

# SEED POTATOES CERTIFICATION REQUIREMENTS AND STANDARDS

## I. BASIC RULES

The UCIA General Seed Certification Requirements and Standards are basic and with the following constitute the requirements and standards for seed potato certification.

## II. SEED PRODUCTION

### A. APPLICATIONS

Date and fees for applications are as listed in the General Requirements and Standards.

### B. VARIETY ELIGIBILITY

#### 1. Limited Generation System:

The purpose of this system is to properly identify and assimilate, in an orderly way, various sources of propagating material and various methods of increase into the certification program. Limited generation type propagating materials from either public or private agencies inside or outside of Utah may be accepted at whichever generation level the material can meet the requirements and standards. Documentation as to source of propagating materials must be supplied to UCIA, including identity of clone, number of generations, results of testing, etc.

#### 2. The levels or classes of propagation are:

|                          |             |
|--------------------------|-------------|
| Pre-Nuclear AC*a         |             |
| Pre-Nuclear GC*b         |             |
| Nuclear (Generation 1)*c |             |
| Generation 2             |             |
| Generation 3             |             |
| Generation 4             | Foundation  |
| Generation 5             | Certified 1 |
| Generation 6             | Certified 2 |

\*a Aseptic Culture

\*b Greenhouse Culture

\*c 1st Year in Field

3. An description of classes is as follows:
- a. Pre-Nuclear AC (Aseptic Culture): Plantlets or "microtubers" produced in aseptic culture from meristem tips or nodal cuttings from shoots grown on tubers originating from a recognized selection testing program. Lines developing from each initial explant must be kept separate until found to be free of virus, fungi and/or bacterial contamination (for specific pathogens and testing protocol see Section IV. A).
  - b. Pre-Nuclear GC (Greenhouse Culture): Plants, minitubers, or tubers produced in the greenhouse. Stock material may be either (1) PreNuclear AC plantlets or microtubers, or (2) stem cuttings from tuber sprouts; all cuttings originating from each sprout on a tuber (to be from a recognized selection testing program) are to be kept separate until after testing as specified for Pre-Nuclear AC.
  - c. Nuclear (Generation 1): Tubers grown in the field from Pre-Nuclear AC or GC stock. If the stock tubers are cut, they must be tuber-unit planted.
  - d. Generation 2: Tubers grown in the field from Nuclear or Pre-Nuclear) stock. If the stock tubers are cut, they must be tuber unit planted.
  - e. Generation 3: Tubers grown in the field from Generation 2 or higher stock.
  - f. Generation 4: Tubers grown from Generation 3 or higher stock. Foundation: This classification consists of seed lots from other certification or line/tuber unit selection programs (designated Foundation, Approved, Basic, etc.) not originating from a tissue culture/stem cutting nuclear program. Such lots must have documentation that field inspections and winter testing meet the standards of Generation 4 to be accepted at the Foundation level.
  - g. Generation 5: Tubers grown from Generation 4 or higher stock. Certified I: Tubers grown from Foundation stock, or other non-nuclear origin stock meeting Generation 5 standards.
  - h. Generation 6: Tubers grown from Generation 5 or higher stock. Certified II: Tubers grown from Foundation or Certified I stock. Generation 6 and Certified II class of tubers are not eligible for re-certification unless there is no higher source of seed available and the field readings and winter testing meet the standards of Generation 5/Certified I class.

C. LAND REQUIREMENTS

1. Laboratory and greenhouse facilities: A tissue culture laboratory and/or stem cutting facility desiring to produce Pre-Nuclear propagating materials must demonstrate to the satisfaction of the UCIA that proper pathogen and/or insect excluding facilities and professional ability and integrity are available to produce a quality disease tested product.
2. Field Crop History

| <u>Class To Be Produced</u>  | <u>Years Out Of Potatoes*a,b</u> |
|------------------------------|----------------------------------|
| Nuclear (G1)                 | Six years (new ground preferred) |
| Generation 2 & 3             | Four years                       |
| Generation 4 or Foundation   | Three years                      |
| Generation 5 or Certified I  | Two years                        |
| Generation 6 or Certified II | Two years                        |

\*a Potatoes of a lower class of the same variety may be grown for a second consecutive year on the same field.

\*b A field will not be eligible for certified seed production of any generation until the fifth year following identification of bacterial ring rot in the field.

3. Areas Not Recommended for Seed Production

The following areas are not recommended for seed production, since virus diseases are spread so extensively during the growing season that field roguing is generally not successful:

Box Elder, Cache, Davis, Salt Lake and Utah Counties, with the exception of a few isolated high elevation areas; Sevier County with the exception of Grass Valley; Weber County with the exception of Ogden Valley; and western Millard County.

4. Isolation:

| <u>Class To Be Produced</u>          | <u>Isolation Required</u>                      |
|--------------------------------------|--|
| Pre-Nuclear AC                       | Satisfactory laboratory procedures             |
| Pre-Nuclear GC                       | Satisfactory greenhouse lot separation         |
| Nuclear (G1) and<br>Generation 2 & 3 | Location of fields must be<br>approved by UCIA |

Generation 4 and 5,  
Foundation, Certified I

100 ft. from lower generation lots

Generation 6 and Certified II

Distinct separation (fenceline,  
roadway, skip row, etc.)  
from non-certified potatoes or certified  
potatoes of another variety or generation/class.

5. Weeds: The field should be free of noxious weeds as listed in the General Requirements and Standards, Section VII. Also, perennial ground cherry (*Physalis longifolia*) is a host plant for mosaic diseases of potatoes. This weed present in a field may disqualify the field or part of the field for certification. All other weeds must be controlled so as to not interfere with timely inspections of the field.

#### D. FIELD INSPECTIONS

1. At least one visual inspection of propagating materials in laboratory and/or greenhouse facilities will be made by UCIA before such material is sold and/or planted for the next generation increase. Samples for testing will be taken as outlined in Section IV.
2. At least two visual inspections (more if necessary) will be made of each field planting of certified eligible potatoes to evaluate compliance with field standards.
3. Roguing to remove weak plants, varietal mixtures, diseased plants, and objectionable weeds from the field should commence as soon as they become apparent and continue through the growing season. Roguing may be delayed until after the first field inspection and determination is made of potential problems. Plants infected with virus or bacterial diseases should be removed from the field along with the seed pieces and new tubers.
4. If ring rot is found in any potato field on a farm (or it is determined that any seed lot planted on the farm is contaminated with ring rot or was stored in a cellar with potatoes that were contaminated with ring rot), all fields on that farm may be downgraded to Generation 6 or Certified II, or may become ineligible for certification depending upon individual circumstances of contamination.

#### E. FIELD STANDARDS

1. Fields will be rejected when seriously infected or damaged by psyllid yellows, late blight, insects, drought, wind, hail, or frost, or other diseases or causes which interfere with proper inspection of potatoes. Poor stands, low soil fertility, poor cultural conditions, or excessive weed growth will also disqualify

a field for certification.

2. Fields showing symptoms of some disease new to Utah may be disqualified or may have certification withheld pending further investigation.
3. No volunteer potato plants will be permitted in any field, except where the previous potato crop was of a higher generation and the same variety as the one currently being produced.
4. Inspection tolerances (see Table E.4 Field Standards, next page): Based on percent visible disease symptoms. Zero tolerance (0) means none found during the normal inspection procedures. Zero is not a guarantee that the lot inspected is free of the disease. See also Section II, General Requirements and Standards.

#### F. HARVEST AND STORAGE

1. Growers who have fields eligible for certification should notify the local UCIA representative prior to harvest and work out with him a satisfactory plan for maintaining the identity of the potatoes through harvest and storage. A lot is eligible for tags only lot is eligible for tags only when this identity is maintained. Harvesting equipment and storage areas must be properly disinfected before handling certified lots.
2. Lots eligible for certification in storage must be clearly distinguished from other seed lots and stored separately from commercial potatoes. Empty bins or tight walls (concrete block, wood, interlocked hay bales, etc.) that prevent mixing are acceptable. A cellar chart showing the variety, seed lot origin, and field from which harvested from each bin should be made to aid the UCIA representative in making his inspections. If the inspector is unable to distinguish, to his own satisfaction, the identity of any seed in the storage place, all or any part of the seed in the storage place may be declared ineligible for certification.

**TABLE E.4, FIELD STANDARDS**

| <u>Factor</u> *a                         | <u>Nuclear (G1)</u> |                                | <u>Gen 4 &amp;</u> |            | <u>Gen 5 &amp;</u> |            | <u>Gen 6 &amp;</u>  |            |
|--|---------------------|--------------------------------|--------------------|------------|--------------------|------------|---------------------|------------|
|  | <u>&amp; Gen 2</u>  | <u>Gen 3</u>                   | <u>Foundation</u>  |            | <u>Certified I</u> |            | <u>Certified II</u> |            |
|  |                     | <u>1st &amp;</u><br><u>2nd</u> | <u>1st</u>         | <u>2nd</u> | <u>1st</u>         | <u>2nd</u> | <u>1st</u>          | <u>2nd</u> |
| Blackleg                                 |                     |                                |                    |            |                    |            |                     |            |
| (visible)*b                              | 0                   | 0.1                            | 0.5                | 0.5        | 1.0                | 1.0        | 5.0                 | 5.0        |
| Bacterial Ring                           |                     |                                |                    |            |                    |            |                     |            |
| Rot                                      | 0                   | 0                              | 0                  | 0          | 0                  | 0          | 0                   |            |
| Total Non-Latent Virus                   | 0                   | 0.1                            | 1.0                | 0.5        | 1.0                | 1.0        | 2.0                 | 2.0        |
| Mosaic                                   | 0                   | .05                            | 0.5                | 0.25       | 1.0                | 0.5        | 1.5                 | 1.0        |
| Leafroll                                 |                     | 0.02                           | 0.1                | 0.05       | 0.2                | 0.1        | 0.5                 | 0.25       |
| Calico                                   |                     | 0.05                           | 0.5                | 0.25       | 1.0                | 0.5        | 2.0                 | 1.0        |
| Haywire                                  |                     | 0.05                           | 0.5                | 0.25       | 1.0                | 0.5        | 2.0                 | 1.0        |
| Other Virus                              | 0                   | .02                            | 0.2                | 0.1        | 0.5                | 0.25       | 1.0                 | 0.5        |
| Nematode *c                              | 0                   | 0                              | 0                  | 0          | 0                  | 0          | 0                   | 0          |
| Eumartii Wilt                            | 0                   | 0                              | 0                  | 0          | 0                  | 0          | 0                   | 0          |
| Other Wilts and<br>Foliar Diseases *d    |                     |                                |                    |            |                    |            |                     |            |
| Varietal Mixture                         | 0                   | 0                              | 0.2                | 0.1        | 0.25               | 0.15       | 0.5                 | 0.25       |
| PVX (Optional Lab<br>test, see IV.B.2.b) | 0                   | 0.5                            | --                 | 1.0        | --                 | 3.0        | --                  | 6.0        |

\*a Inspection tolerances are defined in Part E.4. Tolerances listed are percent (%) of plants.

\*b Tolerance is based on the presence of visible symptoms commonly associated with the blackleg disease, and does not take into consideration Erwinia sp bacteria that may be present on the plant but not causing visible symptoms.

\*c Nematode evaluation based on visible external symptoms.

\*d Verticillium wilt will be a factor only when it makes adequate field inspections impossible (normally about 10.0%). Other fungus diseases such as Rhizoctonia, early blight, or late blight will be noted when observed, as storage problems may result.

3. Storage inspections will be made as soon after harvest as possible before the potatoes are sorted.
  - a. Any certified seed lot stored in a cellar with other potatoes found to be infected with ring rot (other seed lots or commercial potatoes) will be immediately downgraded to generation 6 or Certified II (not eligible for recertification on), and depending on the circumstances may be rejected for certification.
  - b. Scab, rhizoctonia, early and late blight tuber lesions, etc. are considered to be grade defects, to be graded and/or removed during the sorting process. Seed potatoes may be rejected for certification if they have been improperly stored as indicated by excessive black heart, sprouting, shriveling, or soft rot breakdown, or they are so marred in general appearance by dirt, blight, scab, or other diseases or condition that it is obvious sorting will not produce good quality seed potatoes.

### III. SORTING, GRADES, AND LABELING OF SEED POTATO TUBERS

#### A. SORTING REGULATIONS

1. No ring rot, nematodes (based on visible external symptoms), or tuber moth larvae are allowed in certified seed.
2. All equipment that contacts the tuber (sacks, truck beds, pilers, bin boards, etc.) should be disinfected each year before use and between each lot. Disinfection is not effective or satisfactory unless preceded by scouring for removal of dirt, debris, rot smears, etc.
3. Lots showing a disease new to Utah may be disqualified or have certification withheld pending further investigation.
4. Because of the extreme danger in spreading disease, washed potatoes will not be eligible for certification.

#### B. GRADE STANDARDS, INSPECTION AND TAGGING

1. Grade Inspection: A shipping point inspection is required for the first load of each lot of certified potato seed during the sorting and grading process and before it is loaded for shipment. This inspection will be conducted by a representative of the Federal State Inspection Service (Utah District Agricultural Inspectors) in cooperation with the UCIA. Subsequent inspections are made at the discretion of the UCIA or the request of the grower.
2. Tags and Certificates: Certification tags (sewn in or affixed by a seal) or a bulk certificate indicating Generation or Class and grade of seed must accompany the seed potatoes when sold as certified seed. The grower will be



responsible for attaching the tags or issuing bulk certificates under the control of a UCIA representative. See General Requirements and Standards (Section VII) for fees. In addition, a fee (currently 4.5 cents/cwt) is charged for those loads receiving a Federal-State inspection, payable to the Utah State Department of Agriculture. NOTE: On loads not officially inspected by the Federal State Inspection Service, the grower assumes total responsibility and liability in assuring that the seed meets grade specified on the tags or bulk certificate.

### 3. Grade Standards

#### a. Blue Tag Grade

The Certified "Blue Tag" grade shall meet the grade requirements of U.S. No. 1 Seed Potatoes. Copies of the publication "United States Standards For Grades of Seed Potatoes" are available from the UCIA or Utah District Agricultural Inspectors. The Blue Tag (or Bulk Certificate) will carry the information of variety, certification number, generation level or class, and tuber size if otherwise specified from the U.S. No. 1 seed grade. Lots including tubers sized up to 18 oz. will be labeled as OVERSIZE; tubers larger than 18 oz. will be considered yellow tag contract grade (see below). Lots including tubers less than 1 1/2 inches will be labeled UNDERSIZE. Exact size range of UNDERSIZE and OVERSIZE may be written on the tag or bulk certificate.

#### b. Yellow Tag (Contract) Grade

Contract Grade shall consist of potatoes that meet all of the genetic and specific disease requirements for certification at a given generation or class level. Factors of grade and condition, however, may be established by a buyer-seller agreement except that not more than two (2) percent soft rot and/or wet break down, or excessive dirt and debris will be allowed. An example might be where the buyer would specify U.S. No. 1 Seed Grade except for increased allowance of misshapen tubers, excessive scab, up to 2% soft rot, etc.

The Yellow Tag or Bulk Certificate will carry the same information (variety, certification number, etc.) as the Blue Tag or Bulk Certificate. Evidence of the contract agreement between buyer and seller must be presented before grade inspection or tagging will be carried out by the UCIA representative.

## IV. DISEASE SAMPLING AND TESTING

### A. PRE-NUCLEAR STOCK

1. UCIA does not have facilities for sophisticated disease testing, but will accept testing done in an established State, University or private commercial laboratory, or grower's in-house testing procedures subject to accreditation and periodic cross-checking with an outside lab. Testing procedures may include serology, bioassays, molecular hybridization, selective media, gel diffusion, electron microscopy, etc., taking into account the state-of-art in testing for a given pathogen, and the realistic assessment of time and cost factors.
2. Initial explants or mother plants used for subsequent propagation shall be tested for PVX, Y, A, M, S, and LR viruses, spindle tuber viroid, and systemic bacteria (*Erwina sp.* and *Corynebacterium sepidonicum.*) and fungi. Tolerance is zero for these pathogens.
3. Sampling Schedule:
  - a. After a node is excised for reproduction, the basal portion of each explant or mother plant must be tested for systemic bacteria and fungi, and the remaining portion of the plant tested for the viruses and PSTV. Bulking of material for testing at this stage is not permissible.
  - b. Monitoring the pathogen status of the propagating material during production (bulking up) stages shall be at the discretion of the producer, though subject to periodic inspection and/or sampling of plants and/or inspection of production records by UCIA.
  - c. Sampling of each lot (line, or variety, if lines have been bulked) before sale to growers and/or planting in greenhouse or field will be accomplished by UCIA representatives. It will consist of a leaf from 1.0% of the plantlet population (minimum of 10 plantlets samples) for PLRV, PVX, and PVY virus testing. In addition, the basal stem and roots of 0.5% of the plantlet population (at least 5 plants but not more than 50 plants) must be collected and tested for systemic bacteria and fungi. These plant samples may be bulked for testing, except that a minimum of two separate tests for the viruses and two separate tests for systemic bacteria and fungi must be accomplished for each lot.
  - d. Sampling of plants before harvest of pre-nuclear tubers in the greenhouse will follow the protocol of Part c. above, except that a tuber instead of basal stem and roots will be sampled and tested for systemic bacteria and fungi.

## B. FIELD GROWN STOCK

1. Winter Testing (Field)
  - a. Each lot of seed of Nuclear (G1) through Generation 5 (Certified I) must be sampled for winter testing; for Generation 6 (Certified II) it is optional though recommended. Tuber samples for the winter tests must be

collected by October 20 and arrangements made for delivery to UCIA at Utah State University. The samples will then be included in the Idaho Crop Improvement Association winter plots in Oceanside, CA.

b. Sampling Procedures:

1. The sample should be representative of the entire lot being tested, therefore, the samples should be collected all through the harvest period. A sample taken off the top or end of the bin or cellar or after harvest may not be representative. New bags should be used for samples.
2. Contact the UCIA before harvest for instructions as to the number and size of tubers to collect from each seed lot for winter testing.

- c. The winter test results must not exceed by more than 50% the 2nd inspection field standards (see Section II E.). If the tolerance is exceeded at a given generation or class level the seed lot will be downgraded to the next level; Generation 5 or Certified I seed may be ineligible for re-certification depending on the extent of the virus infection.

2. Laboratory Testing

- a. Laboratory disease testing will be accomplished at the ICIA laboratory in Idaho Falls, ID. Such testing may in the future replace the field winter test.
- b. PVX testing is optional, but will follow the leaf sampling and testing protocol as outlined by the ICIA. Seed so tested may be labeled "PVX tested" if the tolerances on Table E.4 are met.

3. Special testing fees

- a. Winter grow out test (Oceanside): Approx. \$75 per sample.
- b. Laboratory Tests: Cost basis depending on number of samples and number of tests performed.