

# POTATO

## Seed Certification Standards in California

### I. General Certification Standards

The CCIA "General Certification Standards," together with these specific potato certification standards, constitute the standards for certification of seed potatoes in California.

### II. Seed Farm Eligibility Requirements

To be eligible for certified seed potato production, all acreage on a Seed Farm must have been planted with Certified seed stock.

### III. Laboratory and Greenhouse Facility Requirements

- A. Laboratory and greenhouse facilities used for production of plantlets or minitubers shall be maintained free of potato pests or vectors of potato pathogens. Failure to keep such pests under control may be cause for rejection of all lots maintained in the facility. All potting or growth media shall be sterile. Water sources used in a laboratory or greenhouse operation shall be treated or otherwise rendered free of potato pathogens by the applicant.
- B. Suitable precautions shall be taken in micropropagation practices and in the potting, planting, irrigating, movement and use of equipment, and other laboratory and greenhouse practices to guard against the spread of disease or pests into and within facilities used within this certification program.
- C. Records to document the progress of certified plant material through all increases are required.

### IV. Seed Stock Eligibility Requirements

- A. Limited-generation seed stocks are eligible for certification for six (6) field production years. Generation 6 seed stocks, the 7th field production year, are not eligible for certification.
- B. All seed stocks purchased by a farming operation from another farming operation and subsequently entered for certification, must be tagged unless the purchaser was a co-applicant for certification of that seed.
- C. The eligibility of seed purchased for recertification must be verified by one of the following; Tags, Bulk Sale Certificates, or an invoice from the seed. *The invoice must include variety, pounds sold, generation of seed, and lot number.*

- D. Bacterial ring rot found in a seed lot of a seed farm will be cause to remove the lot from certification. All fields on that seed farm planted with the same seed lot as the rejected field will also be refused certification. All other seed lots associated with or planted after the rejected lot will not be eligible for recertification, but will be eligible for commercial planting if all other certification requirements are met.
- E. Nuclear, G1 or G2 seed lots disqualified for certification in the post harvest test because of seed-borne chemical injury may only be recertified by the original applicant(s) during the next growing season.
- F. Seed lots containing tubers proven to be powdery scab infected shall not be eligible for certification.

## V. Land Requirements

- A. A field will not be eligible to produce certified seed potatoes if noncertified potatoes or potatoes proven to be Bacterial Ring Rot infected were grown in this field within one previous growing season.
- B. A field must be farmed for 1 (one) year with a crop other than potatoes immediately following the growing season in which potatoes were disqualified for Bacterial Ring Rot.

## VI. Field Isolation Requirements

- A. Potatoes entered for certification must be *separated by at least a skip row* from potatoes not entered for certification.
- B. There must be clear demarcation between different varieties and classes of seed potatoes.
- C. Different lots must be separated from each other by steel posts or heavy wooden stakes that are tall enough to be seen above the crop and placed at *500 ft.* intervals.

## VII. Field Inspection Requirements

- A. For all field plantings, at least two inspections will be made during the growing season, prior to harvest. Seed potatoes entered for certification shall not exceed the tolerances in Tables II and III.

**Table II. Field Inspection 1st Inspection Tolerances**

Factor	Pre-nuclear (Greenhouse)	Nuclear	Generation 1	Generation 2	Generation 3	Generation 4	Generation 5
Potato Leafroll Virus	0	0	0.05	0.20	0.50	0.50	0.50
Mosaic	0	0	0.10	0.30	2.00	2.00	3.00
Other Virus or Virus-like Disease	0	0	0.10	0.30	2.00	2.00	3.00
Total Visible Virus	0	0	0.10	0.50	2.00	2.00	4.00
Spindle Tuber Viroid	0	0	0	0	0	0	0
Blackleg*	0	0	0.10	0.30	3.00	3.00	3.00
Varietal Mixture Off- type	0	0	0	0.20	0.50	0.50	2.00
Bacterial Ring Rot	0	0	0	0	0	0	0
Root Knot Nematode	0	0	0	0	0	0	0

- B. All disease or problem determinations shall consist of a visual inspection of the plants in question, except in the case of latent viral infections, where a serological test such as ELISA may be used to supplement the visual inspection.
- C. Inspection for bacterial ring rot is visual and shall be confirmed by laboratory diagnosis to determine the presence and shall be based on such tests and diagnostic procedures determined appropriate by the California Crop Improvement Association, including those currently approved by the Potato Association of America.
- D. Fields shall be considered ready for inspection at all times. Additional inspections may be made at the discretion of the inspector, but will not be made in order to allow growers to rogue fields which will not pass inspection.

**Table III. Field Inspection 2nd Inspection Tolerances**

Factor	Pre-nuclear (Greenhouse)	Nuclear	Generation 1	Generation 2	Generation 3	Generation 4	Generation 5
Potato Leafroll Virus	0	0	0.05	0.10	0.25	0.25	0.25
Mosaic	0	0	0.10	0.20	1.00	1.00	2.00
Other Virus or Virus-like Disease	0	0	0.10	0.20	1.00	1.00	2.00
Total Visible Virus	0	0	0.10	0.20	1.00	1.00	3.00
Spindle Tuber Viroid	0	0	0	0	0	0	0
Blackleg*	0	0	0.10	0.20	1.00	1.00	1.00
Varietal Mixture Off- type	0	0	0	0.10	0.25	0.25	0.5
Bacterial Ring Rot	0	0	0	0	0	0	0
Root Knot Nematode	0	0	0	0	0	0	0
PVX (optional for Gen 2, 3, 4, 5)	0	0	0.2	1.0	2.0**	3.0**	4.0**

*\*This tolerance is based on the presence of a typical, inky black stem system. Tolerance does not take into consideration the presence of blackleg bacteria that may be present on the plant but not causing disease symptoms or other symptoms caused by *Erwinia carotovora* such as stem rot, below ground stem decay, decay, early dying disease. Tolerance is no indication that this is a true value for the amount of blackleg in a seed lot.*

*\*\*Lots over 1% (percent) PVX will be downgraded or the grower may request the PVX designation dropped and classified TC stock.*

#### E. Chemical Injury:

1. The inspector is given authority to withhold certification pending the outcome of the winter test plot growout or refuse certification on a field or portion of a field sprayed or contaminated with a chemical that causes seed-borne injury to seed potatoes.
2. Those portions of a field that do not show enough chemical injury to interfere with field inspections but still may be contaminated to the degree that seed-borne chemical injury may occur in the next crop, shall be harvested and stored separately from other potatoes in that seed lot.

3. Under the direction of an inspector, a separate winter test sample shall be collected and submitted from those potatoes with the possible chemical injury.
  4. Certification will be withheld until winter test readings are completed.
- F. Fields may be refused certification due to unsatisfactory appearance caused by weeds, poor growth, poor stand, disease, insect damage, and any other condition which prevents accurate inspection or creates doubt as to the identity of the variety.
- G. The following are seed lot disqualifying conditions:
1. Seed lots or portions thereof may be disqualified for certification because of any condition that interferes with the inspection of the potato plants.
  2. Bacterial Ring Rot and Root-Knot Nematode are zero tolerance factors. Any seed lot, regardless of generation, is automatically disqualified from certification when any of these factors are found at any time.
  3. Evidence of failure to remove daughter tubers from rogued hills.
  4. When Bacterial Ring Rot is found in a seed lot, all potatoes grown by that farming operation from that seed source shall be disqualified.
- H. The following are conditions that may disqualify a seed lot:
1. The presence of any new or exotic disease to the state of California.
  2. Failure to list on an application, all seed sources that were used to plant a particular seed lot.

### **VIII. Post Harvest Testing Requirements**

- A. Each seedlot of Nuclear and Generation 1, and any lot of Generation 2,3, and 4 which may be entered for recertification the following season, shall be tested in a winter test plot or greenhouse, or both. Lots not tested are ineligible for recertification and, additionally, may not be eligible for recertification in another state or country. As a means of monitoring program effectiveness, the CCIA may test all lots entered for production as California certified seed potatoes.
- B. Each seed lot will be tested on a sample basis. The following are minimum sizes of samples based on the lot acreage, which shall be furnished to the CCIA for testing in a winter test plot or greenhouse (each seed tuber should be less than or equal to 2 oz. in size):

1. Winter test samples must be submitted in bags weighing no more than approximately 50 pounds.
2. Small seed lots: 4 tubers per hundred weight, with a minimum of 50 tubers.

Larger lots:

Field Acres	Number of Samples	Total Tuber Number
1 to 5	1	220 tubers
6 to 10	2	440 tubers
11 to 20	3	660 tubers
21 to 40	4	880 tubers
41 to 80	5	1100 tubers

- C. Disease Tolerance. Seed potatoes entered for certification shall not exceed the tolerances in Table IV. The presence of diseases shall be determined visually except in the case of latent viral infections, where a serological test such as ELISA may be used to supplement the visual inspection. Compliance with the specified tolerances is based upon the sample inspected. The zero tolerance has been chosen for reasons of convenience and practicality and is not to be construed to mean that the lot inspected is free of these pests or factors. It does mean that no bacterial ring rot or root-knot nematode was found during the inspection process.

**Table IV Post Season Test Disease Tolerance**

Factor	Nuclear	Generation 1	Generation 2	Generation 3	Generation 4	Generation 5
Leafroll	0	0.50	0.50	0.50	0.50	****
Mosaic - Other varieties	0	0.50	0.50	1.00	2.00	****
Mosaic - Russet, Norkotah & Cal White	0	0.50	0.75	1.00	5.00	****
Spindle Tuber Viroid	0	0	0	0	0	0
Other visible virus - other varieties	0	0.50	0.50	1.00	2.00	****
Total Visible virus R-Norkotah	0	0.50	0.75	2.00	5.00	****
Ring Rot & Root Knot Nematodes	0	0	0	0	0	0
Chemical Injury: Severe	***	0.50	0.50	0.50	1.00	****
Chemical Injury: Mild	***	0.50	1.00	3.00	3.00	****
Varietal Mixtures	0	0	0.25	0.05	1.00	****

\*\*\*Does not apply.

\*\*\*\*Acceptance of the seed lot will be based on buyer/seller agreement.

## IX. Disease/Virus Testing

- A. The California Crop Improvement Association may grow and test samples of seed to determine the amount of virus or other disease in such seed. A reasonable amount of seed for testing shall be furnished when requested by the CCIA. CCIA may also take plants

and/or tubers from any planting or storage for inspection and testing purposes. Disease/virus-testing shall be performed using laboratory serodiagnostic and/or plant indicators, molecular hybridization, or other methods as may be determined to be suitable by the CCIA including those currently approved by the Potato Association of America. A list of the approved tests shall be maintained by and made available from the California Crop Improvement Association.

**B. Pre-Nuclear Testing Requirements:**

1. The applicant shall annually test all (100 percent) entry level explants, mother plants and base cultures prior to increasing through micropropagation techniques. All stock shall test negative for potato viruses A (PVA), M (PVM), S (PVS), X (PVX), Y (PVY) and leafroll; spindle tuber viroid (PSTVd); *Erwinia carotovora subsp. carotovora* and *Erwinia carotovora subsp. atroseptica* (Erw); and *Clavibacter michiganensis subsp. sepedonicus* (Cms).
2. The applicant shall sample test micropropagated seed potatoes during the final stage of multiplication prior to distribution. Stock shall test negative for PVA, PVM, PVS, PVX, PVY and PLRV, and Cms and Erw. Leaf tissue shall be sampled from two (2) percent of the plantlets and additionally, when appropriate, microtubers or tubercles shall be collected from one (1) percent of the plantlets.
3. The applicant shall sample test mass propagated seed potatoes during the final stage of multiplication prior to distribution. Samples shall be collected prior to kill down or shipment of plantlets. Stock shall test negative for PVS, PVX, PVY and PLRV, and Cms and Erw. Leaf tissue shall be tested from two (2) percent of the plants and tuber sampled shall be tested from one (1) percent of the plants.
4. Tests shall be conducted by an independent diagnostic laboratory approved by the CCIA. A list of approved laboratories is available upon request from the California Crop Improvement Association.

**X. Harvesting, Grading, and Storage Facility Requirements**

- A. Precautions shall be taken during harvesting, grading and storage to prevent contamination by bacterial ring rot and other potato pathogens.
- B. Storage inspections will be conducted at any time on all storage facilities containing seed potatoes eligible for certification.
  1. Seed potatoes shall be stored in sanitized storage areas after harvest and shall not be stored in the same storage facility with potatoes known to be infected with bacterial ring rot and root knot nematode.

2. Each lot of seed potatoes shall be harvested, graded and stored separately in such a manner as to preclude intermixing.
3. Each lot of stored seed potatoes shall be clearly identified in a manner approved by the CCIA.
4. All containers shall be new, for Nuclear and Generation 1. Containers for Generations 2, 3, 4 and 5 must be cleaned and sanitized if they have been previously used to contain potatoes.
5. Storage where sprout inhibitors were used in the previous season is not to be used to store certified seed