180-190 days after planting to check off types, rhizome rot and *Phyllosticta* leaf spot.
- D. The fourth inspection shall be made before harvest or between 240-250 days after planting to verify rhizome rot, scale insect and meal bug infestation.

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

The fields/blocks of seed ginger shall be isolated from the contaminants shown in the column 1 of the table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

##### B. Specific requirements

<i>Factor</i>	<i>Inspection stage</i>	<i>Foundation</i>	<i>Certified (Maximum)</i>
1.Spacing	I	45 x30 cm	45x30cm
2.Seed piece weight	I	20-25 g	20-25 g
3.Rhizome rot	I	0	0
	II to IV	0	0
4. Shoot borer	II to III	1.0%	5.0%
5.Off-types	III	0.5%	1.0%
6.Phylosticta Leaf spot:	III	1.0%	5.0%
Bacterial wilt ( <i>Rhizictonis solanecsyur</i> )		1.0%	1.0%
7.Scale insect	IV	1.0%	5.0%
8.Mealy bugs	IV	1.0%	5.0%

Note:

1. All Off-types and diseased plants should be rogued out along with rhizomes and destroyed.
2. Gaps in the seed plot should not be more than 10.0%

**V. Seed Standards**

<i>Factor</i>	<i>Foundation</i>	<i>Certified</i>
1. Appearance	Healthy & Plumpy	Healthy & Plumpy
2. Uniformity (Minimum)	95.0%	85.0-95.0%
3. Dry rot (Maximum)	1.0%	5.0%
4. Phyllosticta (Maximum)	5.0%	10.0%
5. Scales (Maximum)	1.0%	5.0%
6. Mealy bugs (Maximum)	1.0%	5.0%

Note:

1. In a seed lot, rhizomes not conforming to specific characteristics of a variety shall not exceed 0.5% and 1.0% (by number – maximum) for foundation and certified seed classes, respectively.
2. The seed material shall be reasonably clean healthy and firm.
3. Cut, bruised, or those damaged by insects shall not exceed more than 1.0% (by weight)

## **POTATO (*Solanum tuberosum* L.)**

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of seed potato.
- B. *Classification of seed potato on the basis of area of production:* There shall be two types of seed potatoes, namely the Hills and plains-grown and shall be designated as Hill seed (HS) and plains seed (PS) respectively. Hill Seed (HS) shall be grown in the high hills generally 2500 meters above the mean sea level or in situations declared technically suitable for seed production plains seed (PS) shall be grown in such areas where aphid infestation is low during the crop growing season and which are technically suitable for seed production.

### **II. Land Requirements**

A crop of seed potato shall not be eligible for certification if grown on land infested with:

- wart (*Synchytrium endobioticum* (Schilb.) Perc. and or cyst forming nematodes;
- brown rot (*Pseudomonas solanacearum* (E.f. Sm.) E.F. Sm or on-cyst forming nematodes within the previous three years;
- common scab (*Streptomyces scabies* (Thaxt.) Waks. & Henrici).

### **III. Field Inspection**

A minimum of four inspections shall be made as follows:

1. The first inspection shall be made about 45 days after planting in the hills and about 35 days after planting in the plains to verify isolation, Off-types and the extent of disease infection with specific reference to mild and severe mosaics, leaf roll, yellows, brown rot and other relevant factors;
2. The second inspection shall be made about 60-65 days after planting for early varieties and about 70-75 days after planting for late varieties or at appropriate growth stage depending on the crop duration of the variety concerned to check isolation, offtype and extent of disease infection and extent of disease infection

with specific reference to mild and severe mosaics, leaf roll, yellows, brown rot and other relevant factors;

3. The third inspection shall be made immediately after haulms cutting/destruction in order to verify that haulms have been cut/destroyed by the prescribed date and in proper manner;
4. The fourth inspection shall be made about 10 days after haulms cutting/destruction and before harvesting in order to verify that no re-growth of haulms has taken place.

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

The fields of seed potato shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2,3 and 4 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>		
	<i>Foundation</i>		<i>Certified</i>
	<i>Stage-I</i>	<i>Stage-II</i>	
1	2	3	4
Fields of other varieties	5	5	5
Fields of the same variety not conforming to varietal purity requirements for certification	5	5	5

**B. Specific requirements**

Factor	Maximum permissible limits			
	Stage	Foundation		Certified
		Stage-I	Stage-II	
1	2	3	4	5
Off-types	I & II Inspection	0.050%	0.050%	0.10%
Plants showing symptoms of :				
-Mild mosaic	I&II Inspection	1.0%	2.0%	3.0%
-Severe mosaic, leaf roll and yellows	I&II inspection	0.50%	0.750%	1.0%
*Total virus	-	1.0%	2.0%	3.0%
**Plants infected by brown rot (syn. Bacterial wilt) ( <i>Pseudomonas</i> (E.F. Sm.) <i>solanacearum</i> E.F. Sm.)	I&II Inspection	None	None	3 plants per hectare
***Re-growth of plants after destruction of haulms	IV inspection	0.50%	0.50%	0.50%

\*Of the two inspections, the higher virus percentage will be considered for the purpose of the specified limits of tolerance.

The presence of brown rot infected plants within the specified limits of tolerance shall be permitted in the areas known to be infected with the disease. In case of plants suspected to be infected with brown rot, the neighbouring plants, one on either side should also be rogued along with tubers.

\*\*\*Standards for re-growth after destruction of haulms shall be met at fourth inspection to be conducted about 10 days after haulms cutting.

*Note:*

1. All Off-types and diseased plants should be rogued out alongwith the tubers and destroyed.
2. Gaps in the seed plot should not be more than 10.0%
3. Haulms must be destroyed as close to the ground as possible before the date specified by the certification agency. Failure to destroy haulms in time shall render the crop liable for rejection

## V. Seed Standards

A. Specification in respect of size and weight of seed material for foundation stage-I, foundation stage-II and certified class shall be as under

Size	Mean length and two widths at the middle of tuber	Corresponding weight
(a) Hill seed (HS)		
Seed size	30mm-60mm	25-150gm
Large size	above 60mm	above 150gm
(b) Plains seed (PS)		
Seed size	30 mm- 55 mm	25-125gm
large size	above 55 mm	above 125 gm

### Note:

1. The size of tuber will be decided either on the basis of mean of two widths of a tuber at the middle and that of length or on the basis of corresponding weight of tuber.
2. In a seed lot, tubers not conforming to specific size of seed shall not exceed more than 5.0% (by number)
3. (a) The seed material shall be reasonably clean healthy firm and shall conform to the characteristics of the variety the tubers not conforming to the varietal characteristics shall not exceed 0.050% and 0.10% (by number) for foundation and certified seed classes respectively.  
 (b) Cut, bruised, unshapy, cracked tubers or those damaged by insects, slugs or worms shall not exceed more than 1.0% (by weight.)  
 (c) Greenish pigmentation on tubers will not be a disqualification for certification.

B. Maximum tolerance limit of tubers showing visible symptoms caused by the diseases mentioned below will be as follows:

Contaminants	Maximum permissible limits		
	Foundation		Certified
1	Stage-I 2	Stage-II 3	4
Late blight ( <i>Phytophthora infestans</i> (Mont.) de Bary), dry rot ( <i>Fusarium caeruleum</i> (Lib) Sacc.) or charcoal rot ( <i>Macrophomina phaseoli</i> (Tassi) G. Goidanich)	1.0% (by number)	1.0% (by number)	1.0% (by number)
Wet rot ( <i>Sclerotium rolfsii</i> Sacc.)	None	None	None
*Common scab ( <i>Streptomyces scabies</i> (Thaxt)Waks. & Henrici)	3.0% (by number)	3.0% (by number)	5.0% (by number)
**Black scurf ( <i>Rhizoctoniasolani</i> Kuchn.)	5.0% (by number)	5.0% (by number)	5.0% (by number)
***Total diseases	5.0% (by number)	5.0% (by number)	5.0% (by number)

\*Even if a single tuber infected with common scab is detected in a seed lot, the entire seed lot shall be treated with approved fungicide before seed lot is declared fit for certification. Seed lots having infected tubers more than the prescribed limits will not be certified even after treatment.

\*\* (a) A tuber carrying 10.0% or above scurfed surface will be considered as one infected unit.

(b) Seed lots having black scurf infection more than the prescribed limits could be certified after treatment with approved chemical/fungicide.

\*\*\*For all diseases, the higher disease percentage will be considered for the purpose of the specified limits of tolerance.



**TRUE POTATO SEED (TPS) (*Solanum tuberosum* L.)  
HYBRIDS**

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid TPS.
- B. The General Standards are amplified as follows to apply specifically to the TPS hybrids.

**1. Eligibility requirements for certification**

- (a) The parental seed stock to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved parental lines.

**2. Classes and Sources of seed**

- (a) Breeder and foundation seed classes shall be produced and multiplied from seed potato (seed tubers).
- (b) Foundation class of seed potato shall conform to the same minimum seed certification standards as specified for certification of seed potato and if required may be increased in two stages namely foundation stage – I and foundation stage-II.
- (c) The certified class seed shall be the hybrid TPS to be planted for any use except seed production.

**II. Land Requirements**

Seed fields offered for certification of TPS hybrid preferably should not be infested with:

- wart (*Synchytrium endobioticum* (Schilb.) Perc. and or cyst forming nematodes;
- brown rot (*Pseudomonas solanacearum* (E.F. Sm.) E.F. Sm or non-cyst forming nematodes within the previous three years;
- common scab (*Streptomyces scabies* (Thaxt.) Waks. & Henrici).

### III. Field Inspection

A minimum of four inspections shall be made as follows:

1. The first inspection shall be made before flowering, to verify isolation, extent of disease infection and Off-types in female and male blocks:
2. The second and third inspections shall be made during flowering to verify Off-types, extent of disease infection and efficiency of cross-pollination;
3. The fourth inspection shall be made during harvesting in order to confirm that selfed berries are eliminated and only properly crossed berries are harvested

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields of TPS hybrid for Certified seed class shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in column 2 of the said Table:

Contaminants	Minimum distance (meters)
1	2
Fields of other varieties including the commercial hybrid of the same variety	50
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification.	50
Between blocks of the parental lines of the same hybrid in case female and male parents are planted in separate blocks	5

***B. Specific requirements***

Factor	Maximum permissible limits Certified seed stage (for both the parents)
1	2
*Off-types	0.10%
**Plants showing symptoms of:	
-Mild mosaic	3.0%
- Severe mosaic, leaf roll and yellows	1.0%
**Plants infected by brown rot (syn. Bacterial wilt) ( <i>Pseudomonas solacearum</i> ) (E.F. Sm.) E.F. Sm.)	3 plants per Hectare

\*Maximum permitted at and after flowering.

\*\*Maximum permitted at final inspection, though the diseases mentioned above are not transmitted through TPS but it is essential to maintain a good crop hygiene.

- C. 1. All certified hybrid TPS lots produced by adopting emasculation or tubing or without emasculation with timely application of pollen from male parent to avoid selfing or through use of Chemical Hybridising Agents' (CHAs') shall be subjected to grow-out test and shall conform to the following minimum genetic purity (Hybridity) requirements:

<i>Class</i>	<i>Genetic purity (%) (Minimum)</i>
Certified	90

2. During grow-out test, the offtype plants (other than selfed plants) such as segregants, outcrosses and plants of other varieties should not exceed more than 1.50% out of 10.0% plants earmarked for selfed plants.

3. The minimum population size of 400 plants shall be maintained in two replicates of 200 each or four of 100 throughout the test and each plant shall be examined individually. The reject number shall be as follows:

<i>Class</i>	<i>Minimum genetic purity (%)</i>	<i>Reject number</i>
Certified	90.0(10 in 100)	44

**V. Seed Standards**

<i>Factor</i>	<i>Standards for certified seed class</i>
<i>1</i>	<i>2</i>
Pure seed (minimum)	98.0%
Inert matter (maximum)	2.0%
Weed seeds (maximum)	10/kg
Germination (minimum)	80%
Moisture (maximum)	8.0%
For vapour-proof containers (maximum)	6.0%

## **TARO (ARVI): *Colocasia esculenta* (L.)**

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of taro.

### **II. Land Requirements**

1. Land to be used for seed production of taro shall be free from volunteer plants.  
Avoid swampy, low lying and over shaded conditions.
2. Avoid taro residue and drainage from other taro fields.

### **III. Field Inspection**

A minimum of three inspection shall be made, the first and second about 60 and 90 days respectively after planting and third about 160 days of planting and prior to harvesting or at appropriate growth stage depending on the crop duration of the variety concerned to check isolation, Off-types and other relevant factors.

### **IV. Field Standards**

#### ***A. General requirements***

##### ***1. Isolation***

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	5	5
Fields of the same variety not conforming to varietal purity requirements for certification	5	5

**B. Specific requirements**

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.50
Plants showing symptoms of dasheen Mosaic	0.50	1.0
Plants infected by phytophthora ( <i>Phytophthora colocasiae</i> (Rac.) disease	None	None
Plants infested with scale insects and mealy bugs	None	None

\*Standards for Off-types shall be met at final inspection and for designated disease and insects at each inspection.

- Note:*
1. All Off-types, diseased and insect infested plants shall be rogued out alongwith corms, cormels and destroyed.
  2. Gaps in the seed field shall not be more than 10.0%

**V. Seed Standards**

- A. Specification in respect of size and weight of seed material for Foundation and Certified classes shall be as under:

<i>Size of seed corms</i>	<i>Corresponding weight</i>
4-6 cm x 2.5 to 3.5 cm	20-40 gm

- Note:*
1. In a seed lot, corms not conforming to specific size of seed shall not exceed more than 5.0% (by number)

2. The seed material shall be reasonably clean, healthy, firm and shall conform to the characteristics of the variety. The corms not conforming to varietal characteristics shall not exceed 0.10% and 0.50% (by number) for Foundation and Certified seed classes respectively
3. Cut, bruised, cracked corms or those damaged by insects (other than scale insects and mealy bugs), slugs or worms shall not exceed more than 1.0% (by weight).
4. Maximum tolerance limit of corms showing visible symptoms of infestation caused by scale insects and mealy bugs shall be as follows:

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Corms infested with scale insects and mealy bugs	None	None

## **TURMERIC (*Curcuma longa* L.)**

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of seed turmeric.
- B. The general standards are amplified as follows to apply specifically to turmeric.
- C. All certified classes shall be produced by vegetative propagation of underground rhizome, whose source and identity may be assured and approved by the Certification Agency.

### **II. Land Requirements**

- Soil should be loose, aerable and offer minimum resistance to rhizome development.
- Soil depth 30 cm or more, high organic matter of acidic soil.
- The crop of seed turmeric shall not be eligible for certification if grown on the land infested with *Pythium* sp., *Pseudomonas solanacearum*, and *Meloidogyne incognita*.

### **III. Field Inspection**

A minimum of four inspections shall be made as follows:

- A. The first inspection shall be made at the time of planting to verify isolation, rhizome rot, seed piece weight and spacing.
- B. The second inspection shall be made about 45-50 days after planting to check germination, sprouting, rhizome rot and shoot borer incidence.
- C. The third inspection shall be made about 120-180 days after planting in order to verify off types, shoot borer and rhizome rot.
- D. The fourth inspection shall be made before harvest or between 240-250 days after planting to verify rhizome rot, scale insect and meal bug infestation.

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

The fields/blocks of seed turmeric shall be isolated from the contaminants shown in column 1 of the table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

##### C. Specific requirements

<i>Factor</i>	<i>Inspection stage</i>	<i>Foundation</i>	<i>Certified (Maximum)</i>
1.Spacing	I	45 x30 cm	45x30cm
2.Seed piece weight	I	20-25g	20-25 g
3.Rhizome rot	I	0	0
4. Shoot borer	II to III	1.0%	5.0%
5.Off-types	III	0.5%	1.0%
6. Scale-insect	IV	1.0%	5.0%
7.Mealy bugs	IV	1.0%	5.0%

Note:

1. All Off-types and diseased plants should be rogued out along with rhizomes and destroyed. \
2. Gaps in the seed plot should not be more than 10.0%
3. Land should be free from volunteers

**V. Seed Standards**

<i>Factor</i>	<i>Foundation</i>	<i>Certified</i>
1. Appearance	Healthy & Plumpy	Healthy & Plumpy
2. Uniformity (Minimum)	95.0-100.0%	85.0%
3. Dry rot (Maximum)	1.0%	5.0%
4. Scales (Maximum)	1.0%	5.0%
5. Mealy bugs (Maximum)	1.0%	5.0%

Note:

1. In a seed lot, rhizomes not conforming to specific characteristics of a variety shall not exceed 0.5% and 1.0% (by number – maximum) for foundation and certified seed classes, respectively.
2. The seed material shall be reasonably clean healthy and firm.
3. Cut, bruised, or those damaged by insects shall not exceed more than 1.0% (by weight)

**CHAPTER-XIV**  
**Seed Certification Standards for Root Crops**

1. Carrot
2. Carrot hybrids
3. Celeriac
4. Garden beet and sugar beet
5. Radish
6. Radish foundation single crosses
7. Radish hybrids
8. Sweet potato
9. Tapioca
10. Turnip
11. Turnip foundation single crosses
12. Turnip hybrids

## **CARROT (*Daucus carota* L.)**

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of carrot seed.

### **II. Land Requirements**

Land to be used for seed production of carrot shall be free from volunteer plants.

### **III. Field Inspection**

#### ***A. Mother Root Production Stage***

A minimum of two inspections shall be made as follows:

1. The first inspection shall be made after 20-30 days of the sowing in order to determine isolation, volunteer plants, outcrosses, Off-types and other relevant factors;
2. The second inspection shall be made after the mother roots have been lifted to verify the true characteristics of roots

#### ***B. Seed Production Stage***

A minimum of four inspections shall be made as follows:

1. The first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses and other relevant factors;
2. The second and the third inspections shall be made during flowering to check isolation, Off-types and other relevant factors;
3. The fourth inspection shall be made at maturity to verify the true nature of umbels

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

Carrot seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2,3, 4 and 5 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>			
	<i>Mother root production stage</i>		<i>Seed production stage</i>	
	<i>Foundation</i>	<i>Certified</i>	<i>Foundation</i>	<i>Certified</i>
1	2	3	4	5
Fields of other varieties	5	5	1000	800
Fields of the same variety not conforming to varietal purity requirements for certification	5	5	1000	800

##### B. Specific requirements

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Roots not conforming to the varietal characteristics including forked roots	0.10% (by number)	0.20% (by number)
**Off-types (plants)	0.10%	0.20%

\*Maximum permitted at second inspection at mother root production stage.

\*\*Maximum permitted at and after flowering at seed production stage

## V. Seed Standards

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	95.0%	95.0%
Inert matter (maximum)	5.0%	5.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	7.0%	7.0%

## CARROT (*Daucus carota* L.) HYBRIDS

### I. Application and Amplification of General Seed Certification Standards

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid carrot seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrid carrot seed.

#### 1. *Eligibility requirements for certification*

- (a) An inbred line to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
- (b) Hybrid seed to be eligible for certification shall be the progeny of two approved inbred lines, one of which shall be male sterile.

#### 2. *Classes and Sources of seed*

- (a) An inbred line shall be a relatively true breeding strain resulting from self pollination with selection.
- (b) The foundation class seed shall consist of an approved male sterile line to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- (c) A male sterile line shall be a strain carrying cytoplasmic genetic-male sterility, which sheds no viable pollen and is maintained by the normal sister strain (B) which is used as pollinator.
- (d) The Certified class seed shall be the hybrid seed to be planted for any use except seed production.

### II. Land Requirements

Land to be used for seed production of hybrid carrot shall be free from volunteer plants.

### III. Field Inspection

#### A. *Mother Root Production Stage*

A minimum of two inspections shall be made as follows:

1. The first inspection shall be made after 20-30 days of the sowing in order to determine isolation, volunteer plants, outcrosses, off-types and other relevant factors:
2. The second inspection shall be made after the mother roots have been lifted to verify the true characteristics of roots.

#### B. *Seed Production Stage*

A minimum of four inspections shall be made as follows:

1. The first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, planting ratio, errors in planting and other relevant factors;
2. The second and the third inspections shall be made during flowering to check isolation, off-types, the number of pollen shedding umbels and other relevant factors;
3. The fourth inspection shall be made at maturity to verify the true nature of umbels.

### IV. Field Standards

#### A. *General requirements*

##### 1. *Isolation*

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2, 3, 4 and 5 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>			
	<i>Mother root production stage</i>		<i>Seed production stage</i>	
	<i>Foundation</i>	<i>Certified</i>	<i>Foundation</i>	<i>Certified</i>
1	2	3	4	5
Fields of other varieties including commercial	5	5	1000	800

hybrid of the same variety				
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	5	5	1000	800

### ***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Roots not conforming to the varietal characteristics including forked roots	0.010% (by number)	0.050% (by number)
Off-types (plants) in seed parent at and after flowering	0.010%	0.050%
Off-types (plants) in pollinator at and after flowering	0.010%	0.050%
Plants of pollen shedding umbels in seed parent at flowering	0.050%	0.10%

\*Maximum permitted at second inspection at mother root production stage

### **V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	95.0%	95.0%
Inert matter (maximum)	5.0%	5.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	7.0%	7.0%

**CELERIAC (TURNIP – ROOTED CELERY):**  
*Apiumgraveolens (L.) var. rapaceum DC.*

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of celeriac seed.

**II. Land Requirements**

Land to be used for seed production of celeriac shall be free from volunteer plants.

**III. Field Inspection**

**A. Mother root production stage**

A minimum of two inspections shall be made as follows:

1. The first inspection shall be made after 30-40 days of planting in order to determine isolation, Off-types and other relevant factors;
2. The second inspection shall be made after the mother roots have been lifted to verify the true characteristics of roots.

**B. Seed production stage**

A minimum of two inspections shall be made as follows:

1. The first inspection shall be made during flowering stage to check isolation Off-types, designated diseases and other relevant factors.
2. The second inspection shall be made at maturity and prior to harvesting.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2,3,4 and 5 of the said Table:

Contaminants	Minimum distance (meters)			
	Mother root production stage		Seed production stage	
	Foundation	Certified	Foundation	Certified
1	2	3	4	5
Fields of other varieties	5	5	500	300
Fields of the same variety not conforming to varietal purity requirements for certification and celery ( <i>Apium graveolens</i> (L.) var. <i>dulce</i> (Mill.) DC.)	5	5	500	300

**B. Specific requirements**

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
*Roots not conforming to varietal characteristics	0.10% (by number)	0.20% (by number)
**Off-types	0.10%	0.20%
***Plants affected by seed borne diseases	0.10%	0.50%

\*Maximum permitted at second inspection at mother root production stage

\*\*Maximum permitted at and after flowering at seed production stage

\*\*\*Seed borne disease shall be : Leaf spot : *Septoria petroselini* Desm.

## V. Seed Standards

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	7.0%	7.0%

**GARDEN BEET (BEET ROOT, MANGELS, STOCK  
BEET): *Beta vulgaris* L. var. *rubra* Moq. AND  
SUGAR BEET: *Beta vulgaris* L.)**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of garden beet and sugar beet.

**II. Land Requirements**

Land to be used for seed production of garden beet and sugar beet shall be free from volunteer plants.

**III. Field Inspection**

***A. Mother Root Production Stage***

A minimum of two inspections shall be made as follows:

1. The first inspection shall be made after 20-30 days of the sowing in order to determine isolation, off-types and other relevant factors;
2. The second inspection shall be made after the roots have been lifted to verify the true characteristics of roots.

***B. Seed Production Stage***

A minimum of two inspections shall be made as follows:

1. The first inspection shall be made before flowering in order to determine isolation and other relevant factors;
2. The second inspection shall be made during flowering to check isolation, off-types and other relevant factors;

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2,3,4 and 5 of the said Table:

Contaminants	Minimum distance (meters)			
	Mother root production stage		Seed production stage	
	Foundation	Certified	Foundation	Certified
1	2	3	4	5
Fields of other varieties	5	5	1600	1000
Fields of the same variety not conforming to varietal purity requirements for certification and fields of the Swiss chard, sea kale beet or silver beet) : ( <i>Beta vulgaris</i> Linn. var. <i>cicla</i> Moq), and Spinach beet (Leaf beet): ( <i>Beta vulgaris</i> L. var. <i>flavescens</i> , DC.)	5	5	1600	1000
Fields of garden beet ( <i>Beta vulgaris</i> (L.) var. <i>rubra</i> (Moq.) from sugar beet ( <i>Beta vulgaris</i> (L.) and vice versa	5	5	1600	1000

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Roots of other varieties not conforming to varietal characteristics	0.10% (by number)	0.20% (by number)
**Off-types	0.10%	0.20%

\*Maximum permitted at second inspection at mother root production stage.

\*\*Maximum permitted at and after flowering at seed production stage.

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	96.0%	96.0%
Inert matter (maximum)	4.0%	4.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	8.0%	8.0%

## **RADISH (*Raphanus sativus* L.)**

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of radish seeds.

### **II. Land Requirements**

Land to be used for seed production of radish shall be free from volunteer plants.

### **III. Field Inspection**

#### ***A. Mother Root Production Stage***

A minimum of two inspections shall be made as follows:

1. The first inspection shall be made after 20-30 days of sowing in order to determine isolation, Off-types and other relevant factors:
2. The second inspection shall be made after the roots have been lifted to verify the true characteristics of roots.

#### ***B. Seed Production Stage***

A minimum of one inspection shall be made during flowering to check isolation; Off-types designated diseases and other relevant factors.

### **IV. Field Standards**

#### ***A. General requirements***

##### ***1. Isolation***

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2,3,4 and 5 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>			
	<i>Mother root production stage</i>		<i>Seed production stage</i>	
	<i>Foundation</i>	<i>Certified</i>	<i>Foundation</i>	<i>Certified</i>
1	2	3	4	5
Fields of other varieties of the same species	5	5	1600	1000
Fields of the same variety not conforming to varietal purity requirements for certification and rat-tail radish ( <i>Raphanus caudatus L.</i> )	5	5	1600	1000

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Root not conforming to varietal characteristics	0.10% (by number)	0.20% (by number)
**Off-types	0.10%	0.20%
***Plants affected by seed borne diseases at final inspection	0.10%	0.50%

\*Maximum permitted at second inspection at mother root production stage.

\*\*Maximum permitted at flowering at seed production stage.

\*\*\* Seed borne diseases shall be :

Black rot: (*Xanthomonas campestris* pv. *campestris* (Pamm.) Dawson.)

Black leg: (*Leptosphaeria maculans* (Desm) (Ces. & de Not)

## V. Seed Standards

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure Seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	5/kg	10/kg
weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	70%	70%
Moisture (maximum)	6.0%	6.0%
For vapour-proof containers (maximum)	5.0%	5.0%

**RADISH (*Raphanus sativus* L.)**  
**FOUNDATION SINGLE CROSSES**

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of foundation single crosses of radish.
- B. The General Standards are amplified as follows to apply specifically to the foundation single cross of radish.

**1. Eligibility requirements for certification.**

- (a) The foundation single cross may be produced by seed to seed method as the inbred lines are by and large fixed for the desired attributes.
- (b) A foundation single cross to be eligible for certification must be produced from two approved inbred lines the identity of which is assured and is approved by the Certification Agency.

**2. Classes and Sources of seed**

- (a) Foundation single crosses shall consist of the first generation hybrid resulting from the controlled crossing of the two approved self-incompatible but cross-compatible inbred lines. The foundation single crosses may be of three types depending upon the procedure of seed production;
  - Seeds of only female parent are harvested and certified;
  - Seeds of both parents are harvested separately and certified; and
  - Seeds of both the parents are harvested, mixed together and certified.
- (b) The foundation single cross shall be used for production of hybrid seed.

**II. Land Requirements**

Land to be used for seed production of foundation single cross of radish shall be free from volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made as follows;

1. The first inspection shall be made before flowering to check isolation, Off-types, outcrosses, planting ratio, and other relevant factors;
2. The second inspection shall be made during flowering to check isolation, Off-types and other relevant factors;
3. The third inspection shall be made at maturity and prior to harvesting to check Off-types, seed borne diseases and other relevant factors.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields of foundation single cross shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in columns 2 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>
<i>1</i>	<i>2</i>
Fields of other varieties of the same species including same single cross hybrid	1600
Fields of the same single cross/hybrid (code designation) not conforming to varietal purity requirements for certification and rat-tail radish ( <i>Raphanus caudatus</i> L.)	1600

### ***B. Specific requirements***

<i>Factor</i>	<i>Minimum permitted (%)</i>
<i>1</i>	<i>2</i>
Off-types in each parent at and after flowering	0.010
*Plants affected by seed borne diseases at final inspection	0.10

\* Seed borne diseases shall be :

Black leg: (*Leptosphaeria maculans* (Desm) (Ces. & de Not)

Black rot: (*Xanthomonas campestris* pv.*campestris* (Pamm.) Dawson.)

### **V. Seed Standards**

<i>Factor</i>	<i>Standard</i>
<i>1</i>	<i>2</i>
Pure Seed (minimum)	98.0%
Inert matter (maximum)	2.0%
Other crops seeds (maximum)	None
Weed seeds (maximum)	None
Germination (minimum)	70.0%
Moisture (maximum)	6.0%
For vapour-proof containers (maximum)	5.0%

## RADISH (*Raphanus sativus* L.) HYBRIDS

### I. Application and Amplification of General Seed Certification Standards

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid radish seed.
- B. The General Standards are amplified as follows to apply specifically to the hybrids of radish.

#### 1. *Eligibility requirements for certification.*

- (a) The hybrid of radish may be produced by seed to seed method as the parents are by and large fixed for the desired attributes.
- (b) A hybrid is one to be planted for any use except seed production it may be any one of the following.
  - (i) Single crosses - the first generation resulting from the open pollination under controlled crossing of the two approved self-incompatible but cross-compatible inbred lines. The foundation single crosses may be of three types depending upon the procedure of seed production;
    - Seeds of only female parent are harvested and certified;
    - Seeds of both parents are harvested separately and certified; and
    - Seeds of both the parents are harvested together, mixed and certified.
  - (ii) Double cross – the first generation resulting from the controlled crossing of the two approved self- incompatible but cross- compatible single crosses.
  - (iii) Three way cross – the first generation resulting from controlled crossing of an approved inbred line and certified single cross being self-incompatible individually but cross compatible to each other.

#### 2. *Classes and Sources of seed*

- (a) Only the class “Certified” shall be recognized
- (b) A hybrid to be certified must be produced from certified foundation seed or seed stocks approved by the certification agency.

## II. Land Requirements

Land to be used for seed production of hybrid radish shall be free from volunteer plants.

## III. Field Inspection

A minimum of three inspections shall be made as follows;

1. The first inspection shall be made before flowering to check isolation, Off-types outcrosses, planting ratio, and other relevant factors;
2. The second inspection shall be made during flowering to check isolation, Off-types and other relevant factors;
3. The third inspection shall be made at maturity and prior to harvesting to check Off-types, seed borne diseases and other relevant factors.

## IV. Field Standards

### A. General requirements

#### 1. Isolation

Seed fields of radish hybrids shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in the columns 2 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>
<i>1</i>	<i>2</i>
Fields of other varieties of the same species including commercial hybrid of the same variety	1600
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and rat-tail radish ( <i>Raphanus caudatus</i> L.)	1600

### ***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)</i>
<i>1</i>	<i>2</i>
Off-types in each parent at and after flowering	0.050
*Plants affected by seed borne diseases at final inspection	0.50

\*Seed borne diseases shall be:

Black leg: (*Leptosphaeria maculans* (Desm) (Ces. & de Not)

Black rot: (*Xanthomonas campestris* pv. *campestris* (Pamm.) Dawson.)

### **V. Seed Standards**

<i>Factor</i>	<i>Standards</i>
<i>1</i>	<i>2</i>
Pure Seed (minimum)	98.0%
Inert matter (maximum)	2.0%
Other crops seeds (maximum)	None
Weed seeds (maximum)	None
Germination (minimum)	70.0%
Moisture (maximum)	6.0%
For vapour-proof containers (maximum)	5.0%

## **SWEET POTATO (*Ipomoea batatas* (L.) Schott.)**

### **I. Application and Amplification of General Seed Certification Standards**

A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of sweet potato.

B. The General Standards are amplified as follows

All certified classes shall be produced from either vine cuttings or from sprouts cut from the bed whose source and identity may be assured and approved by the Certification Agency.

### **II. Land Requirements**

Avoid sweet potato residue and drainage from other sweet potato fields.

### **III. Field Inspection**

A minimum of two inspections shall be made as follows:

1. The first inspection of plants bed shall be made when plants are nearly large enough to transplant;
2. The second inspection shall be made shortly after transplanting in the seed field.

### **IV. Field Standards**

#### **A. *General requirements***

##### **1. *Isolation***

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (Meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	5	5
Fields of the same variety not conforming to varietal purity requirement for certification	5	5

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
<u>Plant bed</u>		
Black rot ( <i>Ceratostomella fimbriata</i> (EII. & Halst) J.A. Elliot.)	None	None
Wilt ( <i>Fusarium oxysporum</i> f. <i>batatas</i> (Wr.) Snyder & Hanson)	None	None
Scurf ( <i>Monilochaetes infuscans</i> (EII. & Halst) Ex. Harter	None	None
Off-types	None	None
<u>Seed field</u>		
Wilt ( <i>Fusarium oxysporum</i> f. <i>batatas</i> (Wr.) Snyder & Hanson)	None	None
Mosaic	0.050	0.10
Off-types	0.050	0.10

\*Maximum permitted at any one inspection.

Note: 1. All off-types and diseased plants should be rouged out along with root and destroyed.

## V. Seed Standards

1. The seed material shall be reasonably clean, healthy, firm and shall confirm to the characteristics of the variety.
2. Cut, bruised, unshaped, cracked, root or those damaged by insects (except sweet potato weevil), slugs or worms shall not exceed more than 1.0% (by weight.)
3. Maximum tolerance limit of roots showing visible symptoms caused by the diseases, sweet potato weevil and other factors will be as follows:

<i>Factor</i>	<i>Maximum permissible limits % (By number)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Storage rot	None	None
Black rot ( <i>Ceratostomella fimbriata</i> (EII.& Halst) J.A. Elliot.)	None	1.0%
*Scurf ( <i>Monilochaetes infuscans</i> (EII. & Halst) Ex. Harter	None	1.0%
Wilt ( <i>Fusarium oxysporum</i> f. <i>batatas</i> (Wr.) snyder & Hanson)	None	1.0%
Internal cork	5.0%	5.0%
Nematode	None	1.0%
Wire worm	1.0%	5.0%
Other distinguishable varieties	0.10%	0.20%
Sweet Potato weevil ( <i>Cylas formicaris</i> Fab. )	None	None

- \* A root carrying 10.0% or above scurfed surface would be considered as one infected unit.

## **TAPIOCA (Cassava): *Manihot esculenta* Crantz.**

### **I. Application and Amplification of General Seed Certification Standards**

A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of tapioca planting material.

B. The General Standards are amplified as follows to apply specifically to tapioca:

All certified classes shall be produced from planting stakes (stem cutting) cut from the seed field whose source and identity may be assured and approved by the Certification Agency.

### **II. Land Requirements**

(a) Land to be used for seed production of tapioca shall be free from volunteer plants. Swampy and shaded conditions might be avoided.

(b) Avoid tapioca residue and drainage from other tapioca fields.

### **III. Field Inspection**

A minimum of four inspections shall be made, the first about 60 days, the second about 120 days and the third about 180 days after planting or at appropriate growth stage depending on the crop duration of the variety concerned and the fourth prior to cutting of planting stakes to verify isolation, Off-types and other relevant factor.

### **IV. Field Standards**

#### **A. *General requirements***

##### **1. *Isolation***

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (Meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	5	5
Fields of the same variety not conforming to varietal purity requirement for certification	5	5

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Off-types	0.10	0.20
Plants showing symptoms of mosaic	0.10	0.50
Plants infested with scale insects	None	None

\*Standards for Off-types shall be met at final inspection and for mosaic and plants infested with scale insects at each inspection.

*Note:* All off-types, diseased plants and plants infested with scale insects should be rouged out along with tubers.

**V. Seed Standards**

A. Specifications in respect of size and age of the planting stakes for foundation and certified classes shall be as follows:

1. Age of the crop: 7 to 12 months.
2. Diameter of the stem: 1.5 to 2.5 cm (planting stake)
3. Approximate length of the stem: 20 cm (planting stake )
4. Approximate number of nodes : 5 in the planting stake.
5. Presence of latex at the cut end of the planting stake is the indication of good quality planting material.

B. Maximum tolerance limit of planting stakes showing visible symptoms of infestation caused by scale insect will be as follows:

<i>Factor</i>	<i>Maximum tolerance limit</i>	
	<i>Foundation</i>	<i>Certified</i>
Planting stakes infested with scale insects	None	None

## **TURNIP: (*Brassica rapa* L.)**

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of turnip seeds.

### **II. Land Requirements**

Land to be used for seed production of turnip shall be free from volunteer plants.

### **III. Field Inspection**

#### ***A. Mother Root Production Stage***

A minimum of two inspections shall be made as follows:

1. The first inspection shall be made after 20-30 days of sowing in order to determine isolation, Off-types and other relevant factors:
2. The second inspection shall be made after the mother roots have been lifted to verify the true characteristics of roots.

#### ***B. Seed Production Stage***

A minimum of one inspection shall be made during flowering to check isolation; off-types designated diseases and other relevant factors.

### **IV. Field Standards**

#### ***A. General requirements***

##### ***1. Isolation***

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2, 3, 4 and 5 of the said Table:

Contaminants	Minimum distance (meters)			
	Mother root production stage		Seed production stage	
	Foundation	Certified	Foundation	Certified
1	2	3	4	5
Fields of other varieties	5	5	1600	1000
Fields of the same variety not conforming to varietal purity requirements for certification and from other species of genus <i>Brassica</i> listed below:	5	5	1600	1000
<i>Brassica pekinensis</i> (Lour.) Rupr. : Chinese cabbage (heading).				
<i>Brassica chinensis</i> L.: Chinese cabbage (non-heading).				
<i>Brassica napus</i> (L.) var. <i>napobrassica</i> (L.) Peterm.: rutabaga (swede)				
<i>Brassica juncea</i> (L.) Czern. & Coss. subsp. <i>juncea</i> : Indian mustard or rai or bangla sarson.				
<i>Juncea</i> var. <i>rugosa</i> (Roxb.) Pahadi rai.				
<i>B. juncea</i> (L.) Czern. & Coss. subsp. <i>integrifolia</i> (West) Thell: Vegetable mustard or rai				
<i>B. chinensis</i> Juslen; non-Duthie and Fuller: brown sarson or kali sarson.				
<i>B. napus</i> L. var. <i>glauca</i> (Roxb.) Schulz: yellow sarson or pilli sarson or sarish.				
<i>B. napus</i> L. var. <i>napus</i> : laha or maghi or achara rai.				
<i>B. tournefortii</i> Gouan: Punjabi rai or jangli rai.				
<i>B. nigra</i> (L.) Koch: true mustard or black mustard or banarasi rai				
<i>B. alba</i> (L.) Robenh: white mustard				

### B. Specific requirements

Factor	Maximum permitted (%)*	
	Foundation	Certified
1	2	3
Off-types	0.10	0.20

**Plants affected by seed borne diseases	0.10	0.50
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\*Maximum permitted at and after flowering in the case of Off-types and at final inspection in case of seed borne diseases.

\*\* Seed borne diseases shall be:

Black rot: (*Xanthomonas campestris* pv. *campestris* (Pamm.) Dawson.)

Black leg: (*Leptosphaeria maculans* (Desm.) (Ces. & de Not)

## V. Seed Standards

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure Seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crops seeds (maximum)	5/kg	10/kg
weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	6.0%	6.0%
For vapour-proof containers (maximum)	5.0%	5.0%

**TURNIP (*Brassica rapa* L.): FOUNDATION  
SINGLE CROSSES**

**I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seeds of foundation single crosses of turnip.
- B. The General Standards are amplified as follows to apply specifically to the foundation single cross of turnip:

**1. Eligibility requirement for certification**

- (a) The foundation single cross may be produced by seed to seed (*in situ*) method as the inbred lines are by and large fixed for the desired attributes.
- (b) A foundation single cross to be eligible for certification must be produced from two approved inbred lines both of which shall be self-incompatible but cross-compatible to each other, the sources of which shall assure their identity and is approved by the Certification Agency.

**2. Classes and Sources of seed**

- (a) A foundation single crosses shall consist of the first generation hybrid resulting from the controlled crossing of the two approved self-incompatible but cross-compatible inbred lines. The foundation single crosses may be of three types depending upon the procedure of seed production;
  - Seeds of only female parent are harvested and certified;
  - Seeds of both parents are harvested separately and certified; and
  - Seeds of both the parents are harvested, mixed together and certified.
- (b) The foundation single cross shall be used for the production of hybrid seed

**II. Land Requirements**

Land to be used for seed production of foundation single cross of turnip shall be free from volunteer plants.

### III. Field Inspection

A minimum of three inspections shall be made as follows:

1. The first inspection shall be made before flowering to check isolation, Off-types outcrosses, planting ratio, and other relevant factors;
2. The second inspection shall be made during flowering to check isolation, Off-types and other relevant factors;
3. The third inspection shall be made at maturity and prior to harvesting to check Off-types, seed borne diseases and other relevant factors.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields of foundation single cross shall be isolated from the contaminants shown in column 1 of the Table below by the distances specified in columns 2 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>
<i>1</i>	<i>2</i>
Fields of other varieties including same single cross hybrid	1600
Fields of the same single cross/hybrid (code designation) not conforming to varietal purity requirements for certification and from other species of genus <i>Brassica</i> listed below:	1600
<i>Brassica pekinensis</i> (Lour.) Rupr. : Chinese cabbage (heading);	
<i>Brassica chinensis</i> L.: Chinese cabbage (non-heading);	
<i>Brassica napus</i> (L.) var. <i>napobrassica</i> (L.) Peterm.: rutabaga (swede);	
<i>Brassica juncea</i> (L.) Czern. & Coss. subsp. <i>Juncea</i> : Indian mustard or rai or bangla sarson;	

*Juncea* var. *rugosa* (Roxb.) Pahadi rai;  
*B. Juncea* (L. Czern. & Coss. subsp. *integrifolia*  
(West) Thell: Vegetable mustard or rai;  
*B. chinensis* Juslen; non-Duthie and Fuller: brown  
sarson or kali sarson;  
*B. napus* L. var. *glauca* (Roxb.) Schulz: yellow sarson  
or pilli saroson or sarish;  
*B. napus* L. var. *napus* : laha or maghi or achara rai;  
*B. tournefortii* Gouan: Punjabi rai or jangli rai;  
*B. nigra* (L.) Koch: true mustard or black mustard or  
banarasi rai;  
*B. alba* (L.) Robenh: white mustard.

### ***B. Specific requirements***

<i>Contaminants</i>	<i>Minimum permitted(%)*</i>
Off-types in each parent at and after flowering	0.010
*Plants affected by seed borne diseases at final inspection	0.10

\* Seed borne diseases shall be:

Black leg: (*Leptosphaeria maculans* (Desm.) (Ces. & de Not)

Black rot: (*Xanthomonas campestris* pv. *campestris* (Pamm.) Dawson.)

### **V. Seed Standards**

<i>Factor</i>	<i>Standard</i>
<i>1</i>	<i>2</i>
Pure Seed (minimum)	98.0%
Inert matter (maximum)	2.0%
Other crops seeds (maximum)	None
Weed seeds (maximum)	None
Germination (minimum)	70.0%
Moisture (maximum)	6.0%
For vapour-proof containers (maximum)	5.0%



## TURNIP (*Brassica rapa* L.): HYBRIDS

### I. Application and Amplification of General Seed Certification Standards

A. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of hybrid turnip seed.

B. The General Standards are amplified as follows to apply specifically to the hybrids of turnip:

#### 1. Eligibility requirement for certification

(a) The hybrid of turnip may be produced by seed to seed (*in situ*) method as the parents are by and large fixed for the desired attributes.

(b) A hybrid is one to be planted for any use except seed production. It may be any one of the following:

(i) Single cross - the first generation resulting from the open-pollination under controlled crossing of the two approved self-incompatible but cross-compatible inbred lines. The foundation single crosses may be of three types depending upon the procedure of seed production;

- Seeds of only female parent are harvested and certified;

- Seeds of both the parents are harvested separately and certified and ;

- Seeds of both the parents are harvested mixed together and certified.

(ii) Double cross – the first generation resulting from the controlled crossing of the two approved self- incompatible but cross- compatible single crosses.

(iii) Three way cross – the first generation resulting from controlled crossing of an approved inbred line and certified single cross being self-incompatible individually but cross compatible to each other.

#### 2. Classes and Sources of seed

(a) Only the class ‘Certified’ shall be recognized.

(b) A hybrid to be certified must be produced from certified foundation seed or seed stocks approved by the Certification Agency.

## II. Land Requirements

Land to be used for seed production of hybrid turnip shall be free from volunteer plants.

## III. Field Inspection

A minimum of three inspections shall be made as follows:

1. The first inspection shall be made before flowering to check isolation, Off-types outcrosses, planting ratio, and other relevant factors;
2. The second inspection shall be made during flowering to check isolation, Off-types and other relevant factors;
3. The third inspection shall be made at maturity and prior to harvesting to check Off-types, seed borne diseases and other relevant factors.

## IV. Field Standards

### A. General requirements

#### 1. Isolation

Seed fields of turnip hybrid shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>
<i>1</i>	<i>2</i>
Fields of other varieties including commercial hybrid of the same variety	1600
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and from other species of genus <i>Brassica</i> listed below:	1600
<i>Brassica pekinensis</i> (Lour.) Rupr. : Chinese cabbage	

(heading);  
*Brassica chinensis* L.: Chinese cabbage (non-heading);  
*Brassica napus* (L.) var. *napobrassica* (L.) Peterm.:  
rutabaga (swede);  
*Brassica juncea* (L.) Czern. & Coss. subsp. *juncea*:  
Indian mustard or rai or bangla sarson;  
*B. juncea* var. *rugosa* (Roxb.) : Pahadi rai;  
*B. Juncea* (L.) Czern. & Coss. subsp. *integrifolia*  
(West) Thell: Vegetable mustard or rai;  
*B. chinensis* Juslen; non-Duthie and Fuller: brown  
sarson or kali sarson;  
*B. napus* L. var. *glauca* (Roxb.) Schulz: yellow sarson  
or pilli saroson or sarish;  
*B. napus* L. var. *napus* : laha or maghi or achara rai;  
*B. tournefortii* Gouan: Punjabi rai or jangli rai;  
*B. nigra* (L.) Koch: true mustard or black mustard or  
banarasi rai;  
*B. alba* (L.) Robenh: white mustard

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### ***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)</i>
Off-types in each parent at and after flowering	0.050
*Plants affected by seed borne diseases at final inspection	0.50

\* Seed borne diseases shall be:

Black leg: (*Leptosphaeria maculans* (Desm.) (Ces. & de Not)

Black rot: (*Xanthomonas campestris* pv. *campestris* (Pamm.) Dawson.)

**V. Seed Standards**

<i>Factor</i>	<i>Standard</i>
<i>1</i>	<i>2</i>
Pure Seed (minimum)	98.0%
Inert matter (maximum)	2.0%
Other crops seeds (maximum)	None
Weed seeds (maximum)	None
Germination (minimum)	70.0%
Moisture (maximum)	6.0%
For vapour-proof containers (maximum)	5.0%

## **CHAPTER-XVII**

### **Seed Certification Standards for Spices**

1. Ajawain
2. Cumin
3. Coriander
4. Fennel
5. Suwa
6. Tamarind

## **AJAWAIN (*Trachyspermum ammi* L.)**

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of Ajawain (*Trachyspermum ammi* L.) open-pollinated varieties/composites.

### **II. Land Requirements**

Land to be used for seed production of Ajawain should be free from volunteer plants.

### **III. Field Inspection**

A minimum of three inspections shall be made as follows:

1. The first inspection shall be made before flowering preferably within 45 days of planting to determine isolation, volunteer plants, Off-types and other relevant factors.
2. The second inspections shall be made during 50% flowering to check isolation, Off-types and other relevant factors.
3. The third inspection shall be made at maturity and prior to harvesting to verify the true nature of plant and other relevant factors,

### **IV. Field Standards**

#### ***A. General requirements***

##### ***1. Isolation***

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	200	100
Fields of same variety not conforming to varietal purity	200	100

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.50

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	65%	65%
Moisture (maximum)	10%	10%
For vapour-proof containers (maximum)	8%	8%

## CUMIN (*Cuminum syminum*)

### Open pollinated varieties and Composites

#### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of cumin open-pollinated varieties/composites.

#### II. Land Requirements

Land to be used for seed production of cumin should be free from volunteer plants and where cumin crop has not been taken over preceding two years.

#### III. Field Inspection

1. The first inspection shall be made before flowering preferably within 45 days of planting to determine isolation, volunteer plants Off-types and other relevant factors:
2. The second inspections shall be made during 50% flowering to check isolation, Off-types and other relevant factors.
3. The third inspection shall be made at maturity and prior to harvesting to verify the true nature of plant and other relevant factors.

#### IV. Field Standards

##### A. *General requirements*

##### 1. *Isolation*

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	800	400
Fields of same variety not conforming to varietal purity	800	400

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types plants	0.10	0.50
*Objectionable weed plants	0.050	0.10

\* Objectionable weed shall be *Plantago pumila L.*

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Objectionable weed seed (maximum)	5/kg	10/kg
Germination (minimum)	65%	65%
Moisture (maximum)	10%	10%
For vapour-proof containers (maximum)	8%	8%

**CORIANDER (*Coriandrum sativum*)**  
**Open pollinated varieties and composites.**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of coriander open-pollinated varieties, composites.

**II. Land Requirements**

Land to be used for seed production of coriander should be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made as follows:

1. The first inspection shall be made before flowering preferably within 45 days of planting to determine isolation, volunteer plants, Off-types and other relevant factors.
2. The second inspections shall be made during 50% flowering to check isolation, Off-types and other relevant factors.
3. The third inspection shall be made at maturity and prior to harvesting to verify the true nature of plant and other relevant factors,

**IV. Field Standards**

**A. *General requirements***

**1. *Isolation***

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	200	100
Fields of same variety not conforming to varietal purity	200	100

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types plants	0.10	0.50
*Objectionable weed plants	None	None

\*Objectionable weeds *Lathyrus*

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Objectionable weed seeds (maximum)	None	None
Germination (minimum)	65%	65%
Moisture (maximum)	10%	10%
For vapour-proof containers (maximum)	8%	8%

## **FENNEL (*Foeniculum vulgare*)**

Open pollinated varieties and composites.

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of fennel open-pollinated varieties, composites.

### **II. Land Requirements**

Land to be used for seed production of fennel should be free from volunteer plants.

### **III. Field Inspection**

A minimum of three inspections shall be made as follows:

1. The first inspection shall be made before flowering preferably within 45 days of planting to determine isolation, volunteer plants, Off-types and other relevant factors.
2. The second inspections shall be made during 50% flowering to check isolation, Off-types and other relevant factors.
3. The third inspection shall be made at maturity and prior to harvesting to verify the true nature of plant and other relevant factors,

### **IV. Field Standards**

#### ***A. General requirements***

##### ***1. Isolation***

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	200	100
Fields of same variety not conforming to varietal purity	200	100

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types plants	0.10	0.50
*Objectionable weed	None	0.05

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
*Objectionable weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	65%	65%
Moisture (maximum)	10%	10%
For vapour-proof containers (maximum)	8%	8%

\*Objectionable weed Dodder (*Cuscuta spp.*)

## **SUWA (INDIAN DIL) (*Anethum suwa* L.)**

Open pollinated varieties and composites.

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for certification of the seed of suwa (*Anethum suwa* L.) open-pollinated varieties, composites.

### **II. Land Requirements**

Land to be used for seed production of Suwa should be free from volunteer plants.

### **III. Field Inspection**

A minimum of three inspections shall be made as follows:

1. The first inspection shall be made before flowering preferably within 45 days of planting to determine isolation, volunteer plants, Off-types and other relevant factors.
2. The second inspections shall be made during 50% flowering to check isolation, Off-types and other relevant factors.
3. The third inspection shall be made at maturity and prior to harvesting to verify the true nature of plant and other relevant factors,

### **IV. Field Standards**

#### ***A. General requirements***

##### ***1. Isolation***

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	200	100
Fields of same variety not conforming to varietal purity	200	100

***B. Specific requirements***

<i>Factor</i>	<i>Maximum permitted (%)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.50

**V. Seed Standards**

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	65%	65%
Moisture (maximum)	10%	10%
For vapour-proof containers (maximum)	8%	8%

## **TAMARIND (*Tamarind indica* L.)**

### **I. Application and Amplification of General Clone Certification Standards**

- A. The General Clone Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Tamarind Clone.
- B. The General Standards are amplified as follows to apply specifically to Tamarind. All certified clones shall be produced by asexual methods like air Layering or Batch budding or Ring budding.

### **II. Land Requirements**

Land to be used for clone propagation of Tamarind shall be free from volunteer plants.

### **III. Field Inspection**

#### **A. Rootstock**

A minimum of one inspection shall be made before budding when the rootstock has attained buddable stage.

#### **B. Mother Plant/Scion**

Mother plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the certifying agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **C. Clones (Budded/Air Layers)**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. *General requirements***

### 1. Isolation

The clone propagation plots of Tamarind shall be isolated from the contaminants as shown in the following table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** the spacing between plants in clone propagation plots should be 25 cm and between row 40 cm.
3. **Rotation:** Nursery should be rotated to other plots after raising line Tamarind three times in the same plot.

### B. Specific requirements

#### A. Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off types should be discarded under the supervision of Certification Agency.

#### B. Certified Class

<i>Factor</i>	<i>Maximum permitted (%)*</i>
	<i>Certified</i>
Off-type	0.10

\* Standards for off-types shall be met at final inspection.

## V. Clone Specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.75-1.0 cm
2. The height of the grafting should range from 15-20 cm.
3. The diameter of the grafts at 10 cm above the graft union should range from 1.0-1.25 cm and height of the graft 50 cm – 100 cm.
4. The diameter of the Air layer at 10 cm above the ground level should range from 1.0-1.25 cm and height of the Air layer 50-100 cm.
5. The grafted clone should be free from suckers
6. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number)

## VI. Clone Standards

<i>Factor</i>	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)

## CHAPTER-XVIII

### Seed Certification Standards for **Fruit Crops**

1. Acid lime
2. Almond
3. Anola
4. Apple
5. Apricot
6. Banana
7. Bael
8. Ber
9. Cherry
10. Custard apple
11. Date palm
12. Fig
13. Grapes
14. Guava
15. Jack fruit
16. Kiwi fruit
17. Lemon
18. Litchi
19. Mandarin
20. Mango
21. Olive
22. Papaya
23. Passion fruit
24. Peach
25. Pear
26. Pea can nut
27. Pineapple
28. Pomegranate
29. Plum
30. Sapota
31. Sweet orange
32. Walnut

## **ACID LIME (*Citrus aurantium Swingle*)**

### **I. Application and Amplification of General Clone Certification Standards**

- A. The General Clone Certification Standards are basic and, together with the following specific standards constitute the standards for certification of acid lime clones.
- B. The General Standards are amplified as follows to apply specifically to acid lime clones.

All certified clones shall be produced by layering or nuclear seedlings.

### **II. Land Requirements**

Land to be used for clonal propagation of acid lime shall be free from volunteer plants.

### **III. Field Inspection**

#### **(a) Mother Plant**

Mother plant should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the certifying agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **(b) Clones (Layers/Nuclear Seedlings)**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. *General requirements***

##### **1. *Isolation***

The clone propagation plots of acid lime shall be isolated from the contaminants as shown in the following table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** the spacing between plants in clone propagation plots should be 25 cm and between row 30 cm.
3. **Rotation:** Nursery should be rotated to other plots after raising acid lime two times in the same plot.

### ***B. Specific requirements***

#### **Foundation clones**

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off types should be discarded under the supervision of Certification Agency.
2. The plants should be free from viruses, canker and greening.

#### **Certified Class**

<i>Factor</i>	<i>Maximum permitted (%)*</i> <i>Certified</i>
Off type	0.10
Plants infected with viruses, canker and greening	None

\* Standards for off types shall be met at final inspection.

## V. Clone Specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

The diameter of the clone should range from 0.6-1.00 cm and height of the clone 20-40 cm. in the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number)

## VI. Clone Standards

<i>Factor</i>	<i>Standard for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Plants infected with viruses, canker or greening (maximum)	None	None

## **ALMOND (*Prunus amygadius* Syn.)**

### **I. Application and Amplification of General Clone Certification Standards**

- A. The General Clone Certification Standards are basic and, together with the following specific standards constitute the standards for certification of almond clones.
- B. The General Standards are amplified as follows to apply specifically to almond. All certified clones shall be produced by asexual methods the T-budding or Tongue grafting.

### **II. Land Requirements**

Land to be used for clone propagation of almond shall be free from volunteer plants.

### **III. Field Inspection**

#### **(a) Rootstock**

A minimum of one inspection shall be made before grafting/budding when the rootstock has attained graftable /buddable stage.

#### **(b) Mother Plant/Scion**

Mother plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the certifying agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **(c) Grafted/Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

The clone propagation plots of almond shall be isolated from the contaminants as shown in the following table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** the spacing between plants in clone propagation plots should be 20 cm and between row 30 cm.
3. **Rotation:** Nursery should be rotated to other plots after raising Almond two times in the same plot.

##### B. Specific requirements

##### (a) Foundation clones

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off types should be discarded under the supervision of Certification Agency.
2. The plants should be free from gummosis.

##### (b) Certified Class

<i>Factor</i>	<i>Maximum permitted (%)*</i>
	<i>Certified</i>
Off type	0.10
Plants infected with gummosis	None

\* Standards for off types shall be met at final inspection.

**V. Clone Specifications**

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.5-1.0 cm
2. The height of the grafting should range from 10-20 cm.
3. The diameter of the grafts at 10 cm above the graft union should range from 0.50-1.0 cm and height of the graft 60 cm – 80 cm.
4. The grafted clone should be free from suckers
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number)

**VI. Clonal Standards**

<i>Factor</i>	<i>Standard for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)
Plants suffering from gummosis (maximum)	None	None

## **ANOLA (*Emblica officinalis*)**

### **I. Application and Amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Anola clones.
2. The General Standards are amplified as follows to apply specifically to Anola. All certified clones shall be produced by asexual methods like batch budding or ring budding or veneer grafting.

### **II. Land Requirements**

Land to be used for clone propagation of Anola shall be free from volunteer plants.

### **III. Field Inspection**

#### **(a) Rootstock**

A minimum of one inspection shall be made before grafting/budding when the rootstock has attained graftable /buddable stage

#### **(b) Mother Plant/Scion**

Mother plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **(c) Grafted/Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

#### IV. Field Standards

##### A. General requirements

###### 1. Isolation

The clone propagation plots of Anola shall be isolated from the contaminants as shown in the following table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** the spacing between plants in clone propagation plots should be 30 cm and between row 30 cm.
3. **Rotation:** Nursery should be rotated to other plots after raising Anola three times in the same plot.

##### B. Specific requirements

###### (a) Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off types should be discarded under the supervision of Certification Agency.

##### A. Certified Class

<i>Factor</i>	<i>Maximum permitted (%)*</i>
	<i>Certified</i>
Off type	0.10

\* Standards for off types shall be met at final inspection.

## V. Clone Specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.75-1.0 cm
2. The height of the grafting should range from 10-15 cm.
3. The diameter of the grafts at 10 cm above the graft union should range from 1.0-1.25 cm and height of the graft 50 cm – 100 cm.
4. The grafted clone should be free from suckers
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number)

## VI. Clone Standards

<i>Factor</i>	<i>Standard for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5 (by number)	2.0% (by number)

## **APPLE (*Malus domestica* Brokh.)**

### **I. Application and Amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Apple clones.
2. The General Standards are amplified as follows to apply specifically to apple. All certified clones shall be produced by asexual methods like Tongue grafting or chip budding.

### **II. Land Requirements**

Land to be used for clonal propagation of Apple shall be free from volunteer plants.

### **III. Field Inspection**

#### **(a) Rootstock**

A minimum of one inspection shall be made before grafting/budding when the rootstock has attained graftable stage

#### **(b) Mother Plant/Scion**

Mother plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the certifying agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree. Separate block for scion, which is to be identified with map.

#### **(c) Grafted/Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after obtaining the specified size to verify relevant factors.

#### IV. Field Standards

##### A. General Requirements

- 1. Isolation:** The clone propagation plots of apple shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

- 2. Spacing:** The spacing between plants in clone propagation plots should be 20cm and between rows 30cm.
- 1. Rotation :** Nursery should be rotated to other plots after raising apple three times in the same plot.

##### B. Specific Requirement

###### a) Foundation clones

- Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.
- The plants should be free from woolly aphid collar rot, rubbery wood and sanjose scale.

###### b) Certified Class

Factor	Maximum permitted (%)* Certified
Offtype	0.10
Plants infected with bacterial gummosis or leaf curl	None

\*Standards for Off-types shall be met at final inspection

#### IV. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.60 - 0.75 cm
2. The height of the grafting should range from 10-20 cm.
3. The diameter of the grafts at 10 cm above the graft union should range from 0.75 – 1.0 cm and height of the graft 50 cm – 120 cm.
4. The grafted clone should be free from suckers
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number)

#### VII. Clone Standards

<i>Factor</i>	<i>Standard for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5 (by number)	2.0% (by number)
Plants infected with woolly aphid Collar rot, rubbery wood or sanjose scale (maximum)	None	None

## **APRICOT (*Prunus ameriaca* L.)**

### **I. Application and Amplification of General Clone Certification Standards**

- A. The General Clone Certification Standards are basic and, together with the following specific standards constitute the standards for certification of apricot clones.
- B. The General Standards are amplified as follows to apply specifically to apricot. All certified clones shall be produced by asexual methods the T-budding or Tongue grafting.

### **II. Land Requirements**

Land to be used for clonal propagation of Apricot shall be free from volunteer plants.

### **III. Field Inspection**

#### **(a) Rootstock**

A minimum of one inspection shall be made before grafting/budding when the rootstock has attained graftable /buddable stage

#### **(b) Mother Plant/Scion**

Mother plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **(c) Grafted/Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

#### IV. Field Standards

##### A. General requirements

###### 1. Isolation

The clone propagation plots of Apricot shall be isolated from the contaminants as shown in the following table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** the spacing between plants in clone propagation plots should be 20 cm and between row 30 cm.
3. **Rotation:** Nursery should be rotated to other plots after raising apricot three times in the same plot.

##### B. Specific requirements

###### (a) Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off types should be discarded under the supervision of Certification Agency.

##### A. Certified Class

<i>Factor</i>	<i>Maximum permitted (%)*</i>
	<i>Certified</i>
Off type	0.10

\* Standards for off types shall be met at final inspection.

## V. Clone Specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.50 - 1.0 cm
2. The height of the grafting should range from 10 - 20 cm.
3. The diameter of the grafts at 10 cm above the graft union should range from 0.5 - 0.75 cm and height of the graft 50 cm – 100 cm.
4. The grafted clone should be free from suckers
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number)

## VI. Clone Standards

<i>Factor</i>	<i>Standard for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5 (by number)	2.0% (by number)

## BANANA (*Musa paradisiaca* L)

### I. Application and Amplification of General Clone Certification Standards

- A. The General Clone Certification Standards are basic and, together with the following specific standards constitute the standards for certification of banana clones.
- B. The General Standards are amplified as follows to apply specifically to banana. All certified clones shall be produced by asexual methods like sword sucker

### II. Land Requirements

Land to be used for clone propagation of banana shall be free from volunteer plants and diseases.

### III. Field Inspection

#### (a) Mother Plant/Scion

Mother plant should be healthy, true to type and free from diseases and pests. The plants should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### (b) Clones (Suckers)

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### IV. Field Standards

#### A. General requirements

- 1. **Isolation:** The clone propagation plots of banana shall be isolated from the contaminants with 3 meter distance.

2. **Spacing:** the spacing between plants in clone propagation plots should be 1.5m and between row 1.5 m.
3. **Rotation:** Nursery should be rotated to other plots after raising banana three times in the same plot.

***B. Specific requirements***

**Clones:**

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.
2. The plants should be free from bunchy top, nematode and Panama disease.

**V. Clone Specifications**

The specification in respect of size of clones shall be as follows:

1. The diameter of the sucker should range from 7.0 – 10.0 cm.
2. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number)

## **BAEL (*Ager marmelos* Corr.)**

### **I. Application and Amplification of General Clone Certification Standards**

- A. The General Clone Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Bael clones.
- B. The General Standards are amplified as follows to apply specifically to Bael. All certified clones shall be produced by asexual methods like batch or ring budding.

### **II. Land Requirements**

Land to be used for clone propagation of Bael shall be free from volunteer plants.

### **III. Field Inspection**

#### **(a) Rootstock**

A minimum of one inspection shall be made before budding when the rootstock has attained buddable stage

#### **(b) Mother Plant/Scion**

Mother plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **(c) Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

#### IV. Field Standards

##### A. General requirements

###### 1. Isolation

The clone propagation plots of Bael shall be isolated from the contaminants as shown in the following table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of same variety not conforming to varietal purity requirements for certification	3	3

**2. Spacing:** the spacing between plants in clone propagation plots should be 30 cm and between row 30 cm.

**3. Rotation:** Nursery should be rotated to other plots after raising Bael three times in the same plot.

##### B. Specific requirements

###### (a) Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off types should be discarded under the supervision of Certification Agency.

###### (b) Certified Class

<i>Factor</i>	<i>Maximum permitted (%)*</i>
	<i>Certified</i>
Off type	0.10

\* Standards for off types shall be met at final inspection.

## V. Clone Specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 1.0 - 1.25 cm
2. The height of the grafting should range from 15 - 20 cm.
3. The diameter of the grafts at 10 cm above the graft union should range from 1.25 - 1.5 cm and height of the graft 50 cm – 75 cm.
4. The grafted clone should be free from suckers
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number)

## VI. Clone Standards

<i>Factor</i>	<i>Standard for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5 (by number)	2.0% (by number)

## **BER (*Zyziphus maurtiona Lam*)**

### **I. Application and Amplification of General Clone Certification Standards**

- A. The General Clone Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Ber clones.
- B. The General Standards are amplified as follows to apply specifically to Ber. All Certified clones shall be produced by asexual methods like batch or ring budding.

### **II. Land Requirements**

Land to be used for clone propagation of Ber shall be free from volunteer plants.

### **III. Field Inspection**

#### **(a) Rootstock**

A minimum of one inspection shall be made before budding when the rootstock has attained buddable stage

#### **(b) Mother Plant/Scion**

Mother plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **(c) Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

#### IV. Field Standards

##### A. General requirements

##### 1. Isolation

The clone propagation plots of Ber shall be isolated from the contaminants as shown in the following table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of same variety not conforming to varietal purity requirements for certification	3	3

**2. Spacing:** the spacing between plants in clone propagation plots should be 30 cm and between row 30 cm.

**3. Rotation:** Nursery should be rotated to other plots after raising Ber three times in the same plot.

##### B. Specific requirements

##### (a) Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off types should be discarded under the supervision of Certification Agency.

##### (b) Certified Class

<i>Factor</i>	<i>Maximum permitted (%)*</i>
	<i>Certified</i>
Off type	0.10

\* Standards for off types shall be met at final inspection.

## V. Clone Specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.6 - 1.0 cm
2. The height of the grafting should range from 10 - 15 cm.
3. The diameter of the grafts at 10 cm above the graft union should range from 0.75 - 1.0 cm and height of the graft 20 cm – 30 cm.
4. The grafted clone should be free from suckers
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number)

## VI. Clone Standards

<i>Factor</i>	<i>Standard for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5 (by number)	2.0% (by number)

## **CHERRY (*Prunus avium* L.)**

### **I. Application and Amplification of General Clone Certification Standards**

- A. The General Clone Certification Standards are basic and, together with the following specific standards constitute the standards for certification of Cherry clones.
- B. The General Standards are amplified as follows to apply specifically to Cherry. All certified clones shall be produced by asexual methods like T- budding or Tongue grafting.

### **II. Land Requirements**

Land to be used for clone propagation of Cherry shall be free from volunteer plants.

### **III. Field Inspection**

#### **(a) Rootstock**

A minimum of one inspection shall be made before grafting / budding when the rootstock has attained graftable / buddable stage

#### **(b) Mother Plant/Scion**

Mother plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **(c) Grafted/Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

#### IV. Field Standards

##### A. General requirements

###### 1. Isolation

The clone propagation plots of Cherry shall be isolated from the contaminants as shown in the following table:

<i>Contaminants</i>	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** the spacing between plants in clone propagation plots should be 20 cm and between row 30 cm.

3. **Rotation:** Nursery should be rotated to other plots after raising Cherry three times in the same plot.

##### B. Specific requirements

###### (a) Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off types should be discarded under the supervision of Certification Agency.

##### A. Certified Class

<i>Factor</i>	<i>Maximum permitted (%)*</i>
	<i>Certified</i>
Off-type	0.10

\* Standards for off types shall be met at final inspection.

## V. Clone Specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.50 - 1.0 cm
2. The height of the grafting should range from 10 - 20 cm.
3. The diameter of the grafts at 10 cm above the graft union should range from 0.50 - 1.0 cm and height of the graft 60 cm – 80 cm.
4. *Prunus cevasoides* should not be used as root stock because of delayed incompatibility.
5. The grafted clone should be free from suckers
6. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number)

## VI. Clone Standards

<i>Factor</i>	<i>Standard for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5 (by number)	2.0% (by number)

## **CUSTARD APPLE (*Annona squamosa* L.)**

### **I. Application and amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Custard Apple clones.
2. The General Standards are amplified as follows to apply specifically to Custard Apple. All certified clones shall be produced by asexual methods like Batch budding or inarching or ring budding.

### **II. Land Requirements**

Land to be used for clone propagation of Custard Apple shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before grafting/budding when the rootstock has attained graftable/buddable stage.

#### **b. Mother Plant/Scion**

Mother Plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **c. Grafted/Budded Clones**

A minimum one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of Custard Apple shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 30 cm and between row 45 cm.
3. **Rotation:** Nursery should be rotated to other plots after raising Custard Apple three times in the same plot.

## B. Specific Requirement

### a. Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.

### b. Certified Class

Factor	Maximum permitted (%) Certified
Off-type	0.10

\*Standards for Off-types shall be met at final inspection.

## V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.75-1.0 cm
2. The height of the grafting should range from 15-20 cm

3. The diameter of the grafts at 10 cm above the graft union should range from 1.0-1.25 cm and height of the graft 30 cm – 50 cm.
4. The grafted clone should be free from suckers.
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

**VI. Clone Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)

## DATE PALM (*Phoenix dactylifera* L.)

### I. Application and amplification of General Clone Certification Standards

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Date Palm clones.
2. The General Standards are amplified as follows to apply specifically to Date Palm. All certified clones shall be produced by asexual means by off shoot.

### II. Land Requirements

Land to be used for clone propagation of Date Palm shall be free from volunteer plants.

### III. Field Inspection

#### a. Mother Plant/Scion

Mother Plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### b. Clones (Off-shoots)

A minimum one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### IV. Field Standards

#### A. General Requirements

1. **Isolation:** The clone propagation plots of Date Palm shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

## B. Specific Requirement

### a. Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.

The plants should be free from *Fusarium* wilt/*Pythium*.

### b. Certified Class

Factor	Maximum permitted (%)* Certified
Offtype	0.10
Plants infected with <i>Fusarium</i> wilt or <i>Pythium</i>	None

\*Standards for Off-types shall be met at final inspection.

## V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The weight of off-shoot should be 10-20 kg
2. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## VI. Clone Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)
Plants infected with <i>Fusarium</i> wilt or <i>Pythium</i> (maximum)	None	None



## FIG (*Ficus carsica* L.)

### I. Application and amplification of General Clone Certification Standards

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Fig clones.
2. The General Standards are amplified as follows to apply specifically to Fig. All certified clones shall be produced by asexual methods like cutting or Air Layering.

### II. Land Requirements

Land to be used for clone propagation of Fig shall be free from volunteer plants.

### III. Field Inspection

#### a. Mother Plant/Scion

Mother Plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### b. Clones (Rooted cuttings or Air Layers)

A minimum one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### IV. Field Standards

#### A. General Requirements

1. **Isolation:** The clone propagation plots of Fig shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 30 cm and between row 30 cm.
3. **Rotation:** Nursery should be rotated to other plots after raising Fig three times in the same plot.

**B. Specific Requirement**

**a. Foundation clones**

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.

**b. Certified Class**

Factor	Maximum permitted (%)* Certified
Off-type	0.10

\*Standards for Off-types shall be met at final inspection

**V. Clone specifications**

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the clone should range from 1.0 to 1.5 cm at 10 cm above ground level.
2. The height of the clone should range from 25 to 50 cm
3. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

**VI. Clone Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)

## **GRAPES (*Vitis vinifera* L.)**

### **I. Application and Amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of grapes clones.
2. The General Standards are amplified as follows to apply specifically to grapes.
3. All certified clones shall be produced by asexual methods like chip budding or cutting.

### **II. Land Requirements**

Land to be used for clonal propagation of grapes shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before budding when the rootstock has attained buddable stage.

#### **b. Mother Plant/Scion**

Mother Block should be healthy, true to type and free from pests and diseases. The plants should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother block.

#### **c. Clones (Budded/rooted cuttings)**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of grapes shall be isolated from the fields of the same variety not conforming to purity and field of other varieties by 3 meters (Minimum).
2. **Spacing:** The spacing between plants in clone propagation plots should be 20 cm and between rows 30 cm.

3. **Rotation:** Nursery should be rotated to other plots after raising grapes three times in the same plot.

#### **B. Specific Requirements**

1. Clones being a group of common ancestry shall be genetically pure in absolute terms. Off types should be discarded.
2. The plants should be free from nematode and anthracnose.
3. The Off-types should not exceed from 0.1% by number (maximum)

#### **V. Clone specifications**

1. The diameter of the stock should range from 1.0-1.25 cm
2. The height of the budding should range from 8-10 cm
3. The diameter of the grafts/rooted cuttings should range from 1.0-1.25 cm and height 25 cm – 40 cm.
4. The grafted clone should be free from suckers.
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## **GUAVA (*Psidium guava* L.)**

### **I. Application and Amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of guava clones.
2. The General Standards are amplified as follows to apply specifically to guava clones.
3. All certified clones shall be produced by asexual methods like patch budding or ring budding or stooling or inarching or air layering.

### **II. Land Requirements**

Land to be used for clonal propagation of guava shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before grafting when the rootstock has attained graftable stage.

#### **b. Mother Plant**

Mother Plant should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **c. Clones (Budded/Grafted/Stool layers/Air layers)**

A minimum of two inspections shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of guava shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 20 cm and between rows 30 cm.
3. **Rotation:** Nursery should be rotated to other plots after raising guava three times in the same plot.

## B. Specific Requirement

### (a) Foundation Clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.

### (b) Certified Class

Factor	Maximum permitted (%) Certified
Off-type	0.10

\*Standards for off-types shall be met at final inspection

## V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.75-1.0 cm
2. The height of the grafting should range from 10-15 cm

3. The diameter of the grafts at 10 cm above the graft union and self rooted plants at 10 cm above ground level should range from 1.00-1.25 cm and height 50 cm – 75 cm.
4. The grafted clone should be free from suckers.
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## VI. Clone Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)

## **JACK FRUIT (*Artocarpus heterophyllus* Lam.)**

### **I. Application and Amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Jackfruit clones.
2. The General Standards are amplified as follows to apply specifically to Jackfruit.
3. All certified clones shall be produced by asexual methods like patch budding or ring budding or veneer budding.

### **II. Land Requirements**

Land to be used for clonal propagation of Jackfruit shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before budding when the rootstock has attained buddable stage.

#### **b. Mother Plant/Scion**

Mother Plants should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **c. Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of Jackfruit shall be isolated from the fields of the same variety not conforming to varietal purity and fields of other varieties by 3 meters (Minimum).

## **B. Specific Requirements**

1. Clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded.
2. Off-types should not be more than 0.10% (maximum)

## **V. Clone specifications**

1. The diameter of the stock should range from 1.0-1.25 cm
2. The height of the grafting should range from 15-20 cm
3. The diameter of the grafts at 10 cm above the graft union should range from 1.25-1.50 cm and height of the graft 30 cm – 50 cm.
4. The grafted clone should be free from suckers.
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## **KIWI FRUIT (*Actinidia deliciosa*)**

### **I. Application and Amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of kiwi fruit clones.
2. The General Standards are amplified as follows to apply specifically to kiwi fruit clones. All certified clones shall be produced by asexual method via cutting.

### **II. Land Requirements**

Land to be used for clonal propagation of kiwi fruit shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Mother Plant/Scion**

Mother Plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **b. Clones (Rooted Cuttings)**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of Kiwi fruit shall be isolated from the contaminants as shown in the following table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 10 cm and between rows 10 cm.

**B. Specific Requirement**

**a. Foundation clones**

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.

**b. Certified Class**

Factor	Maximum permitted (%)* Certified
Off-type	0.10

\*Standards for off-types shall be melting at final inspection

**V. Clone specifications**

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the clone at 10 cm above soil/rooting media should range from 0.8-1.2 cm and height 25-50 cm.
2. Number of roots should not be less than 20 and extension of growth on the cutting not less than 15 cm.
3. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

**VI. Clone Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)

## LEMON (*Citrus limon* Burn.)

### I. Application and Amplification of General Clone Certification Standards

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of lemon clones.
2. The General Standards are amplified as follows to apply specifically to lemon clones.
3. All certified clones shall be produced by asexual methods like layering or cuttings.

### II. Land Requirements

Land to be used for clonal propagation of lemon shall be free from volunteer plants.

### III. Field Inspection

#### a. Mother Plant

Mother Plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### b. Clones (Rooted cuttings/Air layers)

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### IV. Field Standards

#### A. General Requirements

1. **Isolation:** The clone propagation plots of lemon shall be isolated from the contaminants as shown in the following table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to	3	3

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varietal purity requirements for certification

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2. **Spacing:** The spacing between plants in clone propagation plots should be 20 cm and between rows 30 cm.
3. **Rotation:** Nursery should be rotated to other plots after raising lemon two times in the same plot.

## **B. Specific Requirements**

### **Foundation Clones**

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.
2. The plants should be free from viruses and canker.

### **Certified Class**

Factor	Maximum permitted (%)* Certified
Off-type	0.10
Plants infected with viruses or canker (maximum)	None

\*Standards for off-types shall be met at final inspection

## **V. Clone specifications**

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the clone at 10 cm above ground level should range from 1.00-1.25 cm and height of the clone 25-40 cm.
2. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## **VI. Clone Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Plants infected with viruses or canker (maximum)	None	None

## LITCHI (*Litchi chinensis* Sonn.)

### I. Application and Amplification of General Clone Certification Standards

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of litchi clones.
2. The General Standards are amplified as follows to apply specifically to litchi.
3. All certified clones shall be produced by asexual methods viz., air layering.

### II. Land Requirements

Land to be used for clonal propagation of litchi shall be free from volunteer plants.

### III. Field Inspection

#### a. Mother Plant

Mother Plant should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### b. Clones (Air layers)

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### IV. Field Standards

#### A. General Requirements

1. **Isolation:** The clone propagation plots of litchi shall be isolated from the contaminants with 3 meter distance.
2. **Spacing:** The spacing between plants in clone propagation plots should be 30 cm and between rows 50 cm.
3. **Rotation:** Nursery should be rotated to other plots after raising litchi three times in the same plot.

## **B. Specific Requirements**

Nursery:

1. Clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded.
2. The off-types should not exceed to 0.1% by number.

## **V. Clone specifications**

1. The diameter of the plant should range from 1.0-1.5 cm and height of the plant 10-75 cm.
2. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## **MANDARIN (*Citrus reticulata* Blanco)**

### **I. Application and Amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of mandarin clones.
2. The General Standards are amplified as follows to apply specifically to mandarin clones.
3. All certified clones shall be produced by asexual methods like shield budding or patch budding.

### **II. Land Requirements**

Land to be used for clonal propagation of mandarin shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before budding when the rootstock has attained buddable stage.

#### **b. Mother Plant/Scion**

Mother Plant should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **c. Budded Clones**

A minimum of two inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of mandarin shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 25 cm and between rows 40 cm.
3. **Rotation :** Nursery should be rotated to other plots after raising mandarin two times in the same plot.

## B. Specific Requirement

### (a) Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.

The plants should be free from viruses.

### (b) Certified Class

Factor	Maximum permitted (%)* Certified
Offtype	0.10
Plans infected with viruses	None

\*Standards for Off-types shall be met at final inspection

## V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.6-1.00 cm
2. The height of the grafting should range from 15-20 cm.
3. The diameter of grafts at 10 cm above the graft union should range from 1.0-1.25 cm and height of the grafts 40-60 cm.
4. The grafted clone should be free from suckers.
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## VI. Clone Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)
Plants infected with viruses (maximum)	None	None

## **MANGO (*Mangifera indica*L.)**

### **I. Application and Amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of mango clones.
2. The General Standards are amplified as follows to apply specifically to mango.
3. All certified clones shall be produced by asexual methods like veneer grafting or soft wood grafting or epicotyl grafting or inarching.

### **II. Land Requirements**

Land to be used for clonal propagation of mango shall be free from volunteer plants.

Soils with high chloride content should be avoided.

### **III. Field Inspection**

#### **a) Rootstock**

A minimum of one inspection shall be made before grafting when the rootstock has attained graftable stage.

#### **b) Mother Plant/Scion**

Mother Plant should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **c) Grafted Clones**

A minimum of two inspections shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of mango shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

**2. Spacing:** The spacing between plants in clone propagation plots should be 20-30 cm and between rows 30-40 cm.

**3. Rotation :** Nursery should be rotated to other plots after raising mango three times in the same plot.

## B. Specific Requirements

### (a) Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.

The plants should be free from malformation, anthracnose and dieback.

### (b) Certified Class

Factor	Maximum permitted (%)* Certified
Off-type	0.10
Plants infected with malformation or anthracnose	0.20
Plans infected with dieback	None

\*Standards for Off-types shall be met at final inspection

## V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

- a) The diameter of the stock should range from 1.0-1.25 cm
- b) The height of the grafting should range from 15-25 cm.
- c) The diameter of grafts at 10 cm above the graft union should range from 1.25-1.50 cm and height of the grafts 60-100 cm.
- d) The height of the plant should be 25-40 cm in case of stone grafts
- e) The grafted clone should be free from suckers.
- f) In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## VI. Clone Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)
Plants infected with dieback (maximum)	None	None

## **OLIVE (*Olea europea*L.)**

### **I. Application and Amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Olive clones.
2. The General Standards are amplified as follows to apply specifically to Olive. All certified clones shall be produced by asexual methods like Tongue grafting or cleft grafting or budding or cutting.

### **II. Land Requirements**

Land to be used for clonal propagation of Olive shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before grafting/budding when the rootstock has attained graftable/buddable stage.

#### **b) Mother Plant/Scion**

Mother Plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **(c) Grafted /Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of Olive shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 20cm and between rows 30cm.
3. **Rotation :** Nursery should be rotated to other plots after raising Olive three times in the same plot.

## B. Specific Requirements

### a. Foundation clones

Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.

### b. Certified Class

Factor	Maximum permitted (%) Certified
Off-type	0.10

\*Standards for off-types shall be met at final inspection

## V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 1.0-1.25 cm
2. The height of the grafting should range from 10-15 cm.
3. The diameter of grafts at 10 cm above the graft union should range from 1.0-1.5 cm and height of the grafts 50-75 cm.

4. The diameter of the self rooted plant at 10 cm above ground level should range from 1.0-1.5 cm and height of the plant 50-75 cm.
5. The grafted clone should be free from suckers.
6. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## VI. Clone Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)

**PAPAYA(Seed propagated) (Variety)**

**I. Application and Amplification of General Clone Certification Standards**

1. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of Papaya seed.

**II. Land Requirements**

Land to be used for clonal propagation of Papaya shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections should be made, the first before flowering, the second during flowering and fruit stage and the third at mature fruit stage and to harvesting of fruits for seed extraction.

**IV. Field Standards**

1. **Isolation:** The clone propagation plots of Papaya shall be isolated from the contaminants as shown in the following table:

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	1500	1000

**B. Specific Requirements**

**b. Certified Class**

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.10	0.20

\*Maximum permitted at and after flowering

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure Seed (minimum)	98.0	98.0
Inert matter (maximum)	2.0	2.0
Other crop seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7%	7%
For vapour-proof containers (maximum)	6%	6%

## **PASSION FRUIT (*Passiflora edulis*Sims)**

### **I. Application and Amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Passion fruit clones.
2. The General Standards are amplified as follows to apply specifically to Passion fruit.
3. All certified clones shall be produced by asexual means viz., cutting

### **II. Land Requirements**

Land to be used for clonal propagation of Passion fruit shall be free from volunteer plants.

### **III. Field Inspection**

#### **a) Mother Plant(s)**

Mother Plant (s) should be healthy, true to type and free from diseases and pests. The plants should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother plant(s).

#### **b) Clones (Rooted cuttings)**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of Passion fruit shall be isolated from the fields of the same variety not conforming to varietal purity and fields of other varieties by 3 meters (minimum).
2. **Rotation:** Nursery bed should be rotated to other plots after raising Passion fruit three times in the same plot.

## **B. Specific Requirements**

1. Clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded.
2. Off-types should not be more than 0.10% (maximum)

## **V. Clone specifications**

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the plants at 10 cm above ground level should range from 0.42-0.60 cm and height of the plant 15 to 25 cm.
2. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## **PEACH (*Prunus persica*L.)**

### **I. Application and Amplification of General Clone Certification Standards**

2. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of peach clones.
3. The General Standards are amplified as follows to apply specifically to peach. All certified clones shall be produced by asexual methods like T-budding or tongue grafting or veneer grafting.

### **II. Land Requirements**

Land to be used for clonal propagation of peach shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before grafting/budding when the rootstock has attained graftable/buddable stage.

#### **b) Mother Plant/Scion**

Mother Plant should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **c) Grafted/Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of peach shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 20cm and between rows 30cm.
4. **Rotation :** Nursery should be rotated to other plots after raising peach two times in the same plot.

## B. Specific Requirement

### a) Foundation clones

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.
2. The plants should be free from bacterial gummosis and leaf curl.

### b) Certified Class

Factor	Maximum permitted (%)* Certified
Offtype	0.10
Plants infected with bacterial gummosis or leaf curl	None

\*Standards for off-types shall be met at final inspection

## V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.5-1.0 cm
2. The height of the grafting should range from 10-20 cm.
3. The diameter of grafts at 10 cm above the graft union should range from 0.7-1.25 cm and height of the grafts 50-100 cm.
4. The grafted clone should be free from suckers.
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## VI. Clone Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)
Plants infected with bacterial gummosis or leaf curl (maximum)	None	None

## **PEAR (*Pyrus commuris*L. and *P. pyrifolia* L.)**

### **I. Application and Amplification of General Clone Certification Standards**

- a. The General Clone Certification Standards are basic and for together with the following specific standards constitute the standards for certification of Pear clones.
- b. The General Standards are amplified as follows to apply specifically to Pear.
- c. All certified clones shall be produced by asexual methods like tongue grafting or chip budding.

### **II. Land Requirements**

Land to be used for clonal propagation of Pear shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before grafting/budding when the rootstock has attained graftable stage.

#### **b. Mother Plant/Scion**

Mother Plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **c. Grafted/Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of Pear shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 20cm and between rows 30cm.
3. **Rotation :** Nursery should be rotated to other plots after raising Pearthree times in the same plot.

#### **B. Specific Requirement**

##### **a) Foundation clones**

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.
2. The plants should be free from pink disease.

##### **b) Certified Class**

Factor	Maximum permitted (%)* Certified
Off-type	0.10
Plants infected with pink disease	None

\*Standards for off-types shall be met at final inspection

## V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.6-0.75 cm
2. The height of the grafting should range from 10-20 cm.
3. The diameter of grafts at 10 cm above the graft union should range from 0.6-0.75 cm and height of the graft 50 cm-100 cm
4. The grafted clone should be free from suckers.
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## VI. Clone Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)
Plants infected with pink disease (maximum)	None	None

## PECAN NUT (*Carya illinoensis* Koch)

### I. Application and Amplification of General Clone Certification Standards

- a. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Pecan nut clones.
- b. The General Standards are amplified as follows to apply specifically to Pecan nut. All certified clones shall be produced by asexual methods like modified ring budding or Tongue grafting or cleft crafting.

### II. Land Requirements

Land to be used for clonal propagation of Pecan nut shall be free from volunteer plants.

### III. Field Inspection

#### a. Rootstock

A minimum of one inspection shall be made before grafting/budding when the rootstock has attained graftable/buddable stage.

#### b. Mother Plant/Scion

Mother Plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### c. Grafted/Budded Clones

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### IV. Field Standards

#### A. General Requirements

1. **Isolation:** The clone propagation plots of Pecan nut shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 20cm and between rows 30cm.
3. **Rotation:** Nursery should be rotated to other plots after raising Pecan nut two times in the same plot.

### B. Specific Requirements

#### a) Foundation clones

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.

#### b) Certified Class

Factor	Maximum permitted (%)* Certified
Off-type	0.10
Plants infected with gummosis	None

\*Standards for off-types shall be met at final inspection

### V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.75-1.0 cm
2. The height of the grafting should range from 8-10 cm.
3. The diameter of grafts at 10 cm above the graft union should range from 1.0-1.25 cm and height of the graft 30 cm - 50 cm

4. The grafted clone should be free from suckers.
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

**VI. Clone Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)

## **PINE APPLE (*Ananas comosus* Merr.)**

### **I. Application and Amplification of General Clone Certification Standards**

The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Pine apple clones.

The General Standards are amplified as follows to apply specifically to Pine apple.

All certified clones shall be produced by asexual methods like suckers or slips.

### **II. Land Requirements**

Land to be used for clonal propagation of Pine apple shall be free from volunteer plants.

### **III. Field Inspection**

#### **a) Mother Plant**

Mother Plants should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother plants.

#### **b) Clones (Suckers/Slips)**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

- 1. Isolation:** The clone propagation plots of Pine apple shall be isolated from the fields of the same variety not conforming to varietal purity and fields of other varieties by 3 meters (Minimum).
- 2. Spacing:** The spacing between plants in clone propagation plots should be 30cm and between rows 60cm.
- 3. Rotation :** Nursery should be rotated to other plots after raising Pine apple three times in the same plot.

## **B. Specific Requirements**

1. Clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded.
2. The plants should be free from mealy bug.

## **V. Clone specifications**

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The weight of sucker should be 400-500 g and slip 350-450 g.
2. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## **POMEGRANATE (*Punica granatum* L.)**

### **I. Application and Amplification of General Clone Certification Standards**

1. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Pomegranate clones.
2. The General Standards are amplified as follows to apply specifically to Pomegranate. All certified clones shall be produced by asexual methods like cuttings or Air layering.

### **II. Land Requirements**

Land to be used for clonal propagation of Pomegranate shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Mother Plant/Scion**

Mother Plant should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **b. Clones (Rooted cutting/Air Layers)**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of Pomegranate shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 20cm and between rows 30cm.
3. **Rotation :** Nursery should be rotated to other plots after raising Pomegranate three times in the same plot.

#### **B. Specific Requirements**

##### **a) Foundation clones**

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.
2. The plants should be free from nematodes.

##### **b) Certified Class**

Factor	Maximum permitted (%)* Certified
Off-type	0.10
Plants infected with nematodes	None

\*Standards for off-types shall be met at final inspection

## V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the clone should range from 0.75-1.25 cms above ground level and height of the clone 25-40 cm
2. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## VI. Clone Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)
Plants infected with nematodes (maximum)	None	None

## **PLUM (*Prunus domestica*L. and *P. salicina* Lindl)**

### **I. Application and Amplification of General Clone Certification Standards**

- a. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Plum clones.
- b. The General Standards are amplified as follows to apply specifically to plum. All certified clones shall be produced by asexual methods the T budding or tongue grafting or cutting.

### **II. Land Requirements**

Land to be used for clonal propagation of plum shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before grafting when the rootstock has attained graftable stage.

#### **b. Mother Plant/Scion**

Mother Plant should be healthy, true to type and free from pests and diseases. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **c. Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

1. **Isolation:** The clone propagation plots of plum shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

**2. Spacing:** The spacing between plants in clone propagation plots should be 20cm and between rows 30cm.

**3. Rotation :** Nursery should be rotated to other plots after raising plum three times in the same plot.

### B. Specific Requirements

#### a) Foundation clones

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.
2. The plants should be free from plum pox virus and bacterial gummosis.

#### c) Certified Class

Factor	Maximum permitted (%)* Certified
Offtype	0.10
Plants infected with plum pox virus Or bacterial gummosis	None

\*Standards for Off-types shall be met at final inspection

### V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.75-1.0 cm
2. The height of the grafting should range from 10-20 cm.

3. The diameter of grafts at 10 cm above the graft union should range from 0.75-1.25 cm and height of the graft 50 cm - 100 cm.
4. The diameter of self rooted plant at 10 cm above ground level should 0.75-1.25 cm and height would be 50-100 cm.
5. The grafted clone should be free from suckers.
6. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## VI. Clone Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)
Plants infected with plum pox virus or bacterial; gummosis (maximum)	None	None

## **SAPOTA (*Achras sapota*L.)**

### **I. Application and Amplification of General Clone Certification Standards**

The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of Sapota clones.

The General Standards are amplified as follows to apply specifically to Sapota.

All certified clones shall be produced by asexual methods like inarching or air layering.

### **II. Land Requirements**

Land to be used for clonal propagation of Sapota shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before grafting when the rootstock has attained graftable stage.

#### **b. Mother Plant/Scion**

Mother Plants should be healthy, true to type and free from diseases and pests. The plants should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **c. Clones (Grafted/Air Layers)**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

- 1. Isolation:** The clone propagation plots of Sapota shall be isolated from the fields of the same variety not conforming to varietal purity and fields of other varieties by 3 meters (Minimum).

2. **Rotation:** Nursery bed should be rotated to other plots after raising Sapota three times in the same plot.

**B. Specific Requirements**

1. Clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded.
2. The off-types should not be more than 0.10% (maximum).

**V. Clone specifications**

1. The diameter of the stock should range from 1-1.25 cm
2. The height of the grafting should range from 15-25 cm.
3. The diameter of grafts at 10 cm above the graft union should range from 1.0-1.25 cm and height 50 to 75 cm (inarched) and 30-60 cm (air layered).
4. The grafted clone should be free from suckers.
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## **SWEET ORANGE (*Citrus shensis* Osbeck)**

### **I. Application and Amplification of General Clone Certification Standards**

- a. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of sweet orange clones.
- b. The General Standards are amplified as follows to apply specifically to sweet orange clones.
- c. All certified clones shall be produced by asexual methods like shield budding or patch budding.

### **II. Land Requirements**

Land to be used for clonal propagation of sweet orange shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before budding when the rootstock has attained graftable stage.

#### **b. Mother Plant/Scion**

Mother Plant should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **c. Budded Clones**

A minimum of two inspections shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

- 1. Isolation:** The clone propagation plots of sweet orange shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 25 cm and between rows 40cm.
3. **Rotation :** Nursery should be rotated to other plots after raising sweet orange two times in the same plot.

### B. Specific Requirement

#### a) Foundation clones

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.
2. The plants should be free from viruses.

#### b) Certified Class

Factor	Maximum permitted (%)* Certified
Off-type	0.10
Plants infected with viruses	None

\*Standards for off-types shall be met at final inspection

### V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 0.6-1.00 cm
2. The height of the budding should range from 15-20 cm.

3. The diameter of budding at 10 cm above the bud union should range from 1.0 – 1.25 cm and height of the bud 30 cm - 50 cm.
4. The budded clone should be free from suckers.
5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

## VI. Clone Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)
Plants infected with viruses (maximum)	None	None

## **WALNUT (*Juglans regia*L.)**

### **I. Application and Amplification of General Clone Certification Standards**

- a. The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of walnut clones.
- b. The General Standards are amplified as follows to apply specifically to walnut. All certified clones shall be produced by asexual methods the T budding or Tongue grafting or veneer grafting or cleft grafting.

### **II. Land Requirements**

Land to be used for clonal propagation of walnut shall be free from volunteer plants.

### **III. Field Inspection**

#### **a. Rootstock**

A minimum of one inspection shall be made before grafting/budding when the rootstock has attained graftable/buddable stage.

#### **b. Mother Plant/Scion**

Mother Plant should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the Certifying Agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for health and fruit quality of the mother tree.

#### **c. Grafted/Budded Clones**

A minimum of one inspection shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

2. **Isolation:** The clone propagation plots of walnut shall be isolated from the contaminants as shown in the following table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** The spacing between plants in clone propagation plots should be 20 cm and between rows 30cm.

3. **Rotation :** Nursery should be rotated to other plots after raising walnuttwo times in the same plot.

### B. Specific Requirements

#### a. Foundation clones

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off-types should be discarded under the supervision of Certification Agency.

#### b. Certified Class

Factor	Maximum permitted (%)* Certified
Off-type	0.10

\*Standards for off-types shall be met at final inspection

### V. Clone specifications

The specification in respect of size of clones for foundation and certified classes shall be as follows:

1. The diameter of the stock should range from 1.0-1.25 cm
2. The height of the grafting should range from 8-10 cm.
3. The diameter of the grafts at 10 cm above the graft union should range from 1.0 – 1.25 cm and height of the graft 30 cm - 50 cm.
4. The grafted clone should be free from suckers.

5. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

**VI. Clone Standards**

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure living clones (minimum)	99.5% (by number)	98.0% (by number)
Other living plants including Rootstocks (maximum)	0.5% (by number)	2.0% (by number)

## **CHAPTER-XIX**

### **Seed Certification Standards for Flower crops**

1. Annual carnation
2. Annual chrysanthemum
3. Aster
4. Marigold
5. Marigold hybrids
6. Ornamental sunflower
7. Ornamental sunflower hybrids
8. Petunia
9. Petunia hybrids
10. Snapdragon
11. Snapdragon hybrids

**ANNUAL CARNATION (MARGURITE OR CHAUBAD TYPE)**  
(*Dianthus caryophyllus* Linn.)

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of the seeds of Annual Carnation.

**II. Land Requirements**

Land to be used for seed production of Annual Carnation shall be free from volunteer plants.

**III. Field Inspection**

A minimum of three inspections shall be made, the first after transplanting, the second during flowering and the third before (harvesting) capsules start opening (shattering).

**IV. Field Standards**

**A. General requirements**

**1. Isolation:**

Annual Carnation seed fields shall be isolated from the contaminants shown in the Column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants 1	<i>Minimum distance (meters)</i>	
	<i>Foundation</i> 2	<i>Certified</i> 3
Fields of other varieties	600	300
Fields of the same variety not conforming to varietal purity requirements for certification	600	300

## B. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Off-types	0.050	0.10
**Plants affected by designated disease	0.10	0.20

\*Standards for off-types shall be met at and after flowering and for designated disease at final inspection.

\*\*Designated disease shall be : Streak mosaic virus

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	75%	75%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## ANNUAL CHRYSANTHEMUM (*Chrysanthemum* spp. Linn.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of the seeds of Annual Chrysanthemum.

### II. Land Requirements

A seed crop of Annual Chrysanthemum shall not be eligible for certification if planted on land on which the same kind of crop was grown in the previous year unless the crop(s) of Annual Chrysanthemum grown in the previous year was/were of the same variety and of an equivalent or higher class of certified seed and was/were certified.

### III. Field Inspection

A minimum of three inspections shall be made as under:

1. the first inspection shall be made at pre-flowering stage in order to determine land requirements, isolation, volunteer plants and other relevant factors;
2. the second inspection shall be made during flowering to verify relevant factors;
3. the third inspection shall be made at maturity prior to harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Annual Chrysanthemum seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	600	300
Fields of the same variety not conforming to varietal purity requirements for certification	600	300

## B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
Off-types at and after flowering	0.050	0.10
*Plants affected by designated disease	0.10	0.20

\*Designated disease shall be :

- i. Grey mould (*Botrytis cinerea* Pers.)
- ii. Blotch (*Septoria chrysanthmella* Sacc.)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	50%	50%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

**ASTER (*Callistephus* spp. Linn.) (Nees syn. (*Aster* spp. Linn.))**

**I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of Aster.

**II. Land Requirements**

Land to be used for seed production of Aster shall not be eligible for certification if planted on land on which the same kind of crop (including Aster – singles) was grown in the previous year unless the crop(s) as grown in the previous year was/were of the same variety and of an equivalent or higher class of certified seed and was/were certified.

**III. Field Inspection**

A minimum of three inspections shall be made, the first at pre-flowering stage, the second during flowering and the third before (harvesting) pappus or “fuzz” begins to show.

**IV. Field Standards**

**A. General requirements**

**1. Isolation**

Aster seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	600	300
Fields of the same variety not conforming to varietal purity requirements for certification	600	300

## 2. Specific requirements

Factor	<i>Maximum permitted (%)*</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
*Off-types	0.050	0.10

\*Standards for Off-types shall be met at after flowering.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## MARIGOLD (*Tagetes* spp. Linn.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of the seeds of Marigold.

### II. Land Requirements

A seed crop of Marigold shall not be eligible for certification if planted on land on which the same kind of crop was grown in the previous year unless the crop(s) of Marigold grown in the previous year was/were of the same variety and of an equivalent or higher class of certified seed and was/were certified.

### III. Field Inspection

A minimum of three inspections shall be made as follows:

1. the first inspection shall be made at the stage of 6-7 pairs of leaves in order to determine isolation, volunteer plants and other relevant factors;
2. the second inspection shall be made during flowering to check isolation, off-types and other relevant factors;
3. the third inspection shall be made at maturity to verify designated diseases, true nature of plant and other relevant factors.

### IV. Field Standards

#### A. General requirements

#### 1. Isolation

Marigold seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 & 3 of the said Table.

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	600	300
Fields of the same variety not conforming to varietal purity requirements for certification	600	300

## B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
Off-types at and after flowering	0.050	0.10
*Plants affected by designated disease at final inspection	0.10	0.20

\*Designated disease shall be :

- i. Leaf spot (*Alternaria tagetica* shome & Mustafee)
- ii. Flower bud rot (*A. alternata* (Fr.) Keissler & *A. dianthi* Stevans & Hall)
- iii. Collar rot (*Rhizoctonia solani* Kuhn)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	7.0%	7.0%

## MARIGOLD HYBRIDS (*Tagetes* spp. Linn.)

### I. Application and Amplification of General Seed Certification Standards

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrids marigold seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of marigold.

#### 1. Eligibility requirements for certification

- a. An inbred line to be eligible for certification shall be from a source such that its identity may be assured and approved by the certification agency.
- b. Hybrid seed to be eligible for certification shall be the progeny of two approved inbred lines, one of which shall be male sterile.

#### 2. Classes and sources of seed

- a. An inbred line shall be a relatively true breeding strain resulting from self-pollination with selection and/or developed through in-vitro culture.
- b. The foundation seed class shall consist of an approved male sterile (apetalous) line to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- c. \*A male sterile line shall be a monogenic recessive strain carrying genetic male sterility, which sheds no viable pollen and is maintained by the monogenic dominant heterozygous strain and is used as maintainer in propagation blocks.
- d. The certified class seed shall be hybrid seed to be planted for any use except seed production.

\*(Applicable if male sterile line is used)

## II. Land Requirements

A seed crop of hybrid marigold shall not be eligible for certification if planted on land on which the same kind of crop was grown in the previous year unless the crop(s) grown in the previous year was/were of the same variety and of an equivalent or higher class of certified seed and was/were certified.

## III. Field Inspection

A minimum of four inspections shall be made as under:

1. the first inspection shall be made at the stage of 6-7 pairs of leaves in order to determine isolation, volunteer plants, outcrosses, planting ratio (demarcation between female and male block if planted separately) and other relevant factors;
2. the second and third inspection shall be made during flowering to check isolation, pollen shedding heads in seed parent, Off-types and other relevant factors;
3. the fourth inspection shall be made at maturity and prior to harvesting to verify the designated diseases, true nature of plant and capitulum's and other relevant factors.

## IV. Field Standards

### A. General requirements

#### 1. Isolation

Seed fields of marigold hybrids shall be isolated from the contaminants shown in Column 1 of the Table below by the distances specified in columns 2 & 3 of the said Table.

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties including commercial hybrids of the same cultivar	600	300
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification	600	300
Between blocks of the parental lines in case Seed parent and pollinator are planted in Separate block	-	5

## B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
Off-types in seed parent at and after flowering	0.050	0.10
Off-types in pollinator at flowering	0.050	0.10
Pollen shedding heads in seed parent at flowering	0.050	0.10
*Plants affected by designated disease at final inspection	0.10	0.20

\*Designated diseases shall be:

- i. Leaf spot (*Alternaria tagetica* shome & Mustafee)
- ii. Flower bud rot (*A. alternata* (Fr.) Keissler & *A. dianthi* Stevans & Hall)
- iii. Collar rot (*Rhizoctonia solani* Kuhn)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	97.0%	97.0%
Inert matter (maximum)	3.0%	3.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	7.0%	7.0%

## **ORNAMENTAL SUNFLOWER (*Helianthus* spp. L.)**

### **I. Application and Amplification of General Seed Certification Standards**

The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of the seeds of Ornamental Sunflower seeds.

### **II. Land Requirements**

A seed crop of Ornamental Sunflower shall not be eligible for certification if planted on land on which the same kind of crop was grown in the previous year unless the crop(s) grown in the previous year was/were of the same variety and of an equivalent or higher class of certified seed and was/were certified.

### **III. Field Inspection**

A minimum of three inspections shall be made as follows:

1. the first inspection shall be made at the stage of 6-7 pairs of leaves in order to determine isolation, volunteer plants, designated disease and other relevant factors;
2. the second inspection shall be made during flowering to check isolation, off-types and other relevant factors;
3. the third inspection shall be made at maturity and prior to harvesting to verify designated diseases, true nature of plant and head, characteristics of seed other relevant factors.

### **IV. Field Standards**

#### **A. General requirements**

##### **1. Isolation**

Ornamental Sunflower seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 & 3 of the said Table.

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	400	200
Fields of the same variety not conforming to varietal purity requirements for certification	400	200

## B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
*Off-types at and after flowering	0.10	0.20
Plants infected with by downy mildew disease ( <i>Plasmopara halstedii</i> (Fari.) Beri. & De T.) at each inspection	0.050	0.050
Plants infested with <i>Orobanchi cumana</i> Guss, Non-Wallr. at final inspection	None	None

\*Sterile plants of the same variety shall not be considered as Off-types.

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Huskless seeds (maximum)	2.0%	2.0%
	(by number)	(by number)
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	5/kg	10/kg
Seeds infested with <i>Orobanche Cumana</i> Guss, Non-Wallr. (Maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	7.0%	7.0%

## **ORNAMENTAL SUNFLOWER (*Helianthus* spp. L.) HYBRIDS**

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of ornamental sunflower hybrid seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of ornamental sunflower.

#### **1. Eligibility requirements for certification**

- a. An inbred line to be eligible for certification shall be from a source such that its identity may be assured and approved by the Certification Agency.
- b. Hybrid seed to be eligible for certification shall be the progeny of two approved inbred lines, one of which shall be male sterile.

#### **2. Classes and sources of seed**

- a. An inbred line shall be a relatively true breeding strain resulting from self-pollination with selection.
- b. The foundation seed class shall consist of an approved male sterile line to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- c. A male sterile line shall be a strain (A) carrying cytoplasmic-genetic male sterility, which sheds no viable pollen and is maintained by the normal sister strain (B) which is used as pollinator;
- d. The certified class seed shall be hybrid seed to be planted for any use except seed production.

## II. Land Requirements

A seed crop of ornamental sunflower hybrid shall not be eligible for certification if planted on land on which the same kind of crop was grown in the previous year unless the crop(s) grown in the previous year was/were of the same variety and of an equivalent or higher class of certified seed and was/were certified.

## III. Field Inspection

A minimum of four inspections shall be made as follows:

1. the first inspection shall be made at the stage of 6-7 pairs of leaves in order to determine isolation, volunteer plants, outcrosses, planting ratio, errors in planting, designated disease and other relevant factors;
2. the second and third inspection shall be made during flowering to check isolation, pollen shedding heads, off-types and other relevant factors;
3. the fourth inspection shall be made at maturity and prior to harvesting to verify the designated diseases, true nature of plant and head, characteristics of seeds and other relevant factors.

## IV. Field Standards

### A. General requirements

#### 1. Isolation

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties including commercial hybrids of the same variety	600	400
Fields of the same hybrid (code designation) not conforming to varietal purity requirements for certification and wild <i>Helianthus</i> spp.	400	200

## B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
*Off-types in seed parent at and after flowering	0.20	0.50
Off-types in pollinator at and after flowering	0.20	0.50
Pollen shedding heads in seed parent at flowering	0.50	1.00
**Objectionable weed plants at and after flowering	None	None
Plants infected with downy mildew disease ( <i>Plasmopara halstedii</i> (Frl.) Barl & De T.) at each inspection	0.050	0.50
Plants infested with <i>Orobanche cumana</i> Guss Non_Wallr.) at final inspection	None	None

\*Sterile plants of the same strain shall not be considered as off-types

\*\*Objectionable weed plants shall be : Wild *Helianthus* spp.

## V. Seed Standards

Factor	<i>Standards for each class</i>	
	<i>Foundation</i>	<i>Certified</i>
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Huskless seeds (maximum)	2.0%	2.0%
	(by number)	(by number)
Other crop seeds (maximum)	None	None
Total Weed seeds (maximum)	5/kg	10/kg
*Objectionable weed seeds (maximum)	None	None
Seeds infested with <i>Orobanche cumana</i> Guss Non_Wallr. (maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	9.0%	9.0%
For vapour-proof containers (maximum)	7.0%	7.0%

\*Objectionable weed is the same as given at IV.B.

## PETUNIA (*Petunia* spp.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of the seeds of Petunia.

### II. Land Requirements

Land to be used for seed production of Petunia shall be free from volunteer plants

### III. Field Inspection

A minimum of two inspections shall be made; the first before flowering/during flowering to check isolation off-types etc. and second at fruiting stage/maturity prior to harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields of petunia shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties	600	300
Fields of the same variety not conforming to varietal purity requirements for certification	600	300

## B. Specific requirement

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
*Off-types	0.050	0.10
**Plants affected by designated diseases	0.10	0.20

\*Standards for off-types shall be met at and after flowering and for designated diseases at final inspection.

\*\*Designated diseases shall be:

Leaf blight (*Alternaria alternata* (Fr.) Kiessler)

Crown rot (*Phytophthora parasitica* Dast)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	75%	75%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## **PETUNIA HYBRID (*Petunia* spp.)**

### **I. Application and Amplification of General Seed Certification Standards**

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of Petunia hybrid seeds
- B. The General standards are amplified as follows to apply specifically to the hybrids of Petunia.

#### **1. Classes and sources of seed**

- a. Only the class “Certified” shall be recognized.
- b. A hybrid to be certified must be produced from certified foundation seed or seed stocks approved by the certification agency.

#### **2. Eligibility requirements for certification**

- a) A hybrid is one to be planted for any use except seed production. It may be one of the following:

##### **(i) Single cross**

The first generation resulting from controlled crossing of two approved self-incompatible but cross-compatible inbred lines. It may be of three types depending upon procedure of seed production.

- Seed of only female parent are harvested and certified
- Seeds of both the parents are harvested separately and certified and
- Seed of both the parents are harvested together, mixed and certified.

##### **(ii) Double cross**

The first generation resulting from the controlled crossing of two approved self-incompatible but cross-compatible single crosses.

##### **(iii) Three way cross**

The first generation resulting from the controlled crossing of an approved inbred line and certified foundation single cross being self-incompatible individually but cross-compatible to each other.

## II. Land requirement

- a) Land to be used for seed production of petunia hybrids shall be free of volunteer plants.

## III. Field Inspection

A minimum of two inspections shall be made as follows:

1. the first inspection shall be made at pre-flowering stage to check isolation, outcrosses and other relevant factors;
2. the second inspection shall be made during flowering to check isolation, Off-types and other relevant factors;
3. the third inspection shall be made before harvesting to check Off-types, designated diseases and other relevant factors.

## IV. Field Standards

### A. General requirements

#### 1. Isolation

Seed field of Petunia hybrids shall be isolated from the contaminants shown in the column 1 of the table below by the distance specified in column 2 & 3 of the said table.

Contaminants	<i>Minimum distance (meters)</i>	
	<i>Foundation</i>	<i>Certified</i>
1	2	3
Fields of other varieties including commercial hybrids of the same cultivar	600	400
Fields of the same variety not conforming to varietal purity requirements for certification	400	200
Between blocks of the parental lines in case seed parent and pollinator are planted in separate blocks.	-	5

## B. Specific requirements

Factor	Maximum permitted (%*)	
	Foundation	Certified
1	2	3
Off-types in each parent	0.050	0.10
**Plants affected by designated diseases	0.10	0.20

\*Standards for off-types shall be met at after flowering and plants infected with designated diseases at finale inspection.

\*\*Designated diseases shall be:

- i. Leaf blotch (*Cercospora petuniae* (saito) Muller &
- ii. Leaf spot (*Acochyta petuniae*)
- iii. Phyllostica leaf spot (*Phyllostica petuniae* Speg.)
- iv. Leaf blight (*Alternaria alternata* (Fr. (Kiessler)
- v. Crown rot (*Phytophthora parasitix* Dast.)
- vi. Tobacco mosaic virus (TMV)
- vii. Cucumber mosaic virus (CMV)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	75%	75%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## SNAPDRAGON (*Antirrhinum* spp. Linn.)

### I. Application and Amplification of General Seed Certification Standards

The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of Snapdragon seeds.

### II. Land Requirements

Land to be used for seed production of Snapdragon shall be free of volunteer plants

### III. Field Inspection

A minimum of three inspections shall be made; the first before flowering, the second during flowering and the third at maturity prior to harvesting.

### IV. Field Standards

#### A. General requirements

##### 1. Isolation

Seed fields of Snapdragon shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	600	300
Fields of the same variety not conforming to varietal purity requirements for certification	600	300

## B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
*Off-types	0.050	0.10
**Plants affected by designated diseases	0.10	0.20

\*Standards for off-types shall be met at and after flowering and for designated diseases at final inspection.

\*\*Designated diseases shall be:

Anthracnose (*Colletotrichum antirrhini* & *C. fuscum*)

Blight (*Phyllosticta antirrhini* Syd.)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

## SNAPDRAGON HYBRID (*Antirrhinum* spp. Linn.)

### I. Application and Amplification of General Seed Certification Standards

- A. The General Seed Certification Standards are basic and together with the following specific standards constitute the standards for certification of hybrid snapdragon seeds.
- B. The General standards are amplified as follows to apply specifically to the hybrids of Snapdragon.

#### 1. Eligibility requirements for certification

- a. An inbred/parental line to be eligible for certification shall be from a source that its identity may be assured and approved by the certification agency.
- b. \*Hybrid seed to be eligible for certification shall be the progeny of two approved inbred/parental lines, one of which shall be male sterile.

#### 2. Classes and sources of seed

- a. An inbred/parental line shall be a relatively true breeding strain resulting from self-pollination with selection and/or developed through in-vitro culture.
- b. The foundation seed class shall consist of an approved male sterile line (genetic male sterility-apetalous sterile line) to be used as a female parent and an approved inbred line to be used as a male parent for the purpose of producing hybrid seed.
- c. \*A male sterile line shall be a monogenic recessive strain carrying genetic male sterility, which sheds no viable pollen and is maintained by the monogenic dominant heterozygous strain and is used as maintainer in propagation blocks.
- d. The certified class seed shall be hybrid seed to be planted for any use except seed production.

\*(Applicable if male sterile line is used)

## II. Land Requirements

Land to be used for seed production of hybrid snapdragon shall be free of volunteer plants.

## III. Field Inspection

### A. Foundation and certified seeds

A minimum of three inspections shall be made as follows:

1. the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses, and other relevant factors;
2. the second inspection shall be made during flowering/podding stage to check isolation, Off-types fertile segregants in seed parent and other relevant factors;
3. the third inspection shall be made at pod maturity and prior to harvesting to check the designated diseases, Off-types and other relevant factors.

## IV. Field Standards

### B. General requirements

#### 2. Isolation

Seed fields of snapdragon hybrids shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in Columns 2 & 3 of the said Table.

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties including commercial hybrids of the same cultivar	600	300
Fields of the same hybrid not conforming to varietal purity requirements for certification	600	300

## B. Specific requirements

Factor	Maximum permitted (%)	
	Foundation	Certified
1	2	3
Off-types in seed parent	0.050	0.10
Off-types in pollinator	0.050	0.10
Fertile segregants (Pollen shedding spikes) in seed parent	0.050	0.10
*Plants affected by designated disease	0.10	0.20

\*Standards for off-types and fertile segregants (pollen shedding spikes) in seed parent shall be met at and after flowering and for designated diseases at final inspection.

\*Designated disease shall be :

Anthracnose (*Colletotrichum antirrhini* & *C. fuscum*)

Blight (*Phyllosticta antirrhini* Syd.)

## V. Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%

**TISSUE**  
**CULTURE RAISED PROPAGULE**

## **CHAPTER-XX**

1. Apple- tissue culture standards
2. Bamboo- tissue culture standards
3. Banana- tissue culture standards
4. Black pepper- tissue culture standards
5. Citrus- tissue culture standards
6. Potato tissue culture minituber standards
7. Sugarcane- tissue culture standards
8. Vanilla- tissue culture standards

## APPLE- TISSUE CULTURE - (ATC) – STANDARDS

### I. Applications and Amplification of General Seed Standards for ATC

- a. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for approval of ATC. As the name implies, these standards are applicable to tissue culture multiplied under laboratory and greenhouse conditions as laid here.
- b. The General Standards are amplified as follows to apply specifically, to the ATC.

#### 1. *Eligibility requirements for ATC production:*

- i. All micro-propagation and greenhouse facilities must be approved as per standards/guidelines set by the Competent Authority.
- ii. Laboratory and greenhouse facilities used for production of plantlets shall be maintained free of insects or vectors of Apple pathogens. Failure to keep such insects under control may cause rejection of all lots maintained in the facility. All potting or growth media shall be sterile. Water sources used in the laboratory or greenhouse operation shall be treated or otherwise rendered free of all possible pathogens by the applicant.
- iii. Hygienic conditions should be maintained strictly during micro-propagation, potting, planting, irrigating, movement and use of equipment and other laboratory and greenhouse practices to guard against the spread of diseases or insects in the facilities used for Apple plant multiplication.
- iv. The greenhouse (protected environment) must be "insect proof" and be equipped with a double-door entrance, provision for footwear disinfection prior to entering the protected environment and insect proof ventilation screening on intakes and exhaust openings. The persons entering the protected environment should use Wellington boots (plastic boots) and change lab-coat in the changing area to reduce the chances of inadvertent introduction of vector or insects clinging to clothes.
- v. The material being initiated must be of a notified variety and confirmed identity. It must be duly documented with respect to origin.
- vi. All samples of apple varieties being initiated should be tested in an accredited laboratory and be free of viruses such as Apple Mosaic Virus, Apple Chlorotic Leaf Spot Virus, and other endophytic or epiphytic bacteria and fungi.
- vii. The basic material for sub-multiplication need to be obtained a fresh from the nodal organization as soon as the maximum permitted number of passages (as confirmed by DNA fingerprinting) of shoot multiplication with old cultures has been completed.

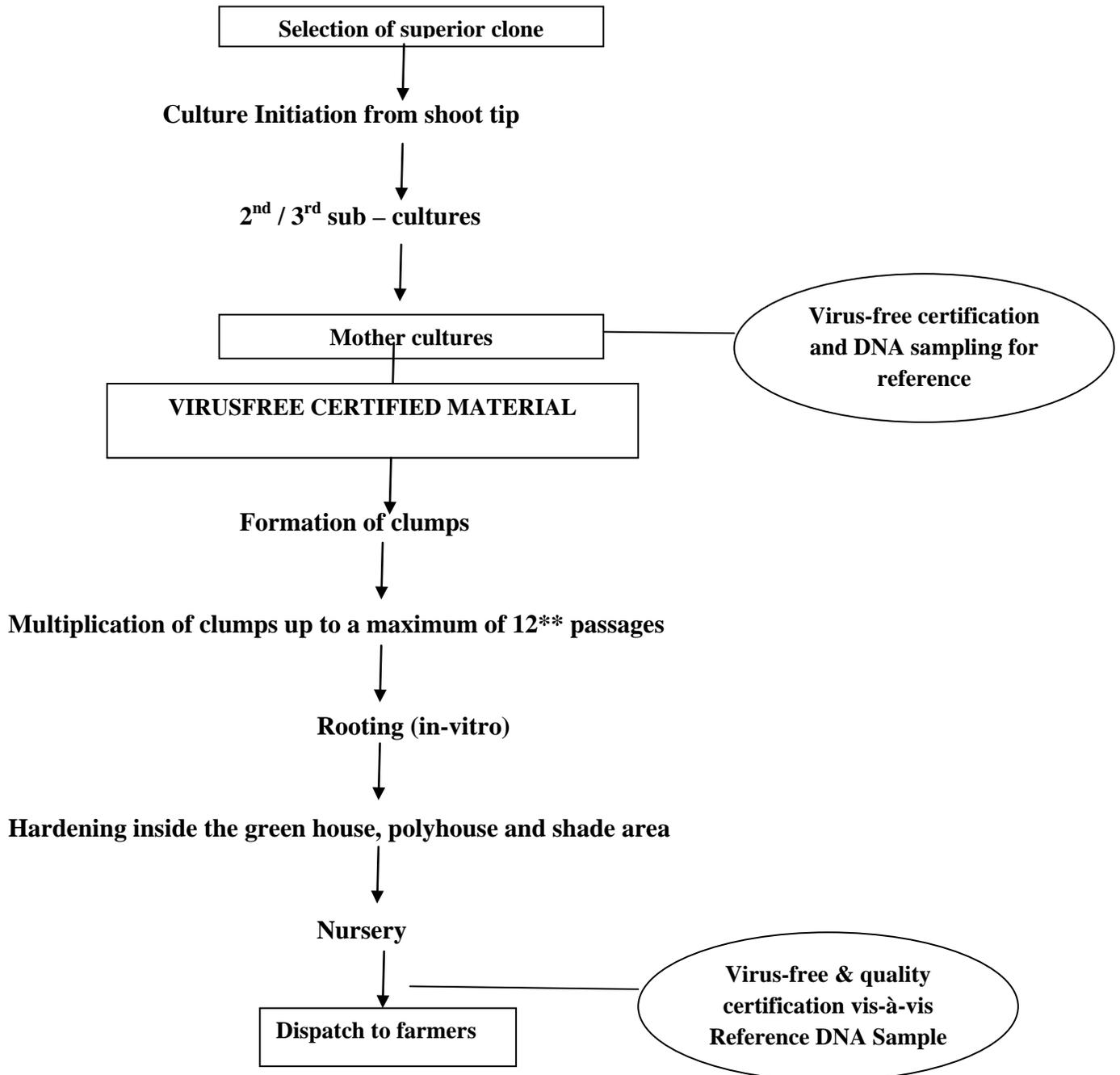
- viii. On application for inspection, the mother cultures as developed above are eligible for certification. The micro-propagation facility to be inspected must have been approved by the Competent Authority. All stocks must have a valid variety identification and disease testing report at any time during multiplication process.

*In vitro multiplication of an imported variety or a non-notified variety can be taken up by the industry exclusively for export purposes. Such varieties, however, should be introduced following the approved guidelines of Government of India.*

## **2. Source of Seed:**

- i. The facility should use recognized aseptic initiation and propagation procedures (i.e., follow procedures and use equipment, which will maintain sterile conditions as per standard tissue culture norms).
- ii. The initiating facility must maintain following information on each variety for review and audit by the Competent Authority at least once in a year: variety identification, date of initiation, origin and testing results from accredited laboratory.
- iii. Tests must be carried out on a minimum of 0.1 % (at least ten) plantlets for each variety by an accredited laboratory. Such tests will be valid so long as cultures of that particular batch are under production (subject to a maximum of 12 passages). No plant should contain viruses such as Apple Mosaic Virus, Apple Chlorotic Leaf Spot virus, and other endophytic or epiphytic bacteria and fungi. .
- iv. Valid pathogen testing results are required at the 2<sup>nd</sup>/3<sup>rd</sup> subculture stage prior to the bulking up of the cultures.

**Procedures and standard parameters for production of Apple by tissue culture is as follows:**



*\*\*In tissue culture it is well known that lesser the number of sub-cultures, lower will be the chances of somaclonal variation. However, it must also be realized that if the number of passages are far too small then the entire production process becomes economically unviable. Therefore, efforts should be made to optimise the shoot multiplication process and extend the number of passages only till the clonal uniformity of the progenies is maintained. This could be achieved through a) strict monitoring of shoot multiplication process ensuring that*

*adventitious shoots are not multiplied and b) confirming the clonal fidelity of tissue cultured plants using molecular markers in different passages. Apple shoots have been sub-cultured upto 12 passages without any loss of clonal fidelity. There is a possibility that the clonal fidelity of the tissue-cultured plants is maintained even beyond 12 passages.*

### **Minimum Quality Standards for growing of plants inside greenhouses/polyhouses**

The following requirements must be met for production of plantlets:

- i. Effective sanitation practices including insect and disease monitoring and prevention must be adhered to.
- ii. No field-produced Apple plants can be grown in the protected environment (greenhouse/polyhouse) along with tissue cultured plants.
- iii. Varieties must be separated by physical barriers and proper tagging, which will prevent varietal mixture.
- iv. Before dispatch to the farmers, the tissue-cultured plants growing in the nursery should be tested for the absence of the viruses such as Apple Mosaic Virus, Apple Chlorotic Leaf Spot Virus, and clonal uniformity. For establishing clonal fidelity, the sample size should be 0.1 % of the batch size with a minimum of 10 plants.
- v. If testing performed by an accredited laboratory reveals the presence of banned viruses, fungus or bacteria the tissue-cultured plants should not be dispatched from the premises of the production lab and the entire material should be destroyed.
- vi. The concerned laboratory/agency producing the tissue culture raised material should issue a certificate to the effect that ATC have been produced as per guidelines
- vii. The agency producing ATC will follow the labelling procedures.

## **BAMBOO- TISSUE CULTURE - (BaTC)- STANDARDS**

### **I. Applications and Amplification of General Seed Standards for BaTC**

- a. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for approval of BaTC. As the name implies, these standards are applicable to tissue culture multiplied under laboratory and greenhouse conditions as laid here.
- b. The General Standards are amplified as follows to apply specifically to the BaTC.

#### ***1. Eligibility requirements for BaTC production:***

- i. All micro-propagation and greenhouse facilities must be approved as per standards/guidelines set by the Competent Authority.
- ii. Laboratory and greenhouse facilities used for production of plantlets shall be maintained free of insects or vectors of Bamboo pathogens. Failure to keep such insects under control may cause rejection of all lots maintained in the facility. All potting or growth media shall be sterile. Water sources used in the laboratory or greenhouse operation shall be treated or otherwise rendered free of all possible pathogens by the applicant.
- iii. Hygienic conditions should be maintained strictly during micro-propagation, potting, planting, irrigating, movement and use of equipment and other laboratory and greenhouse practices to guard against the spread of diseases or insects in the facilities used for Bamboo plant multiplication.
- iv. The greenhouse (protected environment) must be "insect proof" and be equipped with a double-door entrance, provision for footwear disinfection prior to entering the protected environment and insect proof ventilation screening on intakes and exhaust openings. The persons entering the protected environment should use Wellington boots (plastic boots) and change lab-coat in the changing area to reduce the chances of inadvertent introduction of vector or insects clinging to clothes.

- v. The material being initiated must be of a notified variety and confirmed identity. It must be duly documented with respect to origin.
- vi. All samples of bamboo varieties being initiated should be tested in an accredited laboratory and be free of endophytic or epiphytic bacteria and fungi.
- vii. The basic material for sub-multiplication need to be obtained afresh from the nodal organization as soon as the maximum permitted number of passages (as confirmed by DNA fingerprinting) of shoot multiplication with old cultures has been completed.
- viii. On application for inspection, the mother cultures as developed above are eligible for certification. The micro-propagation facility to be inspected must have been approved by the Competent Authority. All stocks must have a valid variety identification and disease testing report at any time during multiplication process.

*In vitro multiplication of an imported variety or a non-notified variety can be taken up by the industry exclusively for export purposes. Such varieties, however, should be introduced following the approved guidelines of Government of India.*

## **2. Source of Seed:**

- i. The facility should use recognized aseptic initiation and propagation procedures (i.e. follow procedures and use equipment, which will maintain sterile conditions as per standard tissue culture norms).
- ii. The initiating facility must maintain following information on each variety for review and audit by the Competent Authority at least once in a year: variety identification, date of initiation, origin and testing results from accredited laboratory.
- iii. Tests must be carried out on a minimum of 0.1 % (at least ten) plantlets for each variety by an accredited laboratory. Such tests will be valid so long as cultures of that particular batch are under production (subject to a maximum of 15 passages). No plant should contain endophytic or epiphytic bacteria and fungi. Generally, viral infection is not seen in bamboos. However, there are reports that suggest infection by Bamboo Mosaic Virus (BaMV) at the nursery stage in India.
- iv. Valid pathogen testing results are required at the 2<sup>nd</sup>/3<sup>rd</sup> subculture stage prior to the bulking up of the cultures.

### **Minimum Quality Standards for growing of plants inside greenhouses/polyhouses**

The following requirements must be met for production of plantlets:

- i. Effective sanitation practices including insect and disease monitoring and prevention must be adhered to.
- ii. No field-produced bamboo plants can be grown in the protected environment (greenhouse/polyhouse) along with tissue cultured plants.
- iii. Varieties must be separated by physical barriers (such as proper tagging), which will prevent varietal mixture.
- iv. Before dispatch to the farmers, the tissue-cultured plants growing in the nursery should be tested for clonal uniformity. For establishing clonal fidelity, the sample size should be 0.1 % of the batch size with a minimum of 10 plants.
- v. If testing performed by an accredited laboratory reveals the presence of banned viruses, fungus or bacteria the tissue-cultured plants should not be dispatched from the premises of the production lab and the entire material should be destroyed.
- vi. The concerned laboratory/agency producing the tissue culture raised material should issue a certificate to the effect that BaTC have been produced as per guidelines.
- vii. The agency producing BaTC will follow the labelling procedures.

### **Nursery Development**

The plants to be used for field trials would be supplied either in polythene bags or bare-rooted (to save the transportation cost). In both cases, the plants should be kept in the nursery till they have recovered from the transportation shock. While the plants in polythene bags may be kept directly in the nursery, the bare-rooted plants should be transferred to the poly bags prior to their transfer to the nursery. The plants should be kept in the nursery for a minimum period of 10 days. However, many a times the plants supplied are not of planting height. In such a situation it would

be necessary to prolong the stay of plants in the nursery (till the plants are at least 18 inches in height) before their transfer to the planting site in an open field.

### **Requirements of a bamboo nursery (holding area)**

- The nursery site should be on level ground and well drained
- It should be as close as possible to the plantation site
- It should have all necessary irrigation facilities
- The site should be protected from animals

### **Managing a bamboo nursery**

- In the nursery the plants of different species should be kept in separate beds to avoid any mixing. If there are more than one genotype for each species, then it would be desirable to keep the plants genotype-wise.
- The approximate size of the nursery bed could be (8-10 m x 1-1.5 m).
- As much as possible, the beds should be prepared where there is some protection (shade of a tree/thatch) for the plants from direct sunlight.
- Each bed should be properly labeled so that there is no mixing of plants.
- In the nursery the plants should be irrigated periodically, and care should be taken that they remain free of diseases.
- Only healthy plants of uniform size (approximately) should be used for field trials, particularly experimental trials.

### **Attributes of primary and secondary hardened tissue cultured bamboo plants**

<b>S. No.</b>	<b>Trait</b>	<b>Primary hardened tissue cultured plant</b>	<b>Secondary hardened tissue cultured plant</b>
1.	Minimum height of the shoot	5 inches	18 inches
2.	Minimum number of shoots	>3	>4
3.	Minimum number of leaves per shoot	>4	>8
4.	Root system	Well developed	Well developed
5.	Rhizomes	Small rhizomes in the initial stages of	Proper rhizomes

		development	
6.	Minimum age of the plant	1 month	> 3 months

## **BANANA- TISSUE CULTURE - (BTC) – STANDARDS**

### **I. Applications and Amplification of General Seed Standards for BTC**

- a. The General Seed Certification Standards are basic and, together with the' following specific standards constitute the standards for approval of BTC. As the name implies, these standards are applicable to tissue culture multiplied under laboratory and greenhouse conditions as laid here.
- b. The General Standards are amplified as follows to apply specifically to the BTC.

#### ***1. Eligibility requirements for BTC production:***

- i. All micro-propagation and greenhouse facilities must be approved as per standards/ guidelines set by the Competent Authority.
- ii. Laboratory and greenhouse facilities used for production of plantlets shall be maintained free of insects or vectors of banana pathogens. Failure to keep such insects under control may cause rejection of all lots maintained in the facility. All potting or growth media shall be sterile. Water sources used in the laboratory or greenhouse operation shall be treated or otherwise rendered free of all possible pathogens by the applicant.
- iii. Hygienic conditions should be maintained strictly during micro-propagation, potting, planting, irrigating, movement and use of equipment and other laboratory and greenhouse practices to guard against the spread of diseases or insects in the facilities used for banana plant multiplication.
- iv. The greenhouse (protected environment) must be insect proof and be equipped with a double-door entrance, provision for footwear disinfection prior to entering the protected environment and insect proof ventilation screening on intakes and exhaust openings. The persons entering the protected environment should use Wellington boots (plastic boots) and change lab-coat in the changing area to reduce the chances of inadvertent introduction of vector or insects clinging to clothes
- v. The material being initiated must be of a notified variety and confirmed identity. It must be duly documented with respect to origin.
- vi. All samples of banana varieties being initiated should be tested in an accredited laboratory and be free of viruses such as Banana Bunchy Top Virus, Cucumber Mosaic Virus, Banana Bract Mosaic Virus, Banana Streak Virus and other endophytic or epiphytic bacteria and fungi.

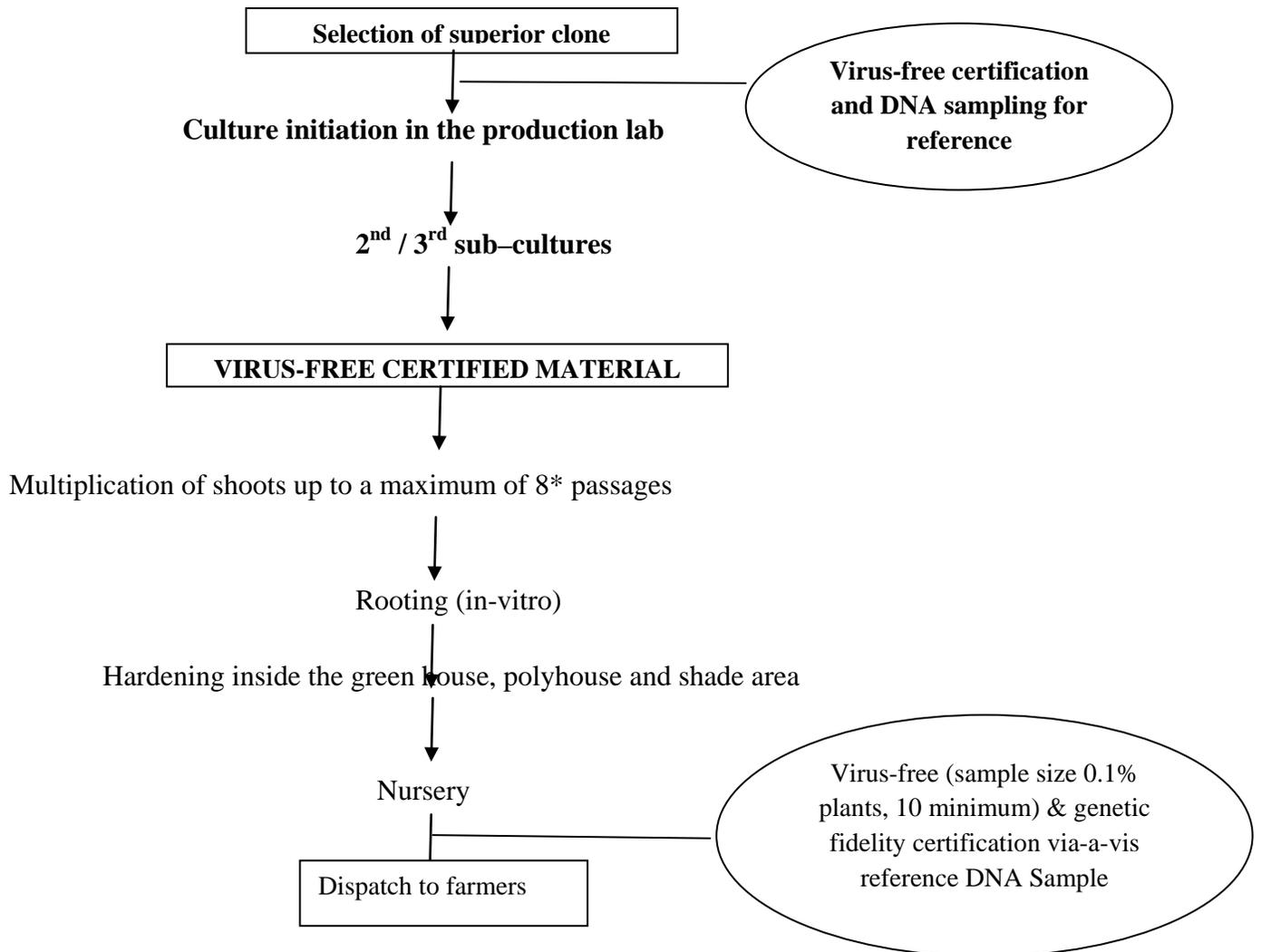
- vii. vii. The basic material for sub-multiplication need to be obtained afresh from the nodal organization as soon as the maximum permitted number of passages (as confirmed by DNA fingerprinting) of shoot multiplication with old cultures has been completed.
- viii. On application for inspection, the mother cultures as developed above are eligible for certification. The micro-propagation facility to be inspected must have been approved by the Competent Authority. All stocks must have a valid variety identification and disease testing report at any time during multiplication process.

*In vitro multiplication of an imported variety or a non-notified variety can be taken up by the industry exclusively for export purposes. Such varieties, however, should be introduced following the approved guidelines of Government of India.*

## **2. Source of Seed:**

- i. The facility should use recognized aseptic initiation and propagation procedures (i.e. follow procedures and use equipment, which will maintain sterile conditions as per standard tissue culture norms).
- ii. The initiating facility must maintain following information on each variety for review and audit by the Competent Authority at least once in a year, variety identification, date of initiation, origin and testing results from accredited laboratory.
- iii. Tests must be carried out on a minimum of 0.1% (at least ten) plantlets for each variety by an accredited laboratory. Such tests will be valid so long as cultures of that particular batch are under production (subject to a maximum of 8 passages). No plant should contain Banana Bunchy Top Virus, Cucumber Mosaic Virus, Banana Bract Mosaic Virus, Banana Streak Virus and other endophytic or epiphytic bacteria and fungi.
- iv. Valid pathogen testing results are required at the 2<sup>nd</sup>/3<sup>rd</sup> sub-culture stage prior to the bulking up of the cultures.

**Procedures and standard parameters for production of Banana by tissue culture is as follows:**



*\*There is a difference of opinion among researchers and production labs on the number of passages that could be regarded as safe for shoot multiplication in banana with respect to clonal uniformity of plants. In tissue culture, it is well known that lesser the number of sub-cultures, lower will be the chances of somaclonal variation. However, it must also be realized that if the number of passages are for too small then the entire production process becomes economically unviable. Therefore, efforts should be made to optimize the shoot multiplication process and extend the number of passages only till the clonal uniformity of the progenies is maintained. This could be achieved though a) strict monitoring of shoot*

*multiplication process ensuring that adventitious shoots are not multiplied and b ) confirming the clonal fidelity of tissue cultured plants using molecular markers in different passages. However, in banana under no circumstances shoots should be sub-cultured for more than 8 passages.*

### **Minimum Quality Standards for growing of plants inside greenhouses/polyhouses**

The following requirements must be met for production of plantlets:

- i. Effective sanitation practices including insect and disease monitoring and prevention must be adhered to.
- ii. No field-produced banana plants can be grown in the protected environment (greenhouse/polyhouse) along with tissue cultured plants.
- iii. Varieties must be separated by physical barriers and proper tagging, which will prevent varietal mixture.
- iv. Before dispatch to the farmers, the tissue-cultured plants growing in the nursery should be tested for the absence of the viruses such as Banana Bunchy Top Virus, Cucumber Mosaic Virus, Banana Bract Mosaic Virus, Banana Streak Virus and clonal uniformity. For establishing clonal fidelity, the sample size should be 0.1 % of the batch size with a minimum of 10 plants.
- v. If testing performed by an accredited laboratory reveals the presence of banned viruses, fungus or bacteria the tissue-cultured plants should not be dispatched from the premises of the production lab and the entire material should be destroyed.
- vi. The concerned laboratory/agency producing the tissue culture raised material should issue a certificate to the effect that BTC have been produced as per guidelines.
- vii. The agency producing BTC will follow the labeling procedures.

## **BANANA – CLONAL CERTIFICATION STANDARDS**

### **I. Application and Amplification of General Clone Certification Standards**

- (a) The General Clone Certification Standards are basic and together with the following specific standards constitute the standards for certification of banana clones.
- (b) The general standards are amplified as follows to apply specifically to banana clones.

### **II. Land Requirement**

- (a) Land to be used for clonal propagation of banana shall be free from volunteer plants.

### **III. Field Inspection**

#### **(a) Mother Plant**

Mother plant should be healthy, true to type and free from diseases and pests. The trees should be certified for the desirable characters by the certifying agency and a certificate to this effect shall be given to the nurseries. A minimum of one inspection shall be made at the time of fruit maturity for continuing health and fruit quality of the mother tree.

#### **(b) Clones**

A minimum of two inspections shall be made before the sale of the clones after attaining the specified size to verify relevant factors.

### **IV. Field Standards**

#### **A. General Requirements**

- 1. Isolation:** the clone propagation plots of banana shall be isolated from the contaminants as shown in the following table:

Contaminants (1)	Minimum distance (meters)	
	Foundation (2)	Certified (3)
Fields of other varieties	3	3
Fields of the same variety not conforming to varietal purity requirements for certification	3	3

2. **Spacing:** the spacing between plants in clone propagation plots should be 20 cm and between row 30 cm.

3. **Rotation:** Nursery should be rotated to other plots after raising banana three times in the same plot.

**B. Specific requirements**

**a. Foundation clones**

1. Foundation clones being a group of common ancestry shall be genetically pure in absolute terms. Off type should be discarded under the supervision of certification agency.

**b. Certified class**

Factor	Maximum permitted (%)* Certified
Off type	0.10

\*Standards for off types shall be met at final inspection.

**V. Clone specifications**

The specification in respect of size of clones shall be as follows:

3. The diameter of the sucker should range from 7.0 – 10.0 cm.

4. In the clone lot, clones not conforming to specified size shall not exceed 5.0% (by number).

**VI. Clone Standards**

Factor (1)	Standard for each class	
	Foundation (2)	Certified (3)
Pure living clones (Minimum)	99.5% (by number)	98.0% (by number)
Other living plants including rootstocks (maximum)	0.5% (by number)	2.0% (by number)

## **BLACK PAPPER TISSUE CULTURE (BPTC) STANDARDS**

### **I. Applications and Amplification of General Seed Standards for BPTC**

- (a) The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for approval of BPTC. As the name implies, these standards are applicable to tissue culture multiplied under laboratory and greenhouse conditions as laid here.
- (b) The General standards are amplified as follows to apply specifically to the BPTC.

#### ***1. Eligibility requirements for BPTC production:***

- i. All micro-propagation and greenhouse facilities must be approved as per standards/guidelines set by the Competent Authority.
- ii. Laboratory and greenhouse facilities used for production of plantlets shall be maintained free of insects or vectors of Black Pepper pathogens. Failure to keep such insects under control may cause rejection of all lots maintained in the facility. All potting or growth media shall be sterile. Water sources used in the laboratory or greenhouse operation shall be treated or otherwise rendered free of all possible pathogens by the applicant.
- iii. Hygienic conditions should be maintained strictly during micro-propagation, potting, planting, irrigating, movement and use of equipment and other laboratory and greenhouse practices to guard against the spread of diseases or insects in the facilities used for Black Pepper plant multiplication.
- iv. The greenhouse (protected environment) must be insect proof and be equipped with a double-door entrance, provision for footwear disinfection prior to entering the protected environment and insect proof ventilation screening on intakes and exhaust openings. The persons entering the protected environment should use wellington boots (plastic boots) and change lab-coat in the changing area to reduce the chances of inadvertent introduction of vector or insects clinging to clothes
- v. The material being initiated must be of a notified variety and confirmed identity. It must be duly documented with respect to origin.
- vi. All samples of black pepper varieties being initiated should be tested in an accredited laboratory and should be free of viruses (CMV, Badnavirus phytoplasm) and other endophytic or epiphytic bacteria and fungi.
- vii. The basic material for sub-multiplication need to be obtained afresh from the nodal organization as soon as the maximum permitted number of passages (as confirmed by DNA fingerprinting) of shoot multiplication with old cultures has been completed.
- viii. On application for inspection, the mother cultures as developed above are eligible for certification, the micro-propagation facility to be inspected must have been approved by

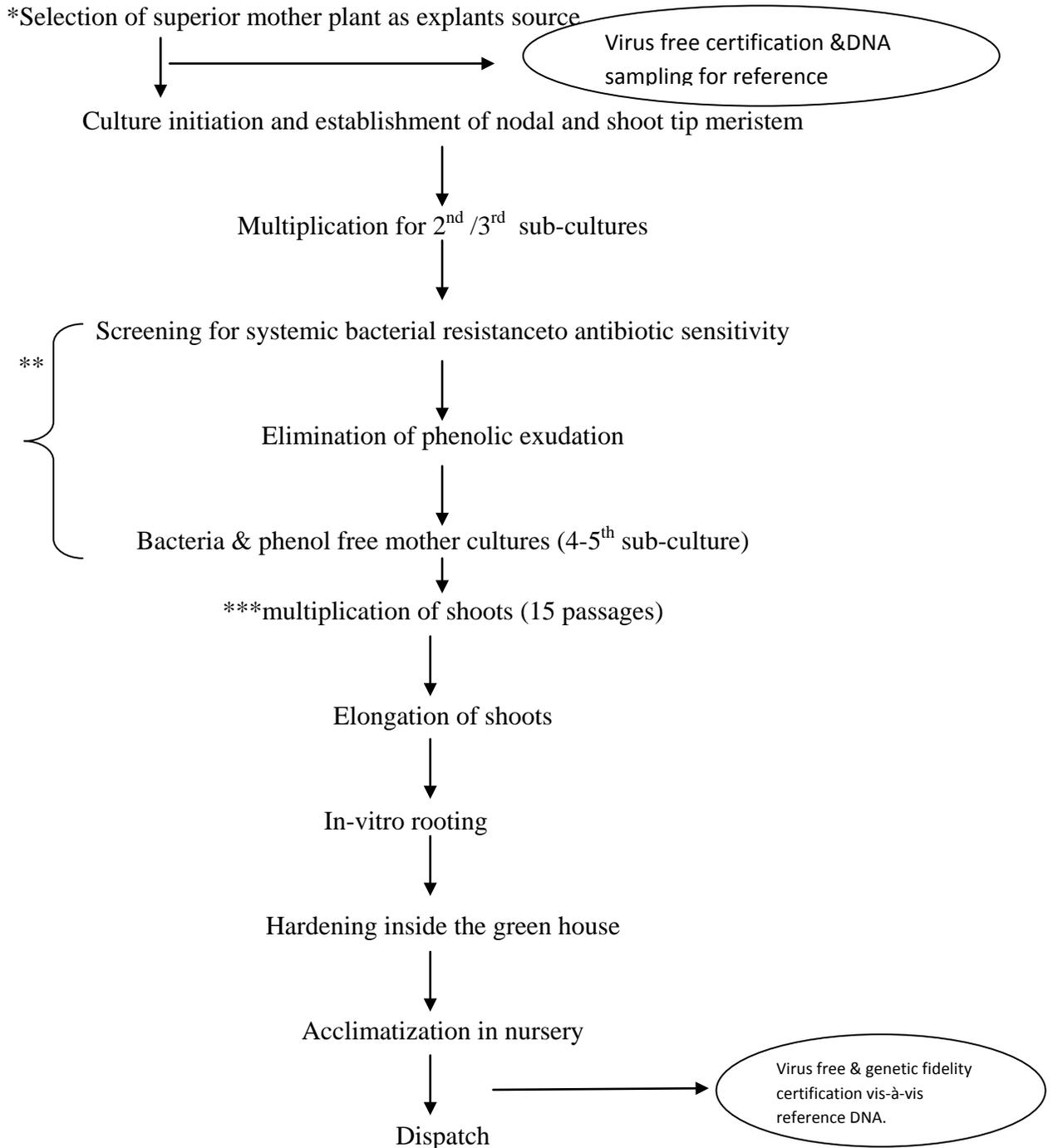
the Competent Authority. All stocks must have a valid variety identification and disease testing report at any time during multiplication process.

*In vitro multiplication of an imported variety or a non-notified variety can be taken up by the industry exclusively for export purposes. Such varieties, however, should be introduced following the approved guidelines of Government of India.*

## **2. Source of seed:**

- i. The facility should use recognized aseptic initiation and propagation procedures (i.e. follow procedures and use equipment, which will maintain sterile conditions as per standard tissue culture norms).
- ii. The initiation facility must maintain following information on each variety for review and audit by the Competent Authority at least once in a year, variety identification, date of initiation, origin and testing results from accredited laboratory.
- iii. Tests must be carried out on a minimum of 0.1% (minimum ten) plantlets for each variety by an accredited laboratory. Such tests will be valid as long as cultures of that particular batch are under production. No plant should contain (CMV and Badnavirus) and other endophytic or epiphytic bacteria and fungi.
- iv. Valid pathogen testing results are required at the 2<sup>nd</sup>/3<sup>rd</sup> sub-culture stage prior to the bulking up of the cultures.

**Procedures and standard parameters for production of black pepper by tissue culture is as follows:**



*\*Plants should be of superior quality in terms of growth, disease / insect resistance, drought tolerance, constant bearing (confirmed for at least three consecutive years), high yield (fresh and dry weight), oil and oleoresin content*

*etc. the explants should be healthy and free from microbial infections. One set of mother plants must be maintained in the glass house as reference sample.*

*\*\*Since black pepper tissue culture is frequently confronted with endogenous bacterial contamination and phenolic exudation, these should be eliminated using appropriate method.*

*\*\*In black pepper the number of passages can be up to 15 for sub-culture of shoots.*

### **Minimum Quality Standards for growing of plants inside greenhouses/polyhouses**

The following requirements must be met for production of plantlets:

- i. Effective sanitation practices including insect and disease monitoring and prevention must be adhered to.
- ii. No field-produced Black Pepper plants can be grown in the protected environment (greenhouse/polyhouse) along with tissue cultured plants.
- iii. Varieties must be separated by physical barriers and proper tagging, which will prevent varietal mixture.
- iv. Before dispatch to the farmers, the tissue-cultured plants growing in the nursery should be tested for the absence of the viruses such as CMV, Badnavirus and clonal uniformity. For establishing clonal fidelity, the sample size should be 0.1 % of the batch size with a minimum of 10 plants.
- v. If testing performed by an accredited laboratory reveals the presence of banned viruses, fungus or bacteria the tissue-cultured plants should not be dispatched from the premises of the production lab and the entire material should be destroyed.
- vi. The concerned laboratory/agency producing the tissue culture raised material should issue a certificate to the effect that BPTC have been produced as per guidelines
- vii. The agency producing BPTC will follow the labelling procedures.

## **CITRUS- TISSUE CULTURE - (CTC)- STANDARDS**

### **I. Applications and Amplification of General Seed Standards for CTC**

- a. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for approval of CTC. As the name implies, these standards are applicable to tissue culture multiplied under laboratory and greenhouse conditions as laid here.
- b. The General Standards are amplified as follows to apply specifically to the CTC.

#### ***1. Eligibility requirements for CTC production:***

- i. All micro-propagation and greenhouse facilities must be approved as per standards/ guidelines set by the Competent Authority.
- ii. Laboratory and greenhouse facilities used for production of plantlets shall be maintained free of insects or vectors of Citrus pathogens. Failure to keep such insects under control may cause rejection of all lots maintained in the facility. All potting or growth media shall be sterile. Water sources used in the laboratory or greenhouse operation shall be treated or otherwise rendered free of all possible pathogens by the applicant.
- iii. Hygienic conditions should be maintained strictly during micro-propagation, potting, planting, irrigating, movement and use of equipment and other laboratory and greenhouse practices to guard against the spread of diseases or insects in the facilities used for Citrus plant multiplication.
- iv. The greenhouse (protected environment) must be insect proof and be equipped with a double-door entrance, provision for footwear disinfection prior to entering the protected environment and insect proof ventilation screening on intakes and exhaust openings. The persons entering the protected environment should use Wellington boots (plastic boots) and change lab-coat in the changing area to reduce the chances of inadvertent introduction of vector or insects clinging to clothes
- v. The material being initiated must be of a notified variety and confirmed identity. It must be duly documented with respect to origin.
- vi. All samples of citrus varieties being initiated should be tested in an accredited laboratory and be free of viruses such as Indian Citrus Ringspot Virus (ICRSV), Citrus Tristeza Virus (CTV) and Citrus Yellow Mosaic Virus (CYMV) and other endophytic or epiphytic bacteria and fungi.
- vii. The basic material for sub-multiplication need to be obtained afresh from the nodal organization as soon as the maximum permitted number of passages (as confirmed by DNA fingerprinting) of shoot multiplication with old cultures has been completed.

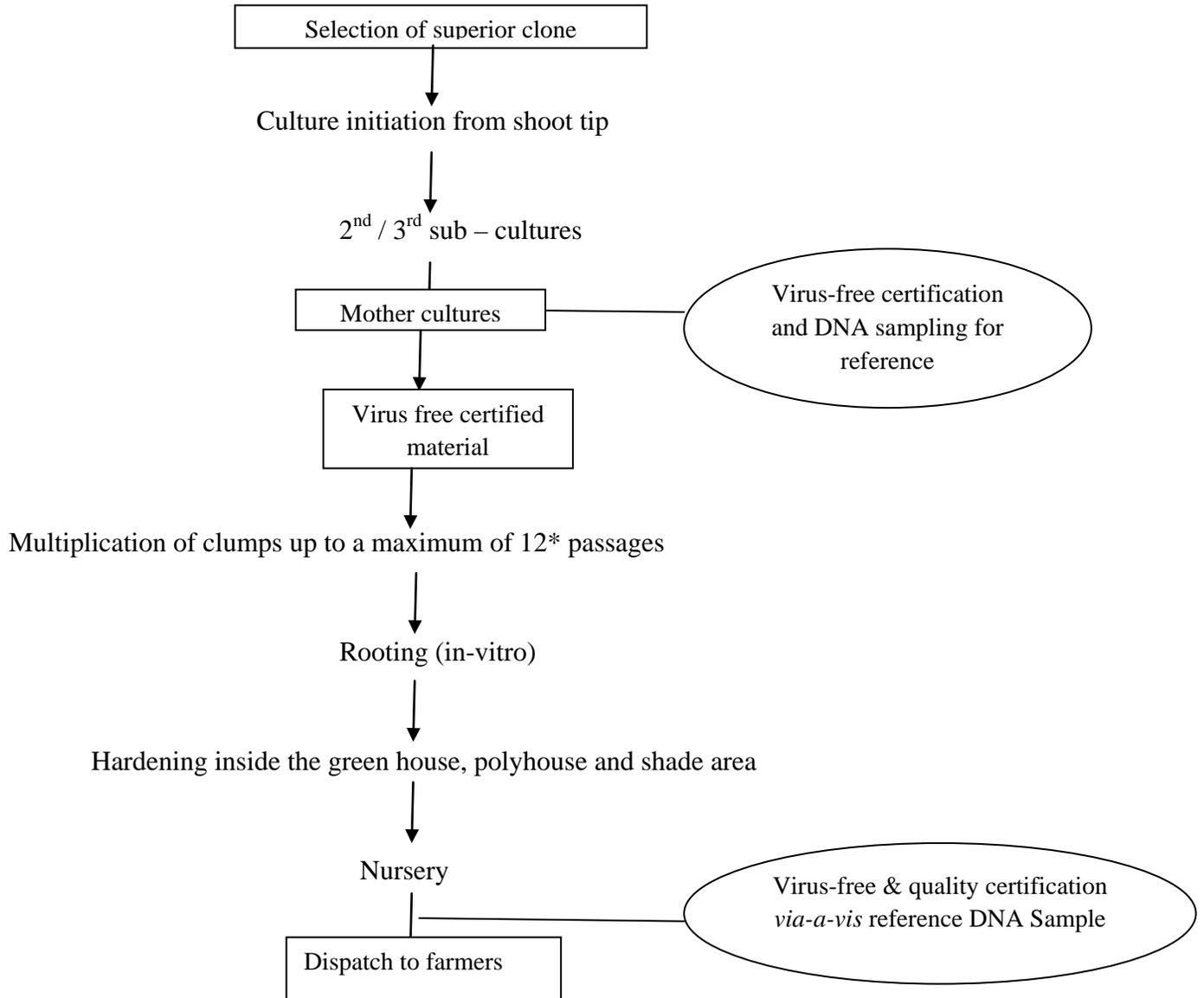
- viii. On application for inspection, the mother cultures as developed above are eligible for certification. The micro-propagation facility to be inspected must have been approved by the Competent Authority. All stocks must have a valid variety identification and disease testing report at any time during multiplication process.

*In vitro multiplication of an imported variety or a non-notified variety can be taken up by the industry exclusively for export purposes. Such varieties, however, should be introduced following the approved guidelines of Government of India.*

## **2. Source of Seed:**

- i. The facility should use recognized aseptic initiation and propagation procedures (i.e. follow procedures and use equipment, which will maintain sterile conditions as per standard tissue culture norms).
- ii. The initiating facility must maintain following information on each variety. For review and audit by the Competent Authority at least once in a year: variety identification, date of initiation, origin and testing results from accredited laboratory.
- iii. Tests must be carried out on a minimum of 0.1 % (at least ten) plantlets for each variety by an accredited laboratory. Such tests will be valid so long as cultures of that particular batch are under production (subject to a maximum of 12 passages). No plant should contain viruses such as Indian Citrus Ring spot Virus (ICRSV), Citrus Tristeza Virus (CTV) and Citrus Yellow Mosaic Virus (CYMV), and other endophytic or epiphytic bacteria and fungi.
- iv. Valid pathogen testing results are required at the 2<sup>nd</sup>/3<sup>rd</sup> sub-culture stage prior to the bulking up of the cultures.

**Procedures and standard parameters for production of citrusby tissue culture is as follows:**



*\*In tissue culture it is well known that lesser the number of sub-cultures, lower will be the chances of somaclonal variation. However, it must also be realized that if the number of passages are far too small then the entire production process becomes economically unviable. Therefore, efforts should be made to optimize the shoot multiplication process and extend the number of passages only till the clonal uniformity of the progenies is maintained. This could be achieved through a) strict monitoring of shoot multiplication process ensuring that adventitious shoots are not multiplied and b) confirming the clonal fidelity of tissue cultured plants using molecular markers in different passages. Citrus shoots have been*

*sub-cultured upto 12 passages without any loss of clonal fidelity. There is a possibility that the clonal fidelity of the tissue-cultured plants is maintained even beyond 12 passages.*

### **Minimum Quality Standards for growing of plants inside greenhouses/polyhouses**

The following requirements must be met for production of plantlets:

- i. Effective sanitation practices including insect and disease monitoring and prevention must be adhered to.
- ii. No field-produced Citrus plants can be grown in the protected environment (greenhouse/polyhouse) along with tissue cultured plants.
- iii. Varieties must be separated by physical barriers and proper tagging, which will prevent varietal mixture.
- iv. Before dispatch to the farmers, the tissue-cultured plants growing in the nursery should be tested for the absence of the viruses such as Indian Citrus Ringspot Virus (ICRSV), Citrus Tristeza Virus (CTV) and Citrus Yellow Mosaic Virus (CYMV) and clonal uniformity. For establishing clonal fidelity, the sample size should be 0.1 % of the batch size with a minimum of 10 plants.
- v. If testing performed by an accredited laboratory reveals the presence of banned viruses, fungus or bacteria the tissue-cultured plants should not be dispatched from the premises of the production lab and the entire material should be destroyed.
- vi. The concerned laboratory/agency producing the tissue culture raised material should issue a certificate to the effect that CTC have been produced as per guidelines
- vii. The agency producing CTC will follow the labelling procedures.

## **POTATO TISSUE CULTURE MINITUBER (PTCMT) STANDARDS**

### **I. Application and Amplification of General Seed Certification Standards.**

- a. The General Seed Certifications Standards are basic and, together with the following specific standards constitute the standards for certification of PTCMT. As the name implies, these standards are applicable to tissue culture raised mini tubers multiplied under laboratory and greenhouse conditions as laid here.
- b. The General Standards are amplified as follows to apply specifically to the PTCMT:

#### **1. *Eligibility requirements for certification***

The PTCMT to be eligible for certification shall be from a source meeting the following standards for laboratory and greenhouse facilities.

- i. Laboratory and greenhouse facilities used for production of plantlets/microtubers or minitubers shall be maintained free of potato insects or vectors of potato pathogens. Failure to keep such insects under control may cause rejection of all lots maintained in the facility. All potting or growth media shall be sterile. Clean water shall be used in a laboratory or greenhouse operation.
- ii. Hygienic conditions should be maintained strictly during micro-propagation, potting, planting, irrigating, movement and use of equipment and other laboratory and greenhouse practices to guard against the spread of diseases or insects in the facilities used for seed multiplication.
- iii. All micro propagation and greenhouse facilities must be approved, as per the standard/guidelines.
- iv. The greenhouse (protected environment) must be insect proof and be equipped with a double-door entrance, provision for footwear disinfection prior to entering the protected environment and insect proof ventilation screening on intakes and exhaust openings. The persons entering the protected environment should use Wellington boots (Plastic boots) and change lab-coat in the changing area to reduce the chances of inadvertent introduction of vector or insects clinging to clothes.
- v. The material being initiated for producing PTCMT must be of notified variety<sup>1</sup> and confirmed identity. It must be duly documented with respect to origin.

- vi. The plants of a potato varieties being initiated for tissue culture should be tested in an accredited laboratory<sup>2</sup> for freedom from the following:

PVA, PVS, PVM, PVY, PYX, PLRV, PALCV, PSTVd and endophytic or epiphytic bacteria and fungi. Tests must be carried on a minimum of ten plantlets of each variety. For virus testing ELISA or an equivalent method should be used, for viroid RT-PCR should be used, and for fungi and bacteria light microscopy and culturing on media should be used.

## 2. *Classes and Sources of seed*

- i. The facility should use recognized aseptic initiation and propagation procedures' (i.e. follow procedures and use equipment, which will maintain sterile conditions as per standard tissue culture norms.)
- ii. The initiating facility must maintain following information on each variety for review and audit by the Competent Authority once in a year: variety identification, date of initiation, origin and testing results from accredited laboratory.
- iii. Tests must be carried out on a minimum of ten plantlets selected at random, for each variety by an accredited laboratory. No plant should contain PVA, PVS, PVM, PVY, PYX, PLRV, P ALCV, PSTVd and other endophytic or epiphytic bacteria and fungi.
- iv. Valid pathogen testing results are required prior to the initiation of micro tuber production cycle or planting of test tube plantlets in the greenhouse.
- v. PTCMT shall be produced and multiplied from certified *in-vitro* plants or microtubers, as per the requirements
- vi. PTCMT shall conform to the same Minimum Seed Standards as Specified for breeder's seed.
- vii. If required PTCMT may be used for producing Foundation stage-I and Foundation stage-II, which can be certified using existing potato seed certification procedure.

## 3. **Controlled Environment Requirements.**

- i. All micropropagation and greenhouse facilities must meet the standards given above under eligibility requirements.
- ii. The soil used for PTCMT production should not be infested with pathogen and pests of potato, particularly the following:
  - wart (*Synchytrium endobioticum* (Schilb.) Perc.) or cyst forming nematodes;
  - brown rot (*Pseudomonas solanacearum* (E.F. Sm.) E.F. Sm.) or non-cyst forming nematodes within the previous three years;

- common scab (*Streptomyces scabies* (Thaxt.) Waks. & Henrici).

#### **4. Inspection of Controlled Environment Facility Used For Products of PTCMT**

- a. The grower must notify the Competent Authority of his production plans well in advance of the planting.
- b. The crop must be grown from certified basic *in-vitro* plants or micro tubers, which were produced, in an aseptic environment.
- c. A minimum of three inspections shall be made as follows:
  - i. The first inspection shall be made 35 days and 45 days after planting for plains and hills respectively to verify growing conditions, extent of disease infection and off-types and also to confirm isolation requirement;
  - ii. The second inspections shall be made at 60-65 days after planting to verify off-types, disease infection if any and pathogen testing, on a representative sample, comprising of 1% of the plants with a minimum of 5 and a maximum of 25 plants sampled for each variety;
  - iii. The third inspection shall be made immediately after haulmcutting/ destruction in order to verify that haulms have been cut/destroyed by the prescribed date and proper manner.
  - iv. Effective sanitation practices including insect and disease monitoring and prevention must be adhered to.
  - v. Basic Stock can be planted in commercially available medium, which has not been recycled. If nursery beds are used, the substrate should be properly sterilized before planting.
  - vi. The greenhouse must be free from all potato and solanaceous plant debris before planting.
  - vii. No field-produced seed potatoes (including pathogen tested clonal selections), non-seed potatoes, nor any other solanaceous species of plants can be grown in the protected environment while used to produce Basic Stock.
  - viii. Varieties must be separated by appropriate partitioning of greenhouse to prevent varietal mixture.
  - ix. If testing performed by an accredited laboratory reveals the presence of banned virus (es), fungus or bacteria all the crops in the protected environment will be non-eligible for certification and the entire material will be destroyed.
  - x. In the eventuality of detection of insect (particularly aphids, thrips and white flies) vectors (for which yellow sticky traps should be put at least at three places in a greenhouse) by Competent Authority, the grower must provide post harvest test results to this Authority. A representative sample, representing each variety grown in the protected

environment must be post harvest tested and if the results are negative for PVA, PVS, PVM, PVY, PYX, PLRV and PALCV and PSTVd, the crop will be assigned Basic Stock status or otherwise rejected.

## 5. Field Standards

### A. Field Standards for direct use of PTCMT as seed

#### a. General requirements

1. Isolation: Not applicable as plants are grown in greenhouse.
2. All micropropagation and greenhouse facilities must be notified by Department of Agriculture and Cooperation, as per the standards given above under eligibility requirements.

#### b. Specific requirements

#### Maximum permissible limits

Factor	Maximum permitted (%)*
*Off -types	0.05
** Plants showing symptoms of:	
- Mild mosaic (Maximum)	0.05
- Severe mosaic, leaf roll, yellows and apical leaf curl (Maximum)	0.05

\* \* Plants infected by brown rot (syn. Bacterial wilt) (*Ralstonia solanacearum*)

\*Maximum permitted before dehaulming

\*\*Maximum permitted at final inspection, though the diseases mentioned above are not expected to be present in tissue culture raised plants but it is essential to maintain a good crop hygiene.

#### c. Seed Standards for PTCMT

Factor	Permissible limit for certified class
Weight of mini tuber (Minimum)	1.0 gm
Physical purity(Minimum)	98.0 %

Germination/Sprouting(Minimum)	90 %
Varietal Purity (Minimum)	99 %
Seed-borne virus (Maximum)	0.01 %

B. Field standards for Foundation crop and Certified crop raised out of Potato-Tissue Culture Mini tuber (PTCMT) (shall be same as prescribed for conventional method)<sup>3</sup>

a. *General Requirement*

1. Isolation: The fields of seed potato shall be isolated from the contaminants shown in column-1 of the table below by distance specified in column -2, 3 and 4 of the said table:

Contaminant	Minimum distance (meters)		
	Foundation		Certified
	Stage I	Stage II	
Fields of other varieties	5	5	5
Fields of the same variety not confirming to varietal purity requirements of certification	5	5	5

b. *Specific requirements*

Factors	Stage	Maximum permitted		
		Foundation		Certified
		Stage I	Stage II	
Off- types	I & II inspection	0.050%	0.050%	0.10%
Plant Showing symptoms of				
Mild mosaic	I & II inspection	1.0%	2.0%	3.0%
Severe mosaic, leaf roll and yellows	I & II inspection	0.50%	0.750%	1.0%
Total virus		1.0%	2.0%	3.0%
Plants infected by brown rot ( <i>syn.</i> Bacterial wilt)	I & II inspection	None	None	3 plants per hectare
Re-growth of	IV inspection	0.50%	0.50%	0.50%

plants after destruction of haulms				
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*c. Seed Standards for Foundation and Certified stages:*

Seed size	Mean length and width at the middle of tuber	Corresponding weight
(a) Hill seed		
Small size	30 mm-60mm	25-150 gm
Large size	Above 60mm	Above 150 gm
(b) Plain seed		
Small size	30mm-55mm	25-125gm
Large size	Above 55mm	Above 125gm

<sup>1</sup>*In-vitro multiplication for custom production of an imported variety or a non-notified variety can be taken up by the industry exclusively for export purposes. Such varieties, however, should be introduced following the approved guidelines of Government of India.*

<sup>2</sup>*The following laboratories of the 'National Facility for Virus Diagnosis and Quality Control of Tissue Culture Raised Plants are currently accredited for virus testing (1) Advanced Centre for Plant Virology, Division of Plant Pathology, Indian Agricultural Research Institute, New Delhi (2) Indian Institute of Horticultural Research, Hessaraghatta Lake PO, Bengaluru, (3) Institute of Himalayan Bio-resources Technology, Post Box No. 6 Palampur (HP.) and (4) CPRI, Shimla is accredited.*

<sup>3</sup>*Details not required here but given for reference*

## **LABORATORIES FOR CERTIFICATION- MINIMUM REQUIREMENT**

Under the national facility for virus diagnosis and quality control of tissue culture raised plants, the following three centers are working for the virus testing.

1. Indian Agricultural Research Institute, New Delhi (Referral Laboratory)
2. Indian Institute of Horticultural Research, Bengaluru
3. Institute of Himalayan Bioresource Technology, Palampur

All the three centers of the national facility for virus diagnosis and quality control of tissue culture raised plants have excellent infra-structure facilities and well trained and experienced scientists to test for plant viruses using state-of-the-art diagnostic techniques like ELISA, PCR, dot blot hybridization, western blotting, immuno-electromicroscopy, etc. considering the availability of expertise and necessary infrastructure, these laboratories may be accredited to test and certify plants for freedom from viruses.

### **General Requirements for accrediting a laboratory for virus testing**

1. The laboratory must be adequately equipped for virus diagnostic work. It must have basic equipment like ultracentrifuge, electrophoretic system, PCR machine, ELISA reader, etc.
2. The laboratory must have facilities for growing plants under insect proof conditions.
3. The laboratory must have at least two scientists with good training in virology preferably Ph.D. in virology, and experience of working on virus diagnosis.

## SUGARCANE- TISSUE CULTURE - (STC)- STANDARDS

### **I. Applications and Amplification of General Seed Standards for STC**

- a. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for approval of STC. As the name implies, these standards are applicable to tissue culture multiplied under laboratory and greenhouse conditions as laid here.
- b. The General Standards are amplified as follows to apply specifically to the STC.

#### **1. *Eligibility requirements for STC production:***

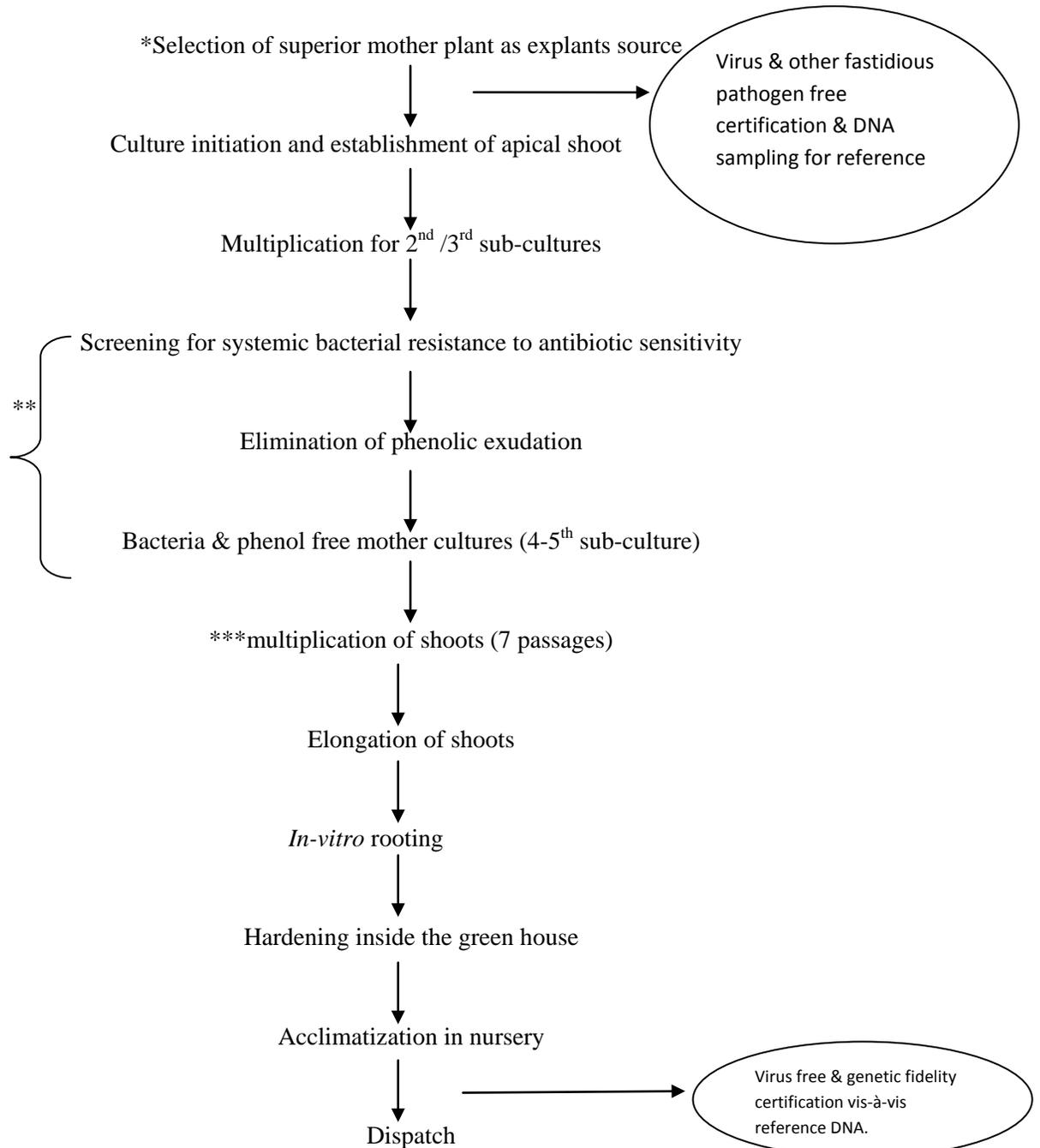
- i. All micro-propagation and greenhouse facilities must be approved as per standards/guidelines set by the Competent Authority.
- ii. Laboratory and greenhouse facilities used for production of plantlets shall be maintained free of insects or vectors of Sugarcane pathogens. Failure to keep such insects under control may cause rejection of all lots maintained in the facility. All potting or growth media shall be sterile. Water sources used in the laboratory or greenhouse operation shall be treated or otherwise rendered free of all possible pathogens by the applicant.
- iii. Hygienic conditions should be maintained strictly during micro-propagation, potting, planting, irrigating, movement and use of equipment and other laboratory and greenhouse practices to guard against the spread of diseases or insects in the facilities used for Sugarcane plant multiplication.
- iv. The greenhouse (protected environment) must be "insect proof" and be equipped with a double-door entrance, provision for footwear disinfection prior to entering the protected environment and insect proof ventilation screening on intakes and exhaust openings. The persons entering the protected environment should use Wellington boots (plastic boots) and change lab-coat in the changing area to reduce the chances of inadvertent introduction of vector or insects clinging to clothes
- v. The material being initiated must be of a notified variety and confirmed identity. It must be duly documented with respect to origin.
- vi. All samples of sugarcane varieties being initiated, should be tested in an accredited laboratory and should be free of viruses such as Sugarcane Mosaic Virus, Badnavirus, Yellow Leaf and Luteovirus and other endophytic or epiphytic bacteria and fungi.
- viii. On application for inspection, the mother cultures as developed above, are eligible for certification. The micro-propagation facility to be inspected must have been approved by the Competent Authority. All stocks must have a valid variety identification and disease testing report at any time during multiplication process.

*In vitro multiplication of an imported variety or a non-notified variety can be taken up by the industry exclusively for export purposes. Such varieties, however, should be introduced following the approved guidelines of Government of India.*

## **2. Source of Seed:**

- i. The facility should use recognized aseptic initiation and propagation procedures (i.e. follow procedures and use equipment, which will maintain sterile conditions as per standard tissue culture norms).
- ii. The initiating facility must maintain following information on each variety for review and audit by the competent authority at least once in a year, variety identification, date of initiation, origin and testing results from accredited laboratory.
- iii. Tests must be carried out on a minimum of 0.1 % (minimum ten) plantlets for each variety by an accredited laboratory. Such tests will be valid as long as cultures of that particular batch are under production. No plant should contain Sugarcane Mosaic Virus, Badnavirus, Yellow Leaf and Luteovirus) and other endophytic or epiphytic bacteria and fungi (Testing for Redrot, Smut and grassy shoot should also be included)
- iv. Valid pathogen testing results are required at the 2<sup>nd</sup>/3<sup>rd</sup> subculture stage prior to the bulking up of the cultures.

**Procedures and standard parameters for production of Sugarcaneby tissue culture is as follows:**



\* *Plants should be of superior quality in terms of growth, disease/insect resistance, drought tolerance, high yield (fresh weight), sugar content etc. The explants should be healthy and free from microbial infections, smut and, grassy shoot. One set of mother plants must be maintained in the insect proof glass house as reference sample.*

\*\* *Since sugarcane tissue culture is frequently confronted with endogenous bacterial contamination and phenolic exudation, these should be eliminated using appropriate method.*

*\*\*\* In sugarcane the number of passages can be up to 7 for sub-culture of shoots.*

### **Minimum Quality Standards for growing of plants inside greenhouses/polyhouses**

The following requirements must be met for production of plantlets:

- i. Effective sanitation practices including insect and disease monitoring and prevention must be adhered to.
- ii. No field-produced Sugarcane plants can be grown in the protected environment (greenhouse/polyhouse) along with tissue cultured plants.
- iii. Varieties must be separated by physical barriers and proper tagging, which will prevent varietal mixture.
- iv. Before dispatch to the farmers, the tissue-cultured plants growing in the nursery should be tested for the absence of the viruses such as Sugarcane Mosaic Virus, Badnavirus, Yellow Leaf and Luteovirus) and clonal uniformity. For establishing clonal fidelity, the sample size should be 0.1% of the batch size with a minimum of 10 plants per batch. Genetic variation upto 0.01% of the representative sampling may be permitted. Beyond this limit plants have to be discarded.
- v. If testing performed by an accredited laboratory reveals the presence of banned viruses, fungus or bacteria the tissue-cultured plants should not be dispatched from the premises of the production lab and the entire material should be destroyed.
- vi. The concerned laboratory/agency producing the tissue culture raised material should issue a certificate to the effect that STC have been produced as per guidelines.
- vii. The agency producing STC will follow the labeling procedures.

## VANILLA- TISSUE CULTURE :- (VTC)- STANDARDS

### **I. Applications and Amplification of General Seed Standards for VTC**

- a. The General Seed Certification Standards are basic and, together with the following specific standards constitute the standards for approval of VTC. As the name implies. These standards are applicable to tissue culture multiplied under laboratory and greenhouse conditions as laid here.
- b. The General Standards are amplified as follows to apply specifically to the VTC.

#### ***1. Eligibility requirements for VTC production:***

- i. All micro-propagation and greenhouse facilities must be approved as per standards/ guidelines set by the Competent Authority.
- ii. Laboratory and greenhouse facilities used for production of plantlets shall be maintained free of insects or vectors of Vanilla pathogens. Failure to keep such insects under control may cause rejection of all lots maintained in the facility. All potting or growth media shall be sterile. Water sources used in the laboratory or greenhouse operation shall be treated or otherwise rendered free of all possible pathogens by the applicant.
- iii. Hygienic conditions should be maintained strictly during micro-propagation, potting, planting, irrigating, movement and use of equipment and other laboratory and greenhouse practices to guard against the spread of diseases or insects in the facilities used for Vanilla plant multiplication.
- iv. The greenhouse (protected environment) must be "insect proof" and be equipped with a double-door entrance, provision for footwear disinfection prior to entering the protected environment and insect proof ventilation screening on intakes and exhaust openings. The persons entering the protected environment should use Wellington boots (plastic boots) and change lab-coat in the changing area to reduce the chances of inadvertent introduction of vector or insects clinging to clothes
- v. The material being initiated must be of a notified variety and confirmed identity. It must be duly documented with respect to origin.
- vi. All cultures of vanilla varieties being initiated should be tested in an accredited laboratory and be free of viruses such as Vanilla Mosaic Potyvirus, Vanilla Necrosis Potyvirus, Cymbidium Mosaic Potexvirus, Odontoglossum Ring Spot Tobamovirus, Uncharacterized Potyvirus/ Rhabdovirus and other endophytic or epiphytic bacteria and fungi.

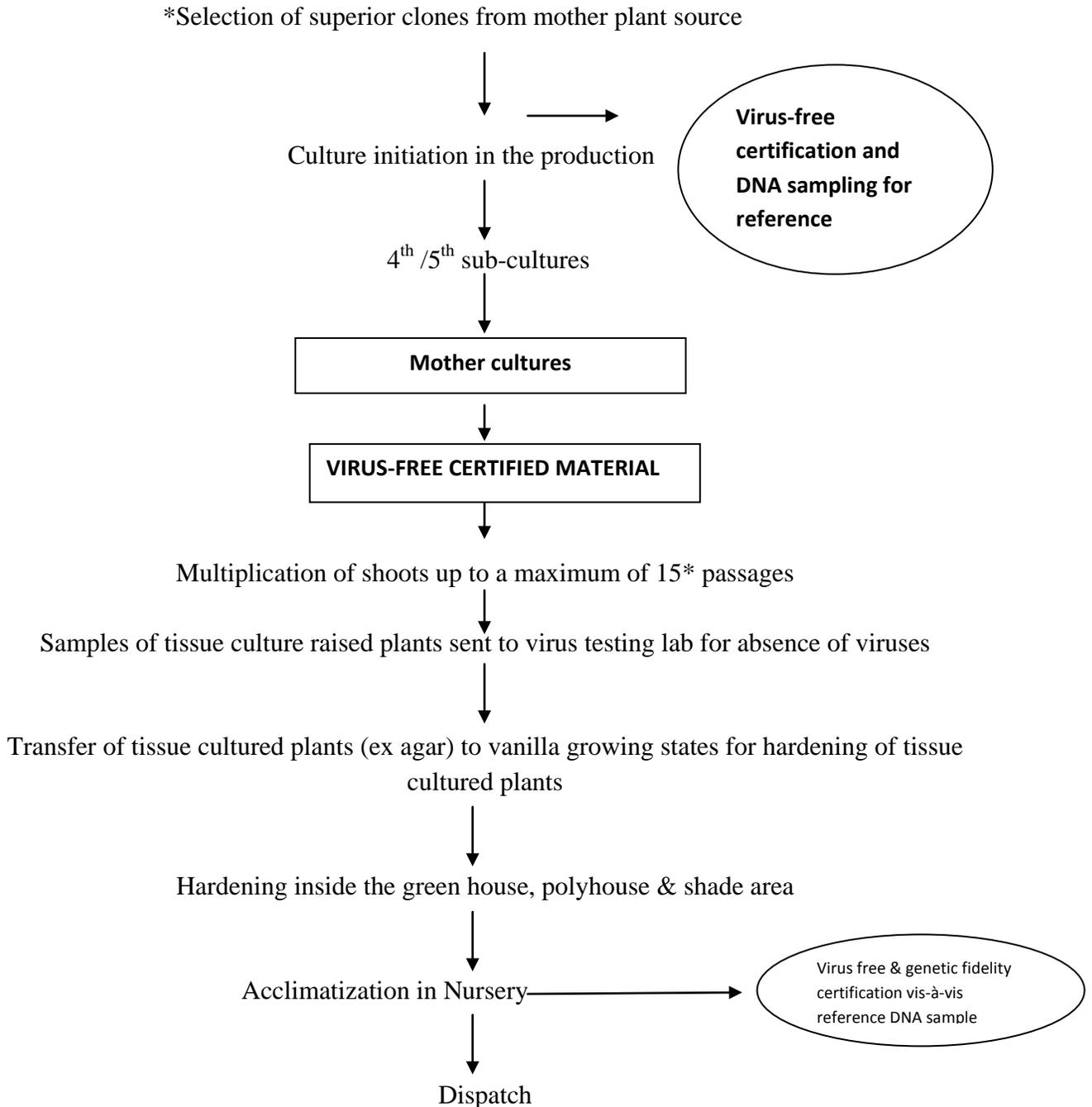
- vii. The basic material for sub-multiplication need to be obtained afresh from the nodal organization as soon as the maximum permitted number of passages (as confirmed by DNA fingerprinting) of shoot multiplication with old cultures has been completed.
- viii. On application for inspection, the mother cultures as developed above are eligible for certification. The micro-propagation facility to be inspected must have been approved by the Competent Authority. All stocks must have a valid variety identification and disease testing report at any time during multiplication process.

*In vitro multiplication of an imported variety or a non-notified variety can be taken up by the industry exclusively for export purposes. Such varieties, however, should be introduced following the approved guidelines of government of India.*

## **2. Source of Seed:**

- i. The facility should use recognized aseptic initiation and propagation procedures (i.e. follow procedures and use equipment, which will maintain sterile conditions as per standard tissue culture norms.)
- ii. The initiating facility must maintain following information on each variety for review and audit by the Competent Authority at least once in a year: variety identification, date of initiation, origin and testing results from accredited laboratory.
- iii. Tests must be carried out on a minimum of 0.1% (at least ten) plantlets for each variety by an accredited laboratory. Such tests will be valid so long as cultures of that particular batch are under production (subject to a maximum of 15 passages). No plant should contain pathogens such as Vanilla Mosaic Potyvirus, Vanilla Necrosis Potyvirus, Cymbidium Mosaic Potyvirus, Odontoglossum Ring Spot Tobamovirus, Uncharacterized Potyvirus/Rhabdovirus and other endophytic or epiphytic bacteria and fungi.
- iv. Valid pathogen testing results are required at the 2<sup>nd</sup> /3<sup>rd</sup> sub-culture stage prior to the bulking up of the cultures.

**Procedures and standard parameters for production of Vanilla by tissue culture is as follows:**



In tissue culture, it is well known that lesser the number of sub-cultures, lower will be the chances of somaclonal variation. However, it must also be realized that if the number of passages are far too small then the entire production process becomes economically unviable. Therefore, efforts should be made to optimize the shoot

multiplication process and extend the number of passages only till the clonal uniformity of the progenies is maintained. This could be achieved through a) strict monitoring of shoot multiplication process ensuring that adventitious shoots are not multiplied and b) confirming the clonal fidelity of tissue cultured plants using molecular markers in different passages. It has been seen in vanilla using molecular markers that clonal fidelity is maintained even up to 24<sup>th</sup> passage. However, to be on the safer side, the shoot multiplication process should not be carried out beyond 15 passages.

### **Minimum Quality Standards for growing of plants inside greenhouses/polyhouses**

The following requirements must be met for production of plantlets:

- a. Effective sanitation practices including insect and disease monitoring and prevention must be adhered to.
- b. No field-produced Vanilla plants can be grown in the protected environment (greenhouse/polyhouse) along with tissue cultured plants.
- c. Varieties must be separated by physical barriers and proper tagging, which will prevent varietal mixture.
- d. Before dispatch to the farmers, the tissue-cultured plants growing in the nursery should be tested for the absence of the viruses such as Vanilla Mosaic Potyvirus, Vanilla Necrosis Potyvirus, Cymbidium Mosaic Potyvirus, Odontoglossum Ring Spot Tobamovirus and Uncharacterized Potyvirus/ Rhabdovirus) and clonal uniformity. For establishing clonal fidelity, the sample size should be 0.1 % of the batch size with a minimum of 10 plants.
- e. If testing performed by an accredited laboratory reveals the presence of banned viruses, fungus or bacteria the tissue-cultured plants should not be dispatched from the premises of the production lab and the entire material should be destroyed.
- f. The concerned laboratory/agency producing the tissue culture raised material should issue a certificate to the effect that VTC have been produced as per guidelines.
- g. The agency producing VTC will follow the labelling procedures.

## **APPENDICES**

- I.** Labelling of breeder seed
- II.** Conditions for Inter-cropping during Certified Seed Production of oil seeds and pulses
- III.** Certification Standards for Other Distinguishable Varieties
- IV.** Determination of Other Distinguishable Varieties
- V.** Maximum Lot Size
- VI.** Procedure for Construction of Lot numbers
- VII.** Screen Aperture Sizes of Seed Processing
- VIII.** Screen Aperture Sizes for Seed Processing of Certain Varieties
- IX.** Grow-out Test for Cultivar Purity
- X.** Specification for Certification Tags
- XI.** Model Composition of the Appellate Authority
- XII.** Extension of the Validity Period
- XIII.** The Central Seed Certification Board
- XIV.** List of the Seed Certification Agencies.
- XV.** Label for Potato Tissue Culture – Mini Tubers
- XVI.** Label for Tissue Culture Propagule

**APPENDIX-I**

**LABELLING OF BREEDER SEED**

Breeder seed shall be supplied in sealed containers, duly stitched and sealed. A cloth-lined label of 12 cm x 6 cm containing following information shall be fixed on the container.

	Label No.
Crop	
Variety	
Class of seed	
Lot No.	Breeder seed
Date of test	
*Pure seed	%
*Inert matter	%
*Germination	%
**Oil content	%
Producing Institution (name and address)	

\*Based on actual.

\*\*It shall be applicable for sunflower crop only.

‘The container should also have printed on it and the kind, variety and name of Institution’

2. The label shall be rubber-stamped with signature, name and designation of the concerned breeder. Colour of the label shall be Golden Yellow No. 356 (IS:5-1978)
3. Every breeder/breeding institute shall maintain the account of labels printed and issued.

**CONDITIONS FOR INTER-CROPPING DURING CERTIFIED SEED  
PRODUCTION OF OILSEEDS AND PULSES**

- (i)** Inter-cropping will be applicable to oilseeds and pulses crops only for production of certified seeds class. The foundation seed class shall be raised strictly as a single crop only;
- (ii)** Other types of cropping patterns such as mixed cropping etc. will not be permitted;
- (iii)** The crops selected for inter-cropping should belong to different genus and preferably with different maturity;
- (iv)** Only basic crop (Seed Crop) pertaining to oilseeds or pulses as the case may be will be registered for certification and companion crop will not be eligible for certification.
- (v)** It should be ensured that the number of rows of seed crop alternating with the companion crop are uniform throughout the field;
- (vi)** The Certification Agencies will prepare a list of the crop combinations which may be followed in respective States. The list so prepared will be circulated among the seed producers in advance. At the time of deciding the crop combinations, the Certification Agencies will ensure that :
  - (a)** the companion crop does not hamper the operation needed for seed crop;
  - (b)** it does not starve the seed crop of nutrients and moisture;
  - (c)** it does not mature simultaneously with the seed crop or it does not carry weed seeds which may mix with the seed crop at maturity;
  - (d)** it does not have common pests and diseases; and
  - (e)** it does not render certification work difficult.

**APPENDIX-III****CERTIFICATION STANDARDS FOR OTHER DISTINGUISHABLE VARIETIES**

<b>Maximum number of Seeds/kg</b>			
<b>Crop</b>	<b>Foundation</b>	<b>Certified</b>	
<b>CEREALS</b>			
1.	Barley/Hybrids	10	20
2.	Paddy/Hybrids	10	20
3.	MaizeInbreds	5	-
4.	Maize Hybrids	-	10
5.	MaizeComposites	10	20
6.	Sorghum (O.P.) (Forage)	10	20
7.	Sorghum Hybrids	10	20
<b>PULSES</b>			
1.	Mothbean	10	20
2.	Lentil	10	20
3.	Khesari	10	20
4.	Green gram	10	20
5.	Black gram	10	20
6.	Pigeonpea	10	20
7.	Bengal gram	5	10
8.	Cowpea	5	10
9.	Horse gram	5	10
10.	Indian bean	5	10
11.	Peas	5	10
12.	Rajmas	5	10

Crop	Maximum number of Seeds/kg	
	Foundation	Certified
<b>OILSEEDS</b>		
1. Soybean	5	10
2. Castor/Hybrid	5	10
3. Rapeseed/Mustard	10	20
4. Linseed	10	20
5. Niger	10	20
6. Taramira	10	20
7. Sesame	10	20
8. Jute	10	20
<b>FORAGE CROPS</b>		
1. Cluster bean	10	20
2. Indian clover	10	20
3. Marvel grass	10	20
4. Oats	10	20
5. Rice bean	10	20
6. Stylo	10	20
<b>VEGETABLES</b>		
1. Bitter gourd/hybrids	5	10
2. Ridge gourd/hybrids	5	10
3. Sponge gourd/hybrid	5	10
4. Water melon/hybrid	5	10
5. Okra	10	20
6. Amaranth	10	20
7. Kasuri methi/methi	10	20
8. Lettuce	10	20
9. Carrot/hybrid	5	10

**DETERMINATION OF OTHER DISTINGUISHABLE VARIETIES**

**1. Object**

The object of the determination is to estimate the number of seeds of other distinguishable varieties present in a seed lot of designated variety.

**2. Field of Application**

The determination is valid only if the cluster is stated by the sender of the sample and if the authentic standard sample of the cultivar is available for comparison in the laboratory.

**3. General principles**

The determination shall be made only on the basis of readily apparent differences in the stable and well-known morphological characters of the seed. Whenever difference is not clearly distinguishable or it has occurred due to other physiological factors, such as frost, drought, immaturity, storage or due to any other reasons which have affected size, shape and luster of the seed the Seed Analyst should not classify these seeds as 'ODV'.

**4. Apparatus and facilities**

- i. Work Board, Magnifier, Stereoscopic Microscope, Spatula and Forceps.
- ii. Authentic samples of the notified cultivars of different crops and vegetable seeds.

**5. Procedure**

This determination must be made before conducting the physical purity analysis

- i. Working sample:  
The whole submitted sample must be used for marketing the determination. The Analyst should, therefore, weigh the submitted sample and record the weight on the analysis card.
- ii. The sample should be examined under magnification to determine the number of seeds of the other cultivar present in the sample.

## Calculation and expression of the results

The results of the investigation are expressed as the number of seeds belonging to the other cultivar found in the actual quantity examined. In addition, the number per unit weight (e.g. per kg) may be calculated.

## Reporting the results

The actual weight of the seed examined and the number of the seeds of the other cultivar present in the sample shall be reported on the Analysis Certificate.

## II. WEIGHT DETERMINATION

The main objective of the test is to determine the weight of 1000 seeds.

Proceed as under:

1. Make purity analysis of the sample
2. Place the pure seed fraction separately
3. Count 100 seeds each in 8 replicates
4. Weight them.
5. Calculate the weight per 1,000 seed in gms.
6. Calculate the variance, standard deviation and co-efficient of variation as follows:

$$\text{Variance} = \frac{n(\sum X^2) - (\sum X)^2}{n(n-1)}$$

where X = weight of each replicate  
n = Number of replicates.

## MAXIMUM LOT SIZE

Crop	Maximum lot size (Quintals)
1	2
<b>Cereals</b>	
Barley	200
Paddy	200
Wheat	200
Triticale	200
<b>Millets</b>	
Maize	400
Sorghum	100
Pearlmillet (Bajra)	100
Barnyard millet (Sawan)	100
Common millet (Cheema)	100
Finger millet (Ragi)	100
Italian millet (Kangni)	100
Kodo millet (Kodo)	100
Little millet (Kutki, samai)	100
<b>Pulses</b>	
Black gram (Urdbean)	200
Chikling vetch (Khesari)	200
Cowpea (Asparagus bean)	200
Rajmash (French bean)	200
Gram (Bengal gram)	200
Green gram (Mung bean)	200
Horse gram (Kulthi)	200
Indian bean (Sem)	200
Moth bean (Kidney bean)	200

Lentil	100
Pea	200
Pigeon pea (Arhar)	200
<hr/>	
<b>Oilseeds</b>	
<hr/>	
Castor	200
Groundnut	200
Rapeseed & Mustard	100
Linseed	100
Niger (Ramtil)	100
Rocket Salad (Taramira)	100
Safflower (Kardi, Kusum)	100
Sesame (Til)	100
Soybean	200
Sunflower	200
<hr/>	
<b>Fibres</b>	
<hr/>	
Cotton	200
Jute	100
<hr/>	
<b>Forages</b>	
<hr/>	
Alfa alfa (Lucerne)	100
Berseem (Egyptian clover)	100
Birdwood grass	200
Buffel grass	100
Cluster bean (Guar)	200
Dharaf grass	100
Dinanath grass	100
Fenugreek (methi)	100
Guinea grass	100
Marvel grass	100
Oats	200

Rice bean	100
Setaria grass	100
Sweet clover (Senji)	100
Stylo	100
Teosinte	200
<hr/>	
<b>VEGETABLE CROPS</b>	
<hr/>	
<b>Tubers &amp; Rhizomes</b>	
<hr/>	
Seed potato	400
True potato seed (TPS)	100
Lesser yam	400
<hr/>	
<b>Cucurbits</b>	
<hr/>	
Ashgourd (Petha)	200
Bottle gourd	200
Bitter gourd	200
Cucumber	100
Chow-chow	400
Indian squash (Tinda)	200
Longmelon (Kakri)	100
Muskmelon	100
Pumpkin	100
Ridge gourd	200
Snapmelon (Phoont)	100
Snake gourd	200
Sponse gourd	200
Summer squash (Vegetable marrow, chappan kaddu)	200
Watermelon	200
Winter squash	200
<hr/>	

<b>Fruit Vegetables</b>	
Brinjal (eggplant)	100
Hot pepper (chilli)	100
Okra (Bhindi)	200
Sweet pepper	100
Rat-tail radish (Mungra)	100
Tomato	100
<b>Green/Leafy Vegetables</b>	
Amaranth	100
Asparagus	200
Celery	100
Lettuce	100
Parsley	100
Spinach	100
Spinach beet	200
<b>Cole Crops</b>	
Broccoli	100
Cabbage	100
Cauliflower	100
Chinese cabbage (heading and non-heading)	100
Knol-kohl	100
<b>Bulb Vegetables</b>	
Garlic	400
Multiplier onion	400
Onion	100
<b>Root Vegetables</b>	
Carrot	100
Celeriac	100

Garden beet	200
Radish	100
Sugar beet	200
Sweet Potato	400
Turnip	100

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**PROCEDURE FOR CONSTRUCTION OF LOT NUMBERS**

The lot number will have four parts. Each part will signify and conform to the details given as under:

**1. First Part**

This shall be called the “Month-Year Code” and will indicate the month and year in which the concerned seed crop was harvested. The month will be represented by its abbreviated form and the year will be represented by the last two digits of the calendar year, such as 89 for 1989 A.D., 90 for 1990 A.D., 00 for 2000 A.D. and 01 for 2001 A.D. The abbreviated form to be used for each month is given as under:

<b>Month</b>	<b>Abbreviated form</b>
January	JAN
February	FEB
March	MAR
April	APR
May	MAY
June	JUN
July	JUL
August	AUG
September	SEP
October	OCT
November	NOV
December	DEC

**2. Second Part**

This shall be called the “Production Location Code” and will indicate the State or Union Territory, where the concerned seed field(s) was/were located. For this purpose, each State and Union Territory is allotted a permanent numerical as shown below:

<b>Numerical</b>	<b>State/Union Territory</b>
01	Andhra Pradesh
02	Arunachal Pradesh
03	Assam

<b>Numerical</b>	<b>State/Union Territory</b>
04	Bihar
05	Goa
06	Gujarat
07	Haryana
08	Himachal Pradesh
09	Jammu & Kashmir
10	Karnataka
11	Kerala
12	Madhya Pradesh
13	Maharashtra
14	Manipur
15	Meghalaya
16	Mizoram
17	Nagaland
18	Odisha
19	Punjab
20	Rajasthan
21	Sikkim
22	Tamil Nadu
23	Tripura
24	Uttar Pradesh
25	West Bengal
26	Andaman & Nicobar Islands
27	Chandigarh
28	Dadra & Nagar Haveli
29	Delhi
30	Daman & Diu
31	Lakshadweep
32	Puducherry
33	Uttarakhand
34	Chhattisgarh
35	Jharkhand

### **3. Third Part**

(a) This shall be called the “Processing Plant Code” and will indicate the seed processing plant where the relevant lot was processed. For this purpose, the Certification Agency shall allot a numerical commencing from 01 to each seed processing plant within its jurisdiction irrespective to whom it belongs.

(b) In crops like groundnut, potato, sweet potato, tapioca etc. which may not be brought to the processing plant for post-harvest operations including grading, sorting, packing etc. the individual centre where such operations are carried out will be treated as a “Processing Plant” for assigning the Processing Plant Code.

#### **4. Fourth Part**

This shall be called the “Seed Produce Code”. It will indicate ultimate serial number of an individual lot. The procedure for assigning this code will be based on unit of certification. For this purpose, the Certification Agency shall allot a numerical commencing from 01 to each unit of certification. However, if seeds of more than one unit are bulked together then bulked unit will be treated as one unit. If the quantity of the seed from one unit of certification exceeds the maximum limit of lot size, it will be further sub-divided into a separate lot, in such cases Roman numerical commencing from (i) will be suffixed with seed produce code within brackets, for example if 586 quintals wheat seed is obtained from one unit of certification, it will necessitate the sub-division of the produce into three separate lots (200, 200 and 186 qtls.) if 01 is allotted to “Seed Produce Code”, then sub-divided lots will be represented as 01 (i), 01(ii) and 01(iii).

5. All the four parts of the lot number shall be written in series with a ‘dash (-)’ between first, second, third and fourth parts to distinctly indicate the code number of each part. An example is shown below:

Lot No. --- MAY 88-12-01-01

MAY 88 --- Seed harvested in May 1988.

12 --- Seed crop raised in Madhya Pradesh

01 --- Seed processed in a processing plant identified as number 01 by the Madhya Pradesh State Seed Certification Agency.

01 --- Seed Produce Code which will trace to the particular unit of certification.

## SCREEN APERTURE SIZE FOR SEED PROCESSING

S.No.	Crop	Screen aperture size in millimeters	
		Top screen	Bottom screen
1	2	3	4
<b>Cereals</b>			
1.	Barley:		
	2 Rowed	6.50 r	2.30 s
	6 Rowed	6.50 r	2.10s, 2.20 s
2.	Paddy:		
	Coarse grain/ bold type	2.8s, 9.0r	1.85s
	Medium slender	2.8s, 9.0r	1.80s
	Fine/superfine	2.8s, 9.0r	1.70s
3.	Wheat :		
	<i>T. aestivum</i>	6.00 r	1.80 s, 2.10 s, 2.30 s
	<i>T. durum</i>	6.00 r	2.10 s, 2.30 s
4.	Triticale	6.00 r, 7.00 r	2.10 s, 2.30 s
<b>Millets</b>			
1.	Maize except popcorn	10.50 r, 11.00 r	6.40 r, 7.00 r
2.	Popcorn	8.75 r	4.25 r, 4.75 r
3.	Sorghum	4.75 r	2.10 s, 3.50 r
4.	Pearlmillet	3.25 r	1.30 r, 1.30 s, 1.40 r, 1.40 s, 1.60 r, 1.90 r
5.	Barnyard millet	3.25 r	1.40 s, 1.80 r
6.	Common millet	3.80 r	1.60 s
7.	Finger millet	3.25 r	1.40 s
8.	Italian millet	3.25 r	1.20 s, 1.30 r

9.	Kodo millet	3.80 r	1.60 s, 2.00 r
10.	Little millet	2.50 r	1.60 r

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### Pulses

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1.	Black gram	5.00 r	2.80 s
2.	Bengal gram	9.00 r, 10.00 r	5.00 r, 5.50 r, 6.00 r
3.	Cowpea	7.00 r	3.50 r, 4.00 r
4.	Green gram	5.50 r	2.80 s, 3.20 s
5.	Indian bean (Sem)	8.75 r	4.75 s
6.	Lentil	7.00 r	3.20 s, 4.00 r, 4.75 r
7.	Pigeon pea (Arhar)	9.50 r	3.20 s, 4.00 r, 4.75 r
8.	Rajmash (French bean)	11.0 r	4.75 s

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### Oilseeds

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1.	Castor	13.50 r	4.40 s, 6.00 r
2.	Rapeseed & Mustard	2.75 r, 3.00 r, 3.25 r	0.90 s, 1.00 s, 1.10 s, 1.40 r
3.	Linseed	4.00 r	2.00 r
4.	Niger	3.20 r	1.20 s
5.	Rocket salad (Taramira)	3.20 r	1.10 s, 1.20 s
6.	Safflower	7.25 r	1.20 s
7.	Sesame	2.40 r	1.60 r, 1.90 r
8.	Soybean	8.00 r	4.00 s
9.	Sunflower	9.00 r	2.40 s

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### Fibres

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1.	Cotton:		
	Fuzzy	14.30 r	5.20 s
	Delinted	7.20 r	3.90 s
2.	Jute:		
	<i>Capsularis</i>	2.40 r	1.20 r, 1.60 r

	<i>Olitorius</i>	2.00 r	0.80 r, 1.00 r
<b>Forages</b>			
1.	Berseem:		
	Diploid	2.00 r	1.00 s
	Tetraploid	2.40 r	1.20 s
2.	Forage sorghum	4.00 r, 4.75 r	2.10 s
3.	Guar (Cluster bean)	6.00 r	1.80 s
4.	Guineagrass	2.10 r	2.40 x 0.65 m
5.	Indian clover (Senji)	2.10 r	2.40 x 0.80 m
6.	Lucerne	2.50 r	0.70 x, 0.70 x 0.70 m
7.	Oats	7.50 r	2.00 s
8.	Setaria grass	2.40 r	1.90 s
9.	Sudan grass	4.00 r	1.20 s, 1.30 s
<b>Vegetable crops</b>			
<b>Cucurbits</b>			
1.	Ashgourd	9.50 r	6.40 r
2.	Bittergourd	11.00 r	6.50 r
3.	Bottlegourd	11.00 r	6.50 r
4.	Cucumber	8.00 r	2.00 r, 2.50 r
5.	Indian squash	9.50 r	6.40 r
6.	Longmelon	5.00 s	1.00 r
7.	Muskmelon	5.00 s	1.00 r
8.	Pumpkin	11.00 r	6.50 r
9.	Ridgegourd	9.50 r	6.40 r
10.	Snakegourd	9.50 r	6.40 r
11.	Snampelon	5.00 s	1.00 r
12.	Spongegourd	9.50 r	6.40 r
13.	Summer squash	8.00 r	2.00 r
14.	Watermelon	6.00 r	1.80 s

<b>Fruit Vegetables</b>			
1.	Brinjal	4.00 r	0.80 s, 2.10 r
2.	Capsicum (Sweet pepper)	4.00 r	0.80 s, 2.10 r
3.	Chilli (Hot pepper)	4.00 r	0.80 s, 2.10 r
4.	Okra (Bhindi)	6.00 r	4.30 r
5.	Rat-tail radish	4.50 r	2.00 r
6.	Tomato	4.00 r	0.80 s, 2.10 r
<b>Greens/Leafy Vegetables</b>			
1.	Asparagus	6.00 r	2.40 r
2.	Celerey	1.80 r	0.40 s, 0.64 x 0.64 m
3.	Fenugreek (Methi):		
	Large & Medium	3.25 r	1.20 s
	Small	2.10 r	0.69 x 0.69 m
4.	Lettuce	2.30 r	0.80 r
5.	Parsley	2.75 r	0.75 s
6.	Spinach beet	5.50 r	1.80 s, 1.85 s, 2.25 r
7.	Spinach:		
	Round seeded	5.00 r	2.75 r
	Sharp seeded	8.00 r	2.50 r
8.	Coriander (All varieties)	4.25 r	2.5 s
<b>Cole Crops</b>			
1.	Cabbage	2.75 r	0.90 s
2.	Cauliflower	2.75 r	1.10 s
3.	Broccoli	2.75 r	1.10 s
4.	Chinese cabbage (heading & Non heading)	2.75 r	0.90 s
5.	Knol-kohl	2.75 r	1.10 s
<b>Bulbs crops</b>			
1.	Onion	3.80 r	2.00 r

<b>Root Crops</b>			
1.	Carrot	2.30 r	1.00 r
2.	Celeriac	1.80 r	0.40 s, 0.65 x 0.65 m
3.	Sugarbeet:		
	Monogerm	9.00 r	3.00 r
	Multigerm	9.00 r	2.50 s
4.	Gardenbeet	9.00 r	3.00 r
5.	Radish	4.50 r	2.00 r
6.	Turnip	1.80 r	1.20 r

r = Screens with round perforations  
 s = Screens with slotted (oblong) perforations  
 m = Wiremesh sieves

**APPENDIX-VIII**

**SCREEN APPERTURE FOR SEED PROCESSING OF CERTAIN VARIETIES**

<b>S.No.</b>	<b>Name of the Crop</b>	<b>Varieties/Hybrids</b>	<b>Recommended BottomScreen Size in millimeter</b>
1.	Sorghum	CSH-1,CSH-5,CSH-6,CSH-9, SPH388, SPV-1359	3.2 r
2.	Cotton	AKA-4, AKA-5, AKA-9	2.8 s
3.	Cotton	DHY-286, AKA-8401, AKA-081, LRA-5166, AKH-84365, NHH-44, PKV Hy-2, PKV Hy-3, Dhan Laxmi	3.2 s
4.	Cotton	Surbhi, RCH-2, RCH-23, MCU-5, MCU-5	3.6 s
5.	Soybean	JS-335, PK-472, MACS-13,MACS-124, MACS-58, PKV-1, CO.1, CO.3, K-851, PKV-416, Soya-Harit	3.6 r
6.	Sunflower	EC-68414, Morden, Surya, PKV SH-27, AKSF-9, PSFH-67, DSH-1, TCSH-2, FSFH-67, F-354RI	2.3 s
7.	Sunflower	CMS-2A, CMS-2B	1.6 s
8.	Sunflower	AK 1-R	1.4 s
9.	Sunflower	TCSH-1, KBSH-44, KBSH-42, KBSH-1	2.5 s
10.	Safflower	Bhima, Tara, Girna, Sharda, N-7	2.4 s
11.	Green gram	Kopargaon, Pusa Vishal, AKM-8803, TARM-2, TARM-18, T-9, K-851, TAP-7	2.8 s
12.	Black gram	T-9, TAU-1, TAU-2, TAU-4, No.55	2.8 s
13.	Chickpea	C-235, HC-1, JAK-9218, AKG-46	3.0 r

## GROW-OUT TEST FOR CULTIVAR PURITY

### I. Object

To determine the genetic purity of a given seed lot of a released cultivar, and the extent to which the submitted sample conforms to the prescribed standards.

### II. Sampling

The samples for grow-out test are to be drawn simultaneously with the samples for other quality tests and the standard procedure shall be followed.

The size of the submitted sample will be as follows:

1,000 gm	--for maize, cotton, groundnut, soybean and species of other genera with seeds of a similar size;
5,00 gm	--for sorghum, wheat, paddy and species of other genera with seeds of similar size;
250 gm	-- <i>Beta</i> and species of other genera with seeds of similar size;
100 gm	--for bajra, jute and species of all other genera;
250 tubers/ planting stakes/ roots/corns	--seed potato, sweet potato and other vegetatively propagating crops.

### III. Procedure

While raising the desired population, standard and recommended agronomic/cultural practices (e.g., field preparation, size of the plot, row length, distance between rows, distance between plants, irrigation, fertilization etc.) in respect of individual crops are to be followed both for the unknown sample and its control.

The possibility to prove the genuineness of a cultivar by grow-out test is based on hereditary characteristics of the plants. Usually the cultivar differences are more distinct if growth conditions are favourable. Crop should be so grown that the genetical difference express themselves as clearly as possible. In self-fertilizing species the individual of a cultivar may be theoretically identical whereas the individual of a cultivar in cross-fertilizing species may not be genetically similar, but comprise a number of types. Therefore, it is easier to determine the cultivar purity in self-fertilizing species than in cross-fertilizing species where the examination for greater part is based on the mutual comparison between the samples to be tested and the standard sample. Hence, it is essential to sow the various samples of the same cultivar in succession and standard samples are sown at suitable intervals (for example, one standard sample

for every ten samples to be tested). The size of plots, row length etc. will differ crop to crop. However, the specifications for different crops are indicated in the following table. The Certification Agency may change the specification if considered necessary:

S. No.	Crop	Row length (meters)	Plant to plant distance (cm)	Space between rows (cm)	Space between plots (cm)	No. of replications
1.	Wheat, barley, oats	6	2	25	50	2
2.	Pea, cowpea	6	10	45	90	2
3.	Chickpea, green gram, black gram	6	10	30	60	2
4.	Maize	10	25	60	90	2
5.	Hybrid cotton	5	10	45	45	2
6.	Paddy:					
	(a) very early to medium	6	15	20	45	2
	(b) late and very late	6	25	30	60	2
7.	Pearlmillet	6	10	60	90	2
8.	Sorghum	6	10	45	60	2

The seed rate may be adjusted depending on the germination percentage of individual samples and the sowing may be done by dibbling. Subsequent thinning is not recommended.

The test crop may be raised alongwith the control either in the areas recommended for the variety or in off-season nurseries. The authentic control sample from the originating plant breeder/breeding institute is to be maintained by the testing station/Agency following standard procedures. A minimum of two hundred plants from control sample will be raised along with the test crop.

#### IV. Observations

(a) All plants are to be studied keeping in view the distinguishing characters described for the cultivar both in the test crop as well as the control. Necessary corrections may be incorporated if the control is found to be heterogenous.

(b) Observations are made during the full growing period, or for a period specified by originating breeding institute and deviations from the standard sample of the same variety are recorded. At suitable development stage the plots are examined carefully and plants which are obviously of other cultivar are counted and recorded.

The specification of the field plot, row length etc. may be determined from the information given in para III above. And on the basis of the number of plants required for taking observations is dependent on maximum permissible offtypes which are as follows:

Maximum permissible Off-types (%)	Minimum genetic purity (%)	Number of plants required per sample for observation
0.10	99.9	4,000
0.20	99.8	2,000
0.30	99.7	1,350
0.50	99.5	800
1.00 and above	99.0 and below	400

#### **V. Calculation, Interpretation and reporting of the result**

Percentage of other cultivars, other species or aberrant found may be calculated upto first place of decimal.

While interpreting the result, use of tolerance may be applied by using the reject Table given below at serial No. VII.

#### **VI. Analysts for grow-out test**

The analysts employed for conducting 'grow-out test' should possess the basic qualification as identified under Seeds Rules, 1968.

#### **VII. Reject number for prescribed standards and sample size.**

Standard	Reject numbers for sample size of	
	800	400
99.5 (1 in 200)	8	*
99.0 (1 in 100)	16	8
95.0 (5 in 100)	48	24
90.0 (10 in 100)	88	44
85.0 (15 in 100)	128	64

\*Indicates that the sample size is too small for a valid test.

**SPECIFICATION FOR CERTIFICATION TAG**

Length : 15 cm  
 Breadth: 7.5 cm

Quality---it shall be made of durable material such as thick paper, paper with cloth lining, wax coated paper, plastic coated paper etc.

Colour—Both sides shall be white for Foundation class and blue (ISI No.---Azure blue) for Certified class.

**Contents and layout**

TAG No.....	CA's	Certified Seed
KIND.....	EMBLEM	Class of seed.....
		Certificate No.....
		Date of issue of
Variety.....	Name & Address of	Certificate.....
	Certification	Date of test.....
Lot No.....	Agency	
“Use of the seed after expiry of the validity period by any person is entirely at his risk and the holder of the certificate shall not be responsible for any damage to the buyer of seed. No one should purchase the seed if seal or the certification tag has been tampered with”		Certificate valid up to..... (Provided seed is stored under cool and dry environment)
		Validity of certificate further extended upto .....
Name and Full Address of the Certified Seed Producer.....		

N.B. If tag is to be affixed on a smaller container then the size of the tag may be reduced proportionately. However, length and breadth ratio and contents would remain the same.  
 (CA's : Certification Agency's)

**MODEL COMPOSITION OF THE APPELLATE AUTHORITY**

<b>The Appellate Authority</b>	All State Governments/Union Territories which have established the Certification Agency under Section 8 of the Seeds Act, 1966 shall invariably constitute an Appellate Authority under Section 11 of the Seeds Act,1966.
<b>Composition</b>	The Appellate Authority shall consist more than one member preferably three members to represent such interests as the State Government think fit, of whom at least one person shall be representative of seed producers.
<b>Term of the Appellate Authority</b>	The members of the Appellate Authority shall, unless their seats become vacant earlier by resignation, death or otherwise, be entitled to hold office for three years.
<b>Decision</b>	The Appellate Authority should ensure that decision on the appeals filed is taken expeditiously.

**EXTENSION OF THE VALIDITY PERIOD**

1. The extension of validity period of Certified seed shall be for a period of six months, at each subsequent validation as long as the seed conforms to the prescribed standards.
2. Holder of the certificate or his authorized representative may request for extension of the validity of certified seed before expiry of the previous validity period to a Certification Agency of the area in which the seed is located. He shall furnish the relevant information such as name of the crop, variety, class of seed, quantity of seed in lot, lot number, size and type of containers, number and date of certificate etc. to the Certification Agency at the time of submission of application.
3. The Certification Agency after receipt of application for extension of validity period shall verify that tags, labels and seals are intact on each seed container and arrange to draw samples and its analysis in a notified seed laboratory. The sample would be tested for physical purity, germination and insect damage.
4. If reprocessing and rebagging at the time of extension of validity is requested to a Certification Agency which has not initially certified the seed, it may be permitted provided Certification Agency is of the opinion that such operation may improve the quality of seed and seeds are not badly invaded by fungus, pest etc. Infested seed lots shall meet the conditions laid down in para XXV of the General Seed Certification Standards. Whenever such operations are undertaken a sample from each lot will be drawn before the seed containers are opened and shall be divided into three equal parts and sealed. One part shall be retained by the Certification Agency, another part by holder of the certificate or his representative and remaining sample will be sent under Registered Post to Certification Agency which had initially certified the seed. Besides this, holder of the stock shall retain at least two bags/containers for smaller packing upto 10 kg and one bag/container above 10 kg in original packing of each seed lot being validated upto the next validation or till the stock is disposed off.
5. After analysis of sample, if seed is found to conform to the prescribed standards, the Certification Agency shall extend the validity of seed for a further period of six months from the date of expiry of previous validity period or date of test, whichever is earlier. The date of test and period of validity and name of Certification Agency who has extended the validity period must be rubber stamped on the tags affixed on the seed containers. However, if new tags are required to be issued due to reprocessing and rebagging of the seed, the information indicated on the certification tags issued at the time of initial certification and name of the Certification Agency who performed the initial certification shall be recorded on the new tags. The serial numbers of new tags used for a seed lot shall be informed to the Certification Agency who performed the

initial certification. The Certification Agency shall preserve at least two tags out of the tags removed from a seed lot and ensure the destruction of remaining tags in its presence.

6. A complete record shall be maintained by the Certification Agency of each lot offered for extension of the validity period.

**THE CENTRAL SEED CERTIFICATION BOARD**

**The Central Seed  
Certification Board**

The Central Government shall, by notification in the Official Gazette, establish a Central Seed Certification Board (here in after referred to as the Board) under Section 8A of the Seeds Act, 1966 to advise the Central Government and the State Governments on all matters relating to certification, and to coordinate the functioning of the agencies established under Section 8.

**Composition**

The Board shall consist of the following members, namely:

- (i) A Chairman, to be nominated by the Central Government
- (ii) four members to be nominated by the Central Government from out of the persons employed by the State Governments as Directors of Agriculture;
- (iii) three members, to be nominated by the Central Government from out of the persons employed by the Agricultural Universities as Directors of Research
- (iv) thirteen persons, to be nominated by the Central Government to represent such interests as that Government think fit, of whom not less than four persons shall be representatives of seed producers or tradesmen;
- (v) appoint a person to be the Secretary of the Board.

**Term of the Central  
Seed Certification  
Board**

The term of the Board shall be for two years from the date of Notification

**LIST OF THE SEED CERTIFICATION AGENCIES**

S.No.	Address	S.No.	Address
1.	Andhra Pradesh Sate Seed Certification Agency (APSSCA) House No.: 5-10-193, 1 <sup>st</sup> -Floor, HACA Complex, Opposite Public Garden, Hyderabad –500 004. Phone: 040-23237016/23235939 Fax : 040-23231021 E-mail: <a href="mailto:apssca@yahoo.co.in">apssca@yahoo.co.in</a> Website: <a href="http://www.apssca.ap.nic.in">www.apssca.ap.nic.in</a>	13.	Maharashtra State Seed Certification Agency, Neel Kanth Soot Girmi, Amaravati Road, Akola (MS). Pin – 444 104. Phone : 072-42258712/3 Fax : 072-42258712 E-mail : <a href="mailto:msscakola@dataone.in">msscakola@dataone.in</a>
2.	Assam State Seed Certification Agency (ASSCA) Dr. B. K. Kskoti Road, Ulubari, Guwahati- 781 007. Phone : Fax : E-mail : Website :	14.	Madhya Pradesh State Seed Certification Agency (MPSSCA) Office Complex, Block B-2, 3 <sup>rd</sup> & 4 <sup>th</sup> Floor, Gautam Nagar, Bhopal – 462 023. Phone : 0755-2583629 Fax : 0755-2583903 E-mail : Website :
3.	Bihar State Seed Certification Agency, Beej Pramanan Bhawan Mithapur Agriculture Farm, Patna – 800 001. Phone : 0612-6531896 Fax : E-mail : <a href="mailto:sca.patna@rediffmail.com">sca.patna@rediffmail.com</a> Website : <a href="http://www.bssca.in">www.bssca.in</a>	15.	Uttar Pradesh State Seed Certification Agency (UPSSCA) Horticulture Complex, Kariyappa Marg, Alam Bagh, Lucknow- 5. Phone : 0522-2451639 Fax : 0522-2451639 E-mail : Website :
4.	Department of Seed Certification, Vikas Bhawan, Thiruvananthapuram- 667041. Phone : Fax : E-mail : Website :	16.	Rajasthan State Seed Certification Agency, Pant Krishi Bhavan, Bhagwan Dass Road, Jaipur-302 005. Phone : 0141-22227104 Fax : 0141-2227456 E-mail : Website :
5.	Karnataka State Seed Certification Agency, KAIC Premier, Opp. Baptist Hospital, Bellary Road, Hebbal, Bangalore- 560 024. Phone : 080-23419418 Fax : 080-23415505	17.	The Punjab State Seed Certification Agency S.C.O.- 837-38, Sector 22A, Chandigarh – 160 022. Phone : 0172-2706490 Fax : 0172-2703269

	E-mail : <a href="mailto:dscbng@gmail.com">dscbng@gmail.com</a> Website : <a href="http://www.kssca.in">www.kssca.in</a>		E-mail : <a href="mailto:psscachd@yahoo.co.in">psscachd@yahoo.co.in</a> Website : <a href="http://www.pssca.in">www.pssca.in</a>
6.	Haryana State Seed Certification Agency, Plot No. B-11 & 12, Sector – 14, Panchkula – 134 109. Phone : 0172-2567642 Fax : E-mail : Website : <a href="http://www.hssca.gov.in">www.hssca.gov.in</a>	18.	Office of the Project Officer (IADP) Government of NCT of Delhi, 11 <sup>th</sup> Floor, MSO Building I.P. Estate, New Delhi –110 002. Phone : Fax : E-mail : Website :
7.	Himachal Pradesh State Seed Certification Agency, Pramanikaran Bhawan, Boiluganj, Shimla- 171005. Phone : 0177-2830643/ 2832376 Fax : 0177-2830643 E-mail : <a href="mailto:hpssopca@gmail.com">hpssopca@gmail.com</a> Website : <a href="http://www.hpssopca.org">www.hpssopca.org</a>	19.	Gujarat State Seed Certification Agency Beej Parmanan Bhawan Near Shyamal Rao House. Oppo. Gurukul Rao House, Ahmedabad- 380015. Phone : 079-26779063/09824065448 (M) Fax : 079-26734116 E-mail : Website : <a href="http://www.gssca.net">www.gssca.net</a>
8.	Odisha State Seed Certification Agency, Plot No. 326, Baramunda, Bhubaneshwar- 751 003. Phone : 0674-2563639 Fax : 0674-2562078 E-mail : Website : <a href="http://www.ossopca.org">www.ossopca.org</a>	20.	West Bengal State Seed Certification Agency, 230A, Netaji Subash Chandra Bose Road, Kolkata – 700 040. Phone : 033-24816350 Fax : 033-24816350 E-mail : <a href="mailto:ddasc.wb@gmail.com">ddasc.wb@gmail.com</a> Website :

9.	Seed Certification Office, Jammu Division, Department of Agriculture, Talab Tilloo, Jammu. Phone : Fax : E-mail : Website :	21.	Directorate of Seed Certification 1424A, Thadagam Road, G.C.T. Post Coimbatore- 641 013. Phone : 0422-2432984 Fax : E-mail : Website :
10.	Seed Certification Office Kashmir Division. Department of Agriculture, Lalmandi, Jawahar Nagar, Srinagar. Phone : Fax : E-mail : Website :	22.	Uttarakhand State Seeds Certification Agency, 12/II, Vasant Vihar, Dehradun – 248 006. Phone : 0135-2760861 Fax : E-mail : Website :
11.	Seed Certification Office, Department of Agriculture, Govt. of Sikkim, Gangtok – 737 101. Phone : 0359-2231040	23.	Pudhucherry State Seed Certification Agency, New Light House Road, Vamba, Keerapalayam, Pudhucherry-605 001. Phone :

	Fax : E-mail : Website :		Fax : E-mail : Website :
12.	Chhattishgarh State Seeds Certification Agency, IGKV Campus, Raipur- 492012. Phone : 0771-6501752 Fax : E-mail : csa.cg@nic.in Website :	24.	Jharkhand State Seed Certification Agency, Krishi Bhawan Campus, Kanke Road, Ranchi – 834 008. Phone : Fax : E-mail : Website :

**Label for Potato-Tissue culture Mini tuber (PTCMT) (Breeder Seed)**

PTCMT (Breeder Seed) shall be supplied in sealed containers. A cloth-lined label of 12 cm x 6 cm containing following information shall be affixed on the container.

	<b>Label No.</b>
<b>Crop</b>	<b>Potato</b>
<b>Variety</b>	
<b>Class of Seed</b>	<b>PTCMT (Breeder Seed)</b>
<b>Lot No.</b>	
<b>Approved laboratory and reference:</b>	
<b>Date of test</b>	
<b>Germination/sprouting (Minimum)</b>	<b>%</b>
<b>Producing Agency</b>	
<b>(Name and address)</b>	

The container should also have printed on it the kind, variety and name of institution

2. The label shall be rubber stamped with signature, name and designation of the concerned agency. Colour of the label shall be diagonally yellow No. 356 (IS:5-1978) and opaline green (IS No. 275)
3. PTCMT (Breeder Seed) producing agency shall maintain the account of labels printed and issued.

**Label for Tissue Culture Propagule**

<b>Crop</b>	:	<b>Lable No.:</b>
<b>Variety</b>	:	
<b>Class of Material</b>	:	
<b>Lot No.</b>	:	
<b>Accredited test laboratory</b>	:	
<b>And certification reference note</b>	:	
<b>Date of certification</b>	:	
<b>Production Agency</b>	:	
<b>(Name and address)</b>	:	

**‘The container should also have printed on it the kind, variety and name of institution’**

1. The label shall be rubber stamped with signature, name and designation of the concerned agency. Colour of the label shall be diagonally yellow No. 356 (IS:5-1978)
2. Producing Agency shall maintain the account of labels printed and issued.

Size of the label as stated in The Seeds Act, 1966 and The SeedRules, 1968.

## **GLOSSARY**

## GLOSSARY

'A' line:	cytoplasmic male sterile seed parent used in making commercial hybrids.
Admixture:	something added to seed other than the kind and/or variety specified
Apomixis:	reproduction from an unfertilized eggs or from somatic cells associated with the egg.
Andromonoecious:	refers to a plant species in which male and bisexual flowers are produced on the same plant e.g., muskmelon and ridgegourd.
'B' line:	(i) fertile counterpart of the 'A' line. The 'B' line does not have fertility-restoring genes and is used as the male parent to maintain the 'A' line, i.e., 'A' line x 'B' line reproduces the 'A' line. The 'B' line is fertile and can be reproduced by self-fertilization; (ii) maintainer of 'A' line.
Berry:	a simple fleshy fruit.
Bulb:	a short, underground stem with fleshy leaves
Bulk:	assembly of similar materials from a collection into one or more bulks.
Border rows:	the recommended number of rows of the male parental line to be grown on all the sides of the seed fields growing two different parents.
Certification Tag:	a tag of specific design as indicated in Appendix-VII.
Chemical Hybridising Agents (CHAs):	chemicals which cause pollen abortion and render the treated plants male sterile while not affecting ovule fertility.
Chromosomes:	small structures in the nucleus of a cell that carry the genes. They appear as thread or rod-shaped structures during metaphase. Each species has a characteristic number of chromosomes.
Clone:	a group of individuals of common ancestry which have been propagated vegetatively (asexually), usually by cutting or natural multiplication of bulbs or tubers.
Commercial hybrid:	refers to the first generation F <sub>1</sub> of the hybrid planted for any purpose.
Companion cropping:	some crops are the best companions and when together they complete their life cycles in equal period.
Composite:	a composite is developed by intermating (three to four generations) selected open-pollinated parent varieties or lines known for their diversity. Parents are selected on the basis of their per se performance or their general combining ability. Such constructed composite populations are made for use in recurrent selecting programmes.

Container:	a box, bottle, casket, tin, barrel, case, receptacle, sack, bag, wrapper or other things in which any article or thing is placed or packed.
Corn:	a bulky, short, vertical, underground stem which stores food.
Cross-fertilization:	the union of an egg with a sperm from a plant of a different clone.
Cross-pollination:	the transfer of pollen from an anther to the stigma in a flower on a different plant.
Crown:	the persistent base of a tufted perennial herbaceous plant as found in grasses and asparagus.
Curd:	a mass of flower primordium meristems as found in cauliflower (heading broccoli).
Cyme:	a centrifugal inflorescence on which the secondary or lateral branches continue to grow and extend beyond main axis.
Cytoplasm:	main contents of a cell in which the nucleus and other bodies are located.
Cytoplasmic-male sterility:	a type of male sterility conditioned by the cytoplasm rather than by nuclear genes and transmitted only through female parent.
Diploid:	organism or cell with two sets of chromosomes.
Detassel:	to remove the tassel or pollen producing organ at the top of maize plant before pollen is released.
Dioecious:	having staminate and pistillate flowers on different plants of the same species for example spinach, hops, hemp, date palm, papaya, pointed gourd, little gourd, asparagus etc.
Emasculation:	removal of stamens before they burst and shed their pollen.
Ergot:	fungus disease of cereals and grasses which forms a sclerotium in place of a healthy grain, often poisonous to man and animals.
F <sub>1</sub> :	generation that arises from a given crossing; filial generation.
F <sub>2</sub> :	generation produced by selfing the F <sub>1</sub> ; the second filial generation.
Field inspection:	an official inspection of seed fields conducted by the official of a Certification Agency or his authorized agent.
Fodder crop:	crop grown for feeding to animals.
Forage:	in range management, unharvested plant material of any kind available for animal consumption. It may be used for grazing or be cut for feeding. When cut, it becomes feed (hay or silage).
Full-sib:	term used in population improvement. A full-sib family comprises progeny from a cross between two selected plants within the population.
Gall:	swelling or excrescence of tissue of plants resulting from the attacks of certain parasites or seed structures in which the contents have been replaced by nematodes.
Gene pool:	useful genes or gene complexes in a divergent population.

Generation:	one complete life cycle. The generation begins with the formation of the zygote and end when the resulting plant dies.
Genetic sterility:	a type of male sterility conditioned by nuclear genes. In contrast to cytoplasmic sterility, it may be transmitted by either the male or female parent.
Germination	in a laboratory test, the emergence and development from the seed embryo of those essential structure which for the kind of seed being tested, indicate the ability to develop into a normal plant under favourable conditions in soil.
Growing season:	period (s) of the year during which crops grow and mature.
Grow-out test:	test performed to determine the genuineness of seed as to species or variety.
Gynomonoecious:	refers to a plant species in which female and bisexual flowers are produced on the same plant e.g., cucumber.
Hardseeds:	seeds that have a seed coat impervious to water or oxygen required for germination for example; seeds of <i>Leguminosae</i> , <i>Malvaceae</i> etc.
Hectare:	standard area measure in the metric system, 10,000 square meters in area.
Heterozygous:	having unlike alleles at corresponding loci of homologous chromosomes. An organism may be heterozygous for one or several genes.
Homozygous:	having genes at corresponding loci on homologous chromosomes that are identical.
Hybrid:	plant resulting from a cross between parents that are genetically unlike.
Hybridization:	crossing of one plant with another. Crossing between plants of the same species is called intraspecific hybridization and crossing between different species is called interspecific hybridization.
Infection:	at the epidemiological level of the pathosystem, infection refers to the contact made between host and parasite; hence, auto-infection, allo-infection. At the histological level, infection refers to the process of penetration of a host by a pathogen.
Infest:	to over run the surface of a plant, or to be dispersed through soil or other substrate.
Inert matter:	seed like structures from crop and weed plants that are one half the original size or less; badly injured and undeveloped seed like structures of weeds, glumes, stems and other parts; sand dirt and other related substances.
Inseparable other crop:	crop whose seeds are difficult to be separated once mixed with the main crop seed.
Inter-cropping:	when two crops of different height, canopy, adaptation, root system and growth habit are made to grow simultaneously in such a way that they accommodate each other with least competition.

Isolation:	the act of keeping the seed crops away from the sources of physical and genetical contamination.
Isolation distance:	the distance to be maintained between the seed crop and the contaminant.
Kind:	one or more related species or sub-species of crop plants each individually or collectively known by one common name such as cabbage, maize, paddy and wheat.
Male sterile:	describes the complete or partial failure of a male plant to produce mature reproductive pollen cells.
Mixed cropping:	two or more than two crops are grown in mixed stand either as 'birra' mixture or in separate rows in different proportion. When any of the crop in mixed stand gets vitiated due to one reason or other, the other crop may act as an insurance against complete loss or other.
Moisture:	amount of water present in seeds.
Monoecious:	having staminate and pistillate flowers on the same plant. For example corn; cucurbits etc.
Multiline variety:	consist of two or more near isogenic lines of normally self-fertilizing plants which are similar in most characteristics but differ in a limited number of describable physiological, morphological or other essential or distinctive characteristics. A multiline is derived by growing the component lines separately compositing the lines to constitute the breeder class of seed.
Nematode:	thread like round worms which live in soil and water but also live in plants.
Objectionable weed:	weed whose seeds are difficult to be separated once mixed with crop seed or which are poisonous or injurious or are having smothering effect on the main crop or are difficult to eradicate once established or are having high multiplication ratio thus making their spread quick.
Offtype/rogue:	plant which does not conform to the varietal characteristics described by the breeder. To designate a plant as an offtype/rogue it is not necessary to identify it as to variety.
Other crop seeds:	seeds of plants grown as crops.
Outcross:	the mating of a hybrid with a third parent; also an offtype plant resulting from pollen of a different sort contaminating a seed field.
Panicle:	in a cereal crop, that portion of the plant that bears seeds.
Phytotoxic:	Poisonous to plants
Planting ratio:	the recommended ratio in which the male and female parental lines are to be planted to make a crossing block in hybrid seed production
Planting stake:	stem cutting used for planting.
Pod:	dry and many seeded dehiscent fruit e.g., as found in <i>Leguminosae</i> or <i>Cruciferae</i> .
Pollen:	male gamete or a plant that is produced in the anthers

Pollen parent:	the parent that furnishes the pollen which fertilizes the ovule of the other parent (seed parent) in the production of seed.
Pollen shedders:	plants of 'B' line which is male fertile when present in 'A' line which is male sterile.
Pollinator:	line or population used as a male parent (pollen donor).
Pollination:	transfer of pollen from the anther to the stigma. Pollination must occur before fertilization can take place.
Polyploid:	plant having other than the diploid (2n) number of chromosomes.
Pure seed:	seed of all botanical varieties of each species under analysis.
Producer:	a person who grows or distributes certified seed in accordance with the procedures and standards of the Certification Agency.
Previous crop:	crop of the same kind grown in the crop season immediately preceding the one in which the seed crops is grown.
Previous season:	the crop season immediately preceding the one in which the seed crop is grown.
Ratoon crop:	crop obtained from re-growth from stubble (living stumps) following a harvest, not necessarily of grain. For example; sugarcane, sorghum, rice, millets, oats, pigeon pea etc.
Ratooning:	cutting a plant to obtain re-growth.
Raw seed:	harvested seed that has not been cleaned and graded.
'R' line (Restorer line):	an inbred line that when crossed to the A-line (male sterile strain) cause the resulting hybrid to be male fertile and produces pollen.
Recessive gene:	(i) a gene not expressed in the heterozygous state when a dominant gene is present at the same locus on the other homologous chromosome; (ii) a gene masked by the effect of another specifically, a gene the effects of which are masked by a dominant allele.
Receptive silks:	silks which are fresh, green/yellow/pink (typical to code designation/variety) and not dried. When more than one cob/ear on a plant have receptive silk it is counted as one only.
Rhizomes:	a horizontal underground stem frequently a storage organ.
Root slips:	the plant plants which arise from portion of root when it is bedded for propagation.
Sclerotia: (pl.sclerotium):	a compact tissue like, sometimes rounded mass of hyphae (threads of fungal mycelium), with or without the addition of host tissue, normally not having spores in or on it e.g. ergot.
Seed:	(i) a mature ovule, consisting of an embryonic plant together with a store of food all surrounded by a protective coat. It usually develops after the fertilization on an egg cell by male generative cell from a pollen grain. Seeds of some species develop without the intervention of the male cell, formed entirely of 'mother' tissue, such seeds are called apogamic seeds.

(ii) "seed" means any of the following classes of seeds used for sowing or planting:

1. seeds of food crops including edible oilseeds and seeds of fruits and vegetables;
2. cotton seed;
3. seeds of cattle fodder;
4. jute seed;

and includes seedlings, and tubers, bulbs, rhizomes, roots, cuttings, all types of grafts and other vegetatively propagated material, of food crops or cattle fodder.

Seed parent:	the strain from which seed is harvested in the hybrid seed field. Also commonly used to designate the female parent in any cross-fertilization.
Seed borne disease:	disease which is carried either within the seed i.e. internally seed borne or on the seed i.e. externally seed borne or both.
Selfing	plant breeding term usually meaning natural or artificial self-pollination.
Self-fertilization:	the union of an egg with a sperm from the same flower or from another flower on the same plant or within a clone.
Self-pollination:	the transfer of pollen from an anther to the stigma of the same flower or another flower on the same plant or within a clone.
Sibbing:	sib-mating. Cross between plants from the same population. Generally pollen is collected from several plants from the same population, bulked and crossed onto sister plants of the same population.
Smut balls:	mass of smut spores, a disease usually of cereals.
Species:	a unit in botanical classification, a sub-division of a genus. A group of closely related individuals descendant from the same stock.
Spikelet:	separate flower cluster in grasses, consisting usually of two sterile glumes at the base of one or more florets.
Sterile:	not fertile, unable to reproduce sexually.
Strain:	a group of similar individuals within a variety. (i) advanced generation random-mating population derived from a few selected inbred lines; (ii) a variety produced by crossing inter-se a number of inbred lines (usually five to eight) selected for their good general combining ability. The variety is subsequently maintained by open-pollination.
Test cross:	cross made with a homozygous recessive parent to determine whether an individual is homozygous or heterozygous.
Tetraploid:	polyploidy plant having four sets of identical similar chromosomes (4n).
Tiller:	a branch arising from the base of a monocot plant, especially in the grass family.
Triploid:	organism or cell with three sets of chromosomes (3n).

Tuber:	an enlarged portion of a rhizome (underground stem) that stores food.
Umbel:	inflorescence in which the stalks of the flowers all spring from the top of the main stock, like the ribs of an umbrella, e.g., in unbelliferae.
Variety:	a sub-division of a kind identifiable by growth, yield, plant, fruit, seed or other characteristics. It also denotes an assemblage of cultivated individuals which are distinguished by a character (morphological, cytological, chemical or others) significant for the purposes of agriculture, or horticulture and which when reproduced (sexually or asexually) or reconstituted retain their distinguishing features.
Vapour-proof container:	container which does not permit entrance or exist of moisture.
Viable:	alive, able to live, grow and develop.
Viviparous:	germinating or sprouting from seed or bud while still attached to the parent plant e.g., chow-chow.
Volunteer plant:	a plant of the crop species same as that of the seed crop which comes up on account of self-seeding from the previous season's crop.
Weed:	a plant out of place. Any plant growing where not wanted.
Weed seed:	seed, bulblet, tuber of plants recognized as weed by laws, official regulations or by general usage.
Wild types:	naturally occurring non-domesticated crop relatives.