

**MONTANA STATE UNIVERSITY RULES AND REGULATIONS FOR
CERTIFICATION OF MONTANA SEED POTATOES
2011**

Section 1. Certification - Authority and General Provisions

- A. Certification of seed potatoes in Montana is conducted by Montana State University in accordance with Section 80-5-140 et seq., MCA.
1. These Rules and Regulations have been adopted in consultation with the Board of Directors of the Montana Potato Improvement Association.
 2. These Rules are effective upon approval by the President, and apply to the 2011 crop of Montana seed potatoes grown and future crops grown certified under these Rules.
 3. All correspondence and inquiries regarding the certification of Montana seed potatoes should be directed to: Director, Seed Potato Certification, MSU-Bozeman, PO Box 172060, Bozeman, MT 59717-2060. Telephone: (406) 994-3150; FAX: (406) 994-6042; e-mail: potatocert@montana.edu.
- B. Certification is a voluntary program designed to encourage the production of top-quality seed potato tubers through application of the requirements stated in the Rules for Seed Potato Certification and through research to improve seed potato quality and testing. Certification means that the seed potatoes were inspected and/or tested according to these Rules for Seed Potato Certification and those potatoes inspected or tested met the requirements of these Rules.
- C. By making application for certification under these Rules, the seed grower grants MSU the right of entry upon any property where seed potatoes are grown, stored, and graded and grants MSU the right to take samples of potato plants and tubers, soil, irrigation water, and pathogenic organisms for the purposes of testing and analysis.
- D. Failure to comply with these Rules shall be cause for refusal or cancellation of any application for or certification of any seed as certified seed potatoes.
- E. All cull tubers must be disposed of and rendered non-viable by June 1 of each year. Viable tubers, once germinated, should be treated with a desiccant and late blight fungicide.

Cull piles will be inspected by Montana State University any time after June 1. Results of such inspections will be kept on file at the Montana State University Seed Potato Certification Office. Any grower having a cull pile not passing inspection will be given a limited time in which to correct the situation. If the grower fails to correct the situation within the time allotted, the MSU Potato Specialist may make alternative arrangements to correct the situation and charge the costs to the grower.

continued to next page . . .

Failure to comply with this rule may result in loss of certification and/or fines imposed by the State of Montana Department of Agriculture.

Section 2. Application for Certification

- A. Any seed grower desiring to have seed potatoes certified by MSU under these Rules shall make application to MSU on a form furnished by it. Application forms are available from the Director, Seed Potato Certification, MSU-Bozeman, PO Box 172060, Bozeman, Montana 59717-2060.
- B. Completed application forms, along with the appropriate fees, must be received in the office of the MSU potato specialist on or before June 10th. Applicants not meeting the June 10th deadline may be assessed a non-refundable penalty of \$50.00 per registration (see Section 5). If a grower is late, a registered letter will be sent to that grower. The grower has ten (10) days after the letter is received to apply for certification. After ten (10) days, no application for certification will be accepted.
- C. Applications must be submitted for any seed lots, fields or varieties for which certification is sought. Failure of any grower to apply for certification of any seed lot, field or variety will result in that grower's field or variety being ineligible for certification.
- D. Applications for certification will not be accepted unless the applicant has enclosed the fees as set forth in Section 5 and has paid all previous indebtedness to the University. Tags will also be withheld until all past indebtedness is paid up.
- E. Growers on state borders shall be required to grow all potatoes under the Montana Rules and Regulations if they wish to certify any portion of their crop in Montana.
- F. A field map with clear designations of each seed lot, all documentation relating to the seed-source and any other information requested on the application form, must be attached to the application.
- G. Applications for Multiple Certifications. A grower may hold more than one certification. For each certification, a seed grower must submit a separate application form and pay the appropriate fees. Multiple certifications are subject to all rules for single certifications as well as the following requirements and restrictions:
 - 1. Each certification should be a separate seed lot, a seed of separate sources, or a different variety.
 - 2. ALL equipment that is shared by different growers shall be cleaned and disinfected each time it is moved from one grower to the next. Cleaning and disinfecting shall be the responsibility of the growers (see Section 8D).
 - 3. A grower intending to grow two (2) or more varieties shall be required to meet all conditions that apply to multiple registrations.

Section 3. Violations, Rejection of Application and Fields

- A. Any certified seed potato grower who willfully violates any certification rule or regulation shall be rejected for any certification for that given year.
- B. MSU may reject an application for certification for the following reasons:
 - 1. an incomplete application form, as determined by the MSU potato specialist;
 - 2. a late application form;
 - 3. the failure of a seed grower to pay a past due or delinquent account or the appropriate application and inspections fees;
 - 4. a seed-source ineligible for certification;
 - 5. the failure of a seed grower to appropriately clean and disinfect equipment.
- C. MSU may reject a seed lot, field or application for certification if the crop fails to meet the standards set forth in the rules and regulations.
- D. The MSU potato specialist shall send written notice by certified U.S. mail with return receipt requested to all seed growers whose application or whose seed lot or field is rejected for certification. This notice shall explain the reason for rejection and notify the seed grower of the right to appeal.

Section 4. Appeal Procedures

- A. Any grower who has a potato field rejected for certification by an MSU inspector shall have that field re-visited by the MSU chief inspector for verification or rejection of the original inspector's decision. If the field is rejected by the MSU chief inspector, the grower will be immediately notified verbally and will be sent a registered letter postmarked within five (5) days of the date of inspection.
- B. If a grower disagrees with a decision rendered by a certification inspector on a crop or any other decision resulting in non-certification of a crop, the grower may appeal this decision. The grower must file a certified letter of appeal within five (5) days of receiving the decision notice. The letter should be signed, dated and mailed to Director, Seed Potato Certification, MSU-Bozeman, PO Box 172060, Bozeman, Montana 59717-2060.
- C. Upon receipt, the letter will be submitted to the Head of the Department of Plant Science, or a designated representative if the Department Head is not available within the time frame of the appeal. The Head of the Department of Plant Science will make the final decision for the University. Within seven (7) days after receipt of the letter, the complainant will be notified of the University's ruling.
- D. Roguing or sorting is not permitted between the time of the initial inspection and the re-examination of the field(s) or storage(s) when growers have submitted an appeal. Violators shall lose the right of appeal and shall have certification rejected.

Section 5. Fees, Payments, Account Collection , Refunds and Adjustments

- A. Certification fees. Fees for the certification of seed potatoes are as listed below.
1. \$50.00 per acre for acres to be certified as **Nuclear and G1**, and
 2. \$41.00 per acre for acres to be certified as **G2, G3 and G4**, payment of which must be attached to the application form.
 3. Fees for greenhouse production to be certified as pre-nuclear and nuclear.
 - a. Contract Production
 1. Registration - \$0.10/sq. ft.
 2. 2 inspections included
 - b. Production of minitubers for planting on your own farm
 1. Registration - \$0.05/sq. ft.
 2. Inspections optional (\$100/inspection)
 4. All certification fees will be paid in full at the time of application for certification (June 10, 2011).
 5. Any application submitted after June 10, 2011 will include a \$50 late fee.
 6. Growers will be assessed a **special travel fee** to seed fields and storage facilities that are located outside an established seed producing county, and/or for reinspections at the request of the grower, and/or for inspections rescheduled due to unavailability of a grower or a grower's agent at the time of a regularly scheduled inspection.
- B. Testing and Miscellaneous Fees. Growers will be assessed fees to cover the full costs of laboratory testing of seed potatoes and miscellaneous services, including the following:
1. a **virus-testing fee**;
 2. a **bacterial ring rot confirmation test fee**;
 3. a **universal disease test fee**;
 4. a **post-harvest fee** and
 5. a **tissue culture material price**, for the purchase of TC plantlets and TC microtubers
 6. fees for any other inspection, testing, or purchase from MSU; and
 7. a base cost of \$20 per line or per variety will be added to the purchase of tissue culture plantlet or microtuber.
- C. Payments
1. All testing and miscellaneous fees are to be paid within 60 days of the date of billing, unless otherwise specified in these rules. The due date for all standard invoices is 60 days from the date of billing.
 2. All invoices not paid within 60 days from the date of billing will be considered delinquent and accrue interest at the rate of 1% per month (10% per annum) *retroactive to the date of billing*.
 3. The seed certification program will not accept an application for certification from any grower who has not paid his account in full at the time of application. The application will be returned to the grower until the grower pays all accounts in full.

4. Payments shall be mailed to the Seed Potato Certification Program, MSU-Bozeman, PO Box 172060, Bozeman, Montana 59717-2060. **Checks are to be payable to Montana State University.** No cash will be accepted.

D. Past Due or Delinquent Accounts

1. Any grower having an amount more than 30 days past due on his/her account will relinquish his/her rights to further certification and other Potato Lab services until all past due amounts are paid. Such action could result in loss of certification, and/or cancellation of special services and/or tissue culture services.
2. No certified seed tags will be issued to any grower who has an amount on his/her account that is 30 days or more past due.

E. Required Deposit for Certain Growers

1. MSU may require any first-time grower, any grower who has been inactive for a period of time, or any grower with a poor payment record to deposit an estimated payment for services prior to that service being rendered.
2. Refusal to make such a required deposit will make that grower ineligible for certification services.

F. New Grower Fee

To help recover the costs of the research and development which has built the Montana Seed Potato Program to what it is today, new growers, for the first two years of production, will be assessed the following surcharges subject to annual board approval:

1. 5% added to acreage [operations] fees,
2. 100% per test for disease testing and
3. 100% per tissue culture plantlet/microtuber.

G. Collection of Past Due/Delinquent Accounts.

1. Accounts which become 90 days or more past due may be turned over to the MSU Business Office for collection. The MSU Business Office may impose additional collection fees, including attorney fees and court costs if necessary to collect an account.
2. The MSU Business Office may turn a past due account over to a private collection agency, who may impose additional fees for services necessary to collect an account.

- H. Fee exemption. All enrolled 4-H members and FFA students growing five acres or less of seed potatoes as a project who are within an established seed producing county are exempt from paying certification and testing fees.

I. Refunds and adjustments.

1. If an application is rejected or withdrawn before the first field inspection, the acreage fee will be refunded.
2. If a seed lot or application for certification is rejected or withdrawn at the first field inspection, one-half of the acreage fee will be refunded.
3. If a seed lot or application for certification is rejected or withdrawn after passing the first inspection, no fees will be refunded.
4. The Seed Potato Certification Program will provide an amount not to exceed \$50,000 for adjustments to the fees of growers with low yields. Any grower whose total yield is less than 170 cwt per acre because of natural conditions will be eligible for the adjustment. Growers whose yields fall below 170 cwt per acre because they sell a portion of their yield to the commercial market are not eligible for the adjustment. Eligible growers will receive a credit of \$10/acre, which will be applied toward the certification fees for the following growing year; however, if the total requests for adjustments exceed \$50,000, each eligible grower's adjustment will be reduced proportionately. Eligible growers must apply for adjustment no later than November 30th of the crop year and will receive the credit in the following crop year, following verification of yields.

Section 6. What Constitutes Certified Seed.

- A. To qualify as Montana certified seed potatoes, the seed potatoes must be produced (grown) in accordance with the certification Rules of Montana State University. In addition, the potatoes must pass the final field inspection, Potato Lab disease testing and grade requirements of Montana State University and be accompanied by an official Montana State University certified seed potato tag.
- B. Certification means that the seed potatoes have been subjected to field and bin visual inspections by MSU inspectors pursuant to these Rules, and at the time of inspection, the individual potatoes and/or potato fields actually inspected met the requirements for certification set forth in these Rules.
- C. Official tags shall be issued only by the Director of the Montana Seed Potato Certification Program, and shall have the words "Montana Certified Seed Potatoes" and the producer's name, address, variety, seed class or other variations, and crop date for which the tags were issued printed plainly upon it. In addition, the tags shall show the address of Montana State University. The tags shall be of colors prescribed by the Department of Agriculture.

Section 7. Limitation of Warranty and Remedy

- A. Montana certified seed potatoes have been subjected to field and bin inspections pursuant to the Rules and Regulations of Montana State University. The seller, the inspector, Montana State University and any of its entities make NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, CONCERNING SAID SEED POTATOES, INCLUDING MERCHANTABILITY, FITNESS FOR A

PARTICULAR PURPOSE, QUALITY, OR ABSENCE OF DISEASE.

- B. The certification tag pertaining to any Montana certified seed potatoes indicates only that, at the time of inspection, the potatoes inspected met the requirements for certification as set forth in these Rules and Regulations. **BY ACCEPTANCE OF THE SEED POTATOES, THE BUYER EXPRESSLY AGREES THAT ITS EXCLUSIVE REMEDY FOR ANY BREACH OF DUTY OWED IN REGARD TO CERTIFICATION SHALL BE LIMITED SOLELY AND EXCLUSIVELY TO A RETURN OF THE PURCHASE PRICE PAID BY THE BUYER FOR THE SEED.**
- C. The above disclaimer of warranty and limitation of liability and remedy may not be altered or amended except by a written instrument and then only as to those parties specifically and expressly agreeing to the terms of the instrument. By acceptance of the seed potatoes, the buyer agrees that the disclaimer and limitations described herein are express conditions of sale, and that they constitute the entire agreement between the parties regarding warranty, liability or remedy.
- D. The assaying of seed potatoes to determine the absence or presence of chemical or pesticide residues is not a function of the MSU seed potato certification process. The certification of seed potatoes by MSU is not an affirmation of fact, promise, guarantee, or warranty, express or implied, that Montana certified seed potatoes are free from chemicals or pesticides residues.

Section 8. General Requirements for Certification

A. Seed Potatoes

1. ANY and ALL seed stocks entered for certification must be approved by the Montana State University prior to planting.
2. All potatoes must meet the requirements of this section and meet the disease tolerances in Section 10.
3. Post-harvest testing [also called Hawaii or southern testing] is mandatory for seed shipped out of state to be planted for recertification as seed, and for seed potatoes to be used for recertification in Montana. Exemption: Nuclear and Generation 1 seed not to be sold.
4. Any potato seed source not certified by Montana State University must be introduced through MSU, and increased through the Montana State University Potato Laboratory, or an MSU-approved laboratory. The grower involved shall bear all costs.
5. A seed stock or lot shall be rejected for certification for any of the following reasons:
 - a. failure to plant MSU-approved seed;
 - b. field(s), or any portion thereof, planted with culls;
 - c. blending seeds of two different sources;
 - d. at the time of inspection or testing, potato plants failed to meet disease tolerance limits set forth in Section 10.

6. Seed potatoes grown in Montana which have been transported out of Montana cannot be brought back into Montana for recertification.

B. Fields

1. The detected presence of the pathogen Columbia Root Knot Nematode (*Meloidogyne chitwoodi*) shall disqualify a field for future production of certified seed potatoes, unless the field(s) is fumigated with a recommended fumigant and rotated to a non-susceptible host crop for five years, or until soil tests indicate absence of Root Knot Nematode.
2. The confirmed diagnosis of Bacterial Ring Rot shall disqualify from seed certification all seed potatoes produced under that application for certification, or different applications using the same equipment. All such fields will be disqualified from seed potato production for a period of two (2) years.
3. There shall be a physical separation:
 - a. between one registration and another;
 - b. of at least twenty (20) feet between certified potato fields and commercial potato fields.
4. Certification shall be denied for any seed stocks grown in field(s) where commercial potatoes were grown the previous season.

C. Storage Facilities

1. Certified seed potatoes shall be neither stored nor graded in a storage facility containing non-certified potatoes.
2. Crops subject to separate applications for certification may be stored in the same storage facility. A physical identification (i.e. Matting, ribbons, paint, et.) between registrations for a common variety is permissible as long as seed potatoes from the transition zone are identified as a mix between the two lots for tracking purposes. However, if stored together without a demonstrable separation, and a disqualifying disease is found, all commonly-stored seed will be denied certification.
3. It is the grower's responsibility to sanitize the potato storage facility.

D. Equipment

1. It is the grower's responsibility to sterilize the equipment before and after use.
2. The exchange of equipment with neighbors is discouraged. Any such exchanges **WILL CONFORM** to the conditions in Section 2.G.

Section 9. Field Inspections, Cellar Visits, Post-harvest tests, Forms and Seed Directory

A. Field Inspections

1. The field inspection of each lot will be based on the visual inspection of the sample selected.
2. At least two (2) field inspections shall be made during one growing season. Field conditions permitting, a third inspection will be performed. Montana State University may make as many field inspections as necessary to fulfill the requirements of the certification program.
3. Inspections shall be performed by walking through the field in a prescribed manner and visually examining the growing plants. Each field shall be observed for abnormal and/or unusual cultural conditions. Inspections will not be made of each individual plant, but only a representative sample of the field.
4. Disease percentages shall be derived from actual plant count in the field. The inspector shall begin counts upon entering the field and shall proceed in a manner he/she deems reasonable and appropriate for adequate inspection of the field. During all inspections, a random sample, which shall be equivalent to at least 100 plants per acre, shall be counted, but not every acre is necessarily inspected. Overt symptoms of potato disease will be recorded by the MSU inspector on the inspection form. A percentage of the overt symptoms for each disease will be derived from the plant count. This disease percentage will be published by MSU in the annual seed directory.
5. All disease diagnosis shall consist of visual examination of the plants and/or plant parts in question. In case of detection of Bacterial Ring Rot caused by *Clavibacter* (equals *Corynebacterium sepedonicum*), visual diagnosis shall be confirmed by the Gram stain and serological test. All tests will be done at the expense of the seed grower.
6. The inspector may refuse to inspect a field for any of the following reasons:
 - a. recent application of dangerous agricultural chemicals which may present a health hazard to the inspector;
 - b. extensive storm or frost damage or other environmental conditions which do not permit satisfactory inspection of the field;
 - c. extensive chemical damage that seriously injures or impairs the growth of the plants or causes conditions that precludes or unreasonably limits a proper inspection of the field.
 - d. Any other condition which, in light of the circumstances, precludes or unreasonably limits inspection.

B. Post-harvest Grow-out Test and Cellar Visits

1. For the post-harvest grow-out test, growers will take samples at the time of harvest. The sample size should be 400 tuber per sample. Number of samples per field for G2, G3, and G4 are as follows:

40 acres or less	one sample
41 – 80 acres	two samples
81 – 120	three samples
120 acres or more	four samples

2. Cellar visits will be performed only at the grower's request. The purpose of the visit is to assist the growers in evaluating the appropriateness of the potato storage.

C. Inspection Forms, Records and Seed Directory

1. Inspection data shall be recorded on an official inspection form(s). The form shall be signed by both the inspector and the grower or his/her designated agent and properly dated. The original shall be presented to the grower and a copy retained by the inspector for the Montana State University records.
2. All MSU seed potato certification and laboratory records, application forms, inspection reports, testing reports, and other documents shall be kept for seven years.
3. MSU shall publish a Montana certified seed potato directory for each crop year. The seed directory shall include:
 - a. the full name of the Montana certified seed grower as it appears on the seed registration records. However, any grower may request to have his mailing address and telephone number excluded from publication in the seed directory;
 - b. the seed class;
 - c. the number of acres certified;
 - d. the PVX designation;
 - e. the PVY designation;
 - f. all field-inspection readings;
 - g. such other information collected in the performance of the certification program as determined by the MSU potato specialist, in consultation with the Montana Potato Advisory Board.

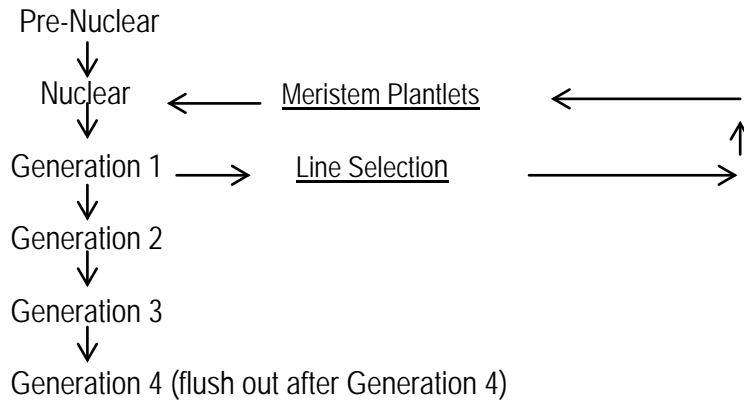
Section 10. Disease Tolerance for Certification

- A. Montana certified seed potatoes that test within the RECOMMENDED PVX or maximum PVY tolerance limits in Table 2 are designated as "PVX Generation" or "PVY Generation" seed potatoes, respectively. Testing for PVX and PVY will be done during the summer using ELISA methods.

1. "PVX tolerance limits" means the RECOMMENDED allowable percentage of detection of potato virus X at the time and place of a virus test to qualify a lot of seed potatoes for specific certification.
 2. "PVY tolerance limits" means the maximum percentage of detection of potato virus Y at the time and place of a virus test. These limits do not affect the qualification of a lot of seed potatoes for certification. EXCEPTION: The PVY maximum tolerance limit for planting in Montana will be 0.5% based on summer testing.
 3. Disease tolerance limits means the maximum allowable observation of any overt symptoms for certain diseases at the time and place of the inspection.
 4. Seed lots that test within the RECOMMENDED PVX tolerance limits as specified in Table 2 are designated as "PVX Generation".
 5. Seed lots that test within the maximum PVY tolerance limits as presented in Table 2 are designated as "PVY Generation" seed potatoes.
 6. The recommended PVX and the maximum PVY tolerance limits set by MSU for each class of Montana certified seed potatoes are specified in Table 2.
 7. All seed classes must be summer tested for PVY, except Generation 3 seed that will not be planted back in Montana for recertification and Generation 4 seed. Seed exceeding the maximum PVY tolerance limits cannot be planted for certification purposes in Montana.
Note: If Generation 3 seed is being sold out of state for recertification as seed, growers are advised to test for PVY during the summer growing season.
 8. If PVX is detected in the Winter Post Harvest Test, all generations of all seed lots from that farm will be tested for PVX the following summer.
- B. Montana certified seed potatoes that exceed the RECOMMENDED maximum of PVX or the maximum PVY tolerance limits in Table 2 by lab test, will have no prefix before the given generation.
- C. An indication of zero tolerance means that a particular disease must not be observed during various field inspections, cellar visits or lab tests. **Note:** A "0" (zero) recorded for a disease does not mean that a lot of seed potatoes is free from a certain disease or cause of disease. It means only that a disease was not observed during regular certification procedures.

D. Certified Seed Production Field disease tolerances are listed in Tables 1 and 2.

1. Required steps for production of seed stocks. Each subsequent generation is the progeny of the previous generation.



2. Pre-Nuclear

Pre-Nuclear must be tissue culture plantlets cut from disease-free materials or greenhouse produced minitubers produced from disease-free plants.

3. Nuclear

- a. Seed source must be pre-nuclear and/or grower's selected lines grown in Montana.
- b. One hundred percent (100%) of the mother materials must be tested for all diseases of concern.
- c. Seed must be planted as tuber units and hill units if a selected line is used; or as family units if meristem plantlets are used.
- d. There must be two (2) feet between plants and three (3) feet between units.
- e. One hundred percent (100%) of the plants must be tested for PVA and PVY by ELISA during summer disease testing. PVA testing will be conducted for research purposes. (PVX testing optional unless found in the Winter Test)

Exception: if source of nuclear is tissue culture plantlets grown in an insect-proof greenhouse, one and one-half percent (1.5%) of the plants must be tested for PVA and PVY.

- f. Nuclear plants must be free from all diseases of concern (Table 1 and Table 2).
- g. Post-harvest testing is optional for seed not to be sold. Post-harvest testing at the

Montana winter test plot is required for all seed to be sold.

Note: Nuclear seed is not to be sold out-of-state.

4. Generation 1

- a. Source of Generation 1 must be nuclear seed.
- b. Seed must be planted as hill units.
Exception: Seed generated from insect-proof greenhouses may be exempt from this rule.
- c. 100 hundred percent (100%) of plants or hill units will be tested for PVA and PVY by ELISA in the summer testing. PVA testing will be conducted for research purposes. (PVX testing optional unless found in the Winter Test)
- d. There is 0% tolerance for all diseases of concern (Tables 1 & 2).
- e. Post-harvest testing is required.

5. Generation 2

- a. Seed source must be Generation 1.
- b. Two hundred (200) plants per acre shall be tested for PVA, PVX and PVY by ELISA in the summer testing.
- c. Post-harvest testing is required.

6. Generation 3

- a. Seed source must be Generation 2.
- b. Testing plants (100 plants per acre) for PVA, PVX and PVY during the regular growing season is optional for seed that will not be planted back in Montana for recertification.
- c. Post-harvest testing is required.

7. Generation 4

- a. Seed source must be Generation 3.
- b. Testing plants (50 plants per acre) for PVA, PVX and PVY during the regular growing season is optional.
- c. Progeny of Generation 4 cannot be planted for recertification purposes in Montana.
- d. Post-harvest testing is required.

E. Identities

1. Line-selection (LS)

Seed potatoes produced through the process of line selection will be given LS as identity. To qualify for line selection, selected units must be planted in the field for comparison of plant performance and yields for at least two years. The best line can be used as a source of nuclear plants. **LS identity can only be carried to Nuclear and Generation 1.**

2. Meristem (M)

Seed potatoes generated through meristem methods and propagated *in vitro* will be given M as identity. Meristem and propagation work must be done in a laboratory approved or recognized by Montana State University (Appendix B). **M identity can only be carried to Nuclear and Generation 1.**

3. Stem cutting (SC)

Seed potatoes increased using the stem cutting method will be given SC as identity. **SC can only be carried in Nuclear and Generation 1.**

TABLE 1
VISUAL INSPECTION TOLERANCES FOR CERTIFICATION

Disease	Nuclear & Generation 1 All Inspections	Generation 2 All Inspections	Generation 3 All Inspections	Generation 4 All Inspections
Leafroll	0.0	0.05	0.1	0.2
Mosaic	0.0	0.1	0.2	0.5
Spindle Tuber	0.0	0.0	0.0	0.0
Calico	0.0	0.15	0.3	1.0
TOTAL All Non-latent Viruses	0.0	0.2	0.4	1.0
Haywire	0.0	0.1	0.2	0.5
Witches Broom	0.0	0.1	0.2	0.5
Giant Hill	0.0	0.05	0.1	0.5
Varietal Mix	0.0	0.05	0.1	0.5
Volunteer Potatoes (same variety)	0.0	0.05	0.1	0.5
Bacterial Ring Rot	0.0	0.0	0.0	0.0
Columbia Root Knot Nematode (visible symptoms)	0.0	0.0	0.0	0.0

IMPORTANT NOTE: The 0.0% tolerance is not intended, nor may it be construed, to mean that the lot inspected is free from the disease. In cases of bacterial ring rot and Columbia root knot nematode, it means only that said disease was not identified during the inspection process. In cases of other disease, it means only that the disease infection should be rogued to zero.

**TABLE 2
SUMMER RANDOM LEAF TESTING
PVX & PVY SEED CLASSES AND REQUIREMENTS ****

SEED CLASS	PLANTS SERO-TESTED	RECOMMENDED PVX TOLERANCE	PVY TOLERANCE	RECOMMENDED PLANTING METHOD	OTHER DISEASE TOLERANCES
Nuclear	100%	0%	0%	Tuber Unit	See Table 1
Generation 1	100%	0%	0%	Hill Unit	"
Generation 2	200 leaves per acre	1%***	1%***	regular planting	"
Generation 3 (optional)	100 leaves per acre	N/A	N/A	regular planting	"
Generation 4 (optional)	50 leaves per acre	N/A	N/A	regular planting	"

** NOTE: Percentage of infection is based on ELISA test.

***EXCEPTION: Seed to be replanted in Montana may not exceed .5% PVX or PVY based on summer lab testing. See Section 10.A.2.

NOTES:

1. Enzyme-linked Immunosorbent Assay (ELISA) for all virus disease(s) of concern shall be required each year for Nuclear and G1.
2. G4 seed shall not be used for the purpose of recertification in Montana.
3. The 0.0 tolerance means that all infected plants must be rogued out.

Section 11. Out-of-State Restriction

Certified Nuclear and Generation 1 seed potato stock will not be sold out of state.

Section 12. Tags, Tag Colors, Grades and Bulk Shipments

Grades have been established by the State Department of Agriculture pursuant to 80-3-311, Montana Codes Annotated, 1981. Any questions or other concerns regarding grades should be presented to the State Department of Agriculture. Montana State University assumes no responsibility for the establishment, inspection or enforcement of grades. A copy of the relevant Department of Agriculture regulations are attached as Appendix B.

Section 13. Plantlet Production on a Grower's Seed Farm or Private Micropropagation Laboratory

The following conditions must be fulfilled before plant material produced by a private micropropagation laboratory, including a grower's individual seed farm, will be accepted into Montana's Limited Generation Certification Program.

1. Propagation sources must be disease-free materials.
2. Testing
 - a. All initial *in vitro* mother plant materials must be tested for PVX, PVY, PVS, PVA, and PLRV by ELISA and electron microscope; must have the PSTV test by the PSTV nucleic acid hybridization assay; *Erwinia carotovora* must be tested for by CVP or MacConkey's method, and *Clavibacter* must be tested for by gram stain and immunofluorescent antibody stain. These tests will be made by the Montana State Potato Laboratory or by an independent testing laboratory approved by the Montana Seed Potato Certification Program. The testing results are to be sent to the Montana seed grower and will serve as the documentation source for the certification office.
 - b. Plantlet populations or mini-tubers produced in a greenhouse also shall be randomly tested for all diseases of concern. A minimum of one and one-half percent (1.5%) of plants shall be sent to the MSU Potato Lab prior to planting.
3. Classification
 - a. Plantlets increased *in vitro* (pre-nuclear) can be used as a source of nuclear, and the progeny will be classified as nuclear if they are 100% tested for all diseases by the MSU Potato Lab for diseases stated in Section 13, Item 2a., and the progeny will be classified as nuclear.
 - b. Minitubers produced in a greenhouse can be used as a source of Generation 1, and the progeny will be classified as Generation 1.
 - c. Minitubers produced in a greenhouse can be used as a source of nuclear for planting in the field if they are 100% tested during the nuclear field year, and the daughter tubers (Generation 1) are planted as family units the following year and 100% tested.
4. Structural, Cultural and Certification Requirements for Greenhouse Production
 - a. Greenhouse facilities must be insect-proof and approved by MSU Seed Potato Certification prior to planting.
 1. Double-door entry with enough space for a dip-pan and room to remove/change coveralls. Growers will have 1 year to make the structural changes..
 - b. Seed source must be tissue culture plantlets or microtubers produced by the Montana Seed Potato Certification Program. Propagation of plantlets is allowed in grower labs in approved facilities. New plantlets must be obtained from MSU each year, or if from Montana grower stock, must be tested by MSU each year.
 - c. New (sterilized) growth media shall be used for each planting.

- d. Spring production should be registered for certification by the same deadline as for field registrations. Late summer and fall crops should be registered immediately after planting.
- e. Contract production:
 - 1. Two inspections are required. The first inspection will be performed during optimal plant growth and the second inspection will be performed just before vine kill. It is the responsibility of the grower to schedule the inspections with the certification program.
 - 2. Leaf testing for PVA, PVX, PVY at 1.5% of plants
 - 3. Tuber or stem testing for bacterial ringrot (*Clavibacter michiganensis*) 10 samples/ lot
 - 4. Stem testing for blackleg and soft rot bacteria (*Pectobacterium sp.*) 10 samples/lot
- f. Production of minitubers for planting on your own farm.
 - 1. Visual inspections are optional
 - 2. Leaf testing for PVA, PVX, PVY at 1.5% of plants

5. Cost

Growers involved will bear the cost of testing.

APPENDICES

APPENDIX A Glossary of Terms

1. Bacterial Ring Rot A disease caused by *Clavibacter* (equals *Corynebacterium sepedonicum*). There is "0" tolerance for this disease and the discovery of a single infected plant in the field, or tuber in the storage, is sufficient for rejection of certification.
2. Blackleg A disease caused by a complex of two organisms: *Erwinia carotovora* var. *atroseptica* and *Erwinia carotovora* var. *carotovora*. Due to the unpredictable pathogenic nature of these two pathogens, the blackleg disease infection has been excluded from the certification disease list in Table 1 on page 15. The visual reading of this disease infection from individual seed lots can be obtained from the MSU Seed Potato Certification Office.
3. Columbia Root Knot Nematode A disease (infestation) of the nematode *Meloidogyne chitwoodi*. There is no tolerance (zero tolerance) for this disease and the discovery of a single infected plant in the field, or tuber in the storage, is sufficient for rejection of certification.
4. Disease Tolerance Since "disease free" seed is unknown except in extremely special circumstances, certification rules and regulations attempt to specify certain levels of disease infection that are low enough to reasonably preclude significant effect on seed quality.
5. ELISA means "enzyme-linked immunosorbent assay". It is a modified serology test. At the MSU Potato Lab, an enzyme-labeled antibody is used to react to antigen (viruses). By adding substrate, the resulting enzyme-substrate reaction provides easy detection of the antigen.
6. Greenhouse Indexing Basically, a quality control program for seed that is intended for replanting a grower's seed plot. Single eyes are removed from numbered tubers, planted in greenhouse benches and allowed to grow to about a height of 10 inches. These plants are examined for disease and genetic aberrations and the grower receives a written report detailing the results.
7. Grower A single operation actively engaged in raising and producing seed potatoes whether as a family farm or farms, individual, partnership, corporation or firm.
8. Hollow Heart A non-parasitic condition of the tuber caused by uneven growing conditions in the field. It is confined mainly to large or oversized tubers and is characterized by the presence of variously sized, irregularly-shaped white to brown cavities in the centers of the tubers. Hollow Heart has not been shown to affect seed quality.
9. Late Blight A fungal disease caused by *Phytophthora infestans*. There is a one percent (1%) maximum tolerance of visible tuber symptoms for this disease.
10. Latent Virus A virus infecting a plant that fails, under normal climatic and cultural conditions, to cause visible symptoms on the diseased plant. Examples are Potato Virus X and Potato Virus S.
11. Line Selection The selected plant units from unit selection be planted as lines for comparison of plant performance and yields. The best line, after two years of comparison, can be used as Nuclear, PVX-Nuclear and SC-Nuclear.
12. Lot A field or the potatoes harvested therefrom.
13. Microtuber A tuber produced in tissue culture medium.

14. Mini-tuber A tuber produced from a plant grown in an insect-proof greenhouse. The source of the parent plant must be a disease-free tissue culture plant or microtuber.
15. Non-latent Virus A virus infecting a plant that almost always causes visible symptoms on the diseased plant. The symptoms may at times be used synonymously with the virus. An example of such a case is Calico (symptom expressed by the plant) which is caused by Alfalfa Mosaic Virus.
16. Post-harvest Test (also known as Hawaii or Southern Test) Because a late season infection of certain virus diseases cannot be detected under Montana field conditions, samples from seed lots are planted during the winter in Hawaii and observed for symptoms of seed-borne viral infection. It is not intended to be substituted for laboratory testing, but only to supplement it. The post-harvest test is mandatory for seed potatoes to be used for seed purposes.
17. Plant Units: Tuber Unit A method of planting whereby cut seed pieces (usually four) from one tuber are planted in a row. Hill Unit A method of planting whereby tubers from a single plant are dropped consecutively in a row. These tubers may be drop seed or cut seed. Family Unit A method of planting where tubers produced by plants grown in a single hill unit, or plants cut from a single tissue culture plant, are planted consecutively in a row. Tubers may be cut seed pieces or drop seed.
18. PVX prefix means that a lot of seed has been tested for potato virus X using the ELISA method and the infection rate is less than the maximum allowable percentage set for each seed class set forth in the Montana State University Rules and Regulations for Seed Potato Certification.
19. PVY prefix means that a lot of seed has been tested for potato virus Y using the ELISA method and the infection rate is less than the maximum recommended percentage set for each seed class set forth in the Montana State University Rules and Regulations for Seed Potato Certification.
20. Rejected As applied to a field or lot of potatoes, means that the potatoes (plants and/or tuber) failed to meet the certification standards as stated in the official Rules and Regulations of MSU.
21. Roguing The removal and destruction of all diseased or undesirable plants, hill units or tuber units and potatoes produced thereon during the growing season.
22. Seed Plot A field that is planted in tuber or hill units.
23. Sunburn Caused by exposure of tubers to sunlight or strong diffused light. Tubers develop a green or reddish color due to chlorophyll formation. Sunburn (greening) does not adversely affect a seed potato's quality.
24. Zero "0" Tolerance The 0.0% tolerance is not intended, nor may it be construed, to mean that the lot inspected is free from the disease. In cases of bacterial ring rot and Columbia root knot nematode, it means only that said disease was not identified during the inspection process. In cases of other disease, it means only that the diseased plants observed were required to be rogued out.

APPENDIX B

**MONTANA DEPARTMENT OF AGRICULTURE
AGRICULTURAL SCIENCES DIVISION**

**Title 80, Chapter 3, Part 3, MCA
Montana Produce Act**

80-3-301. Short title. This part may be cited as the "Montana Produce Act".

80-3-311. Standard grades for produce. (1) Unless a Montana grade standard has been established, the standard grades for produce:

(a) are limited to the U.S. grades governing the produce;

(b) must conform in all respects and be identical with the most recent standards established by the U.S. department of agriculture for the produce; and

(c) when conforming, must be accepted as the legal standards for this state.

(2) The department may by rule establish state grades for produce grown in Montana when the amount grown reaches a volume rendering it of market importance or when requested by the industry. State produce grades must be established in consultation with representatives of the various components of the produce industry, including growers, sellers, buyers, traders, wholesalers, retailers, and consumers.

(3) The grade "Montana unclassified" must contain at least 50% of produce that would grade U.S. No. 2 or better.

(4) Produce not conforming to established grades may be sold if it is marked in the same manner as graded produce, except that in place of specifying the grade, the word "ungraded" or "unclassified" must be used.

80-3-315. Shipping point inspection -- fees. Produce graded and prepared for shipment is subject to a shipping point inspection by the department upon request; however, Montana-grown seed potatoes that are entered in the Montana seed certification program and prepared for shipment off the farm for planting purposes are subject to a shipping point inspection by the department. Inspection fees must be set by rule and must be commensurate with the cost of providing the inspection.

**Administrative Rules of Montana
Sub-Chapter 35
Grading of Certified Seed Potatoes**

4.12.3501 GENERAL REQUIREMENTS

(1) The department of agriculture, pursuant to [80-3-311](#) and [80-3-315](#), MCA, adopts grade standards and inspection procedures to enforce those grades as further set out in these rules. For the purposes of grading certified seed potatoes, the department hereby adopts by reference the United States Standards for Grades of Potatoes as specified in 7 CFR Part 51 sections 1540 through 1566 of the January 1, 1998 edition with the exceptions specified in ARM [4.12.3501](#) through [4.12.3504](#).

(2) All seed potatoes shall be shipped under tags that represented all grade and classes to which they were

sorted and certified.

(3) Final pack inspection.

(a) all Montana certified seed potatoes sold in bulk or offered for sale in bags shall be inspected by a federal or federal-state inspector. The final inspection shall be made before potatoes are moved from the loading point. If the potatoes do not meet the final grade requirements, the grade certificate shall not be issued unless the potatoes are regraded to meet the requirements. Standard method of loading shall be used when loading trucks and/or railroad cars, or bulk shipments; and

(b) federal and federal-state grade inspectors are granted authority at any or all times to call in a potato specialist from the Montana state university (MSU) extension potato certification program if they suspect grower(s) are not handling certified seed potatoes in accordance with guidelines set forth by the MSU extension potato certification program, or if they suspect potatoes inspected do not conform in other respects with the requirements of MSU extension potato certification program. However, under no circumstances shall the department be held responsible for enforcing MSU extension potato certification program guidelines and procedures, and any failure to review for such compliance shall not be construed as approving for MSU extension potato certification program guidelines.

(4) Issuance of an official grade certificate by the department shall mean approval for department grading standards only.

(5) Official tags shall be issued by MSU extension potato certification program officials to the applicant or a designated agent. No mutilation of official tags by writing or marking over, or otherwise altering original information printed thereon, shall be permitted unless requested in writing by the grower and approved by the department of agriculture.

(6) The grower, to whom the official tags were issued, shall be responsible for the proper completion of the tags.

(7) Each lot of certified seed potatoes shall be inspected by either federal or federal-state inspectors at the time of shipment.

(8) Ungraded potatoes shall not be inspected.

(9) Washing of certified seed potatoes to be tagged with an official tag shall not be permissible unless requested by the buyer. Presence of soil on tubers shall not constitute reason for throwing them out of the grade. Grower should allow for weight of soil when packaging potatoes for sale.

(10) It shall be permissible to use official tags on potatoes containing an excess of oversize, undersize, and/or sprouts providing that the official grade certificate indicates that the potatoes exceed the tolerance. It shall be the responsibility of the grower to submit written evidence that the purchaser is willing to accept such a grade.

4.12.3502 SEED CLASS DESIGNATION

(1) At the time the tags are ordered by the grower, it shall be the responsibility of the MSU extension potato certification program to print clearly across the face of the appropriate grade tag the following: the proper class designation, growers name, address, and any other pertinent information necessary for shipment of the potato crop.

4.12.3503 BLUE TAGS

(1) The official blue tag shall be used to designate seed lots that are the equivalent of the U.S. No. 1 grade with the following exceptions:

(a) size -- the minimum size shall be 1 1/2 ounces and the maximum size shall be 12 ounces.

(b) combined total length of growth cracks may extend two-thirds length of tuber and/or the depth of one-fourth

the diameter of the tuber.

(c) cuts and bruises shall be scored when removal causes loss of more than 10% of the total weight of a tuber.

(d) air cracks shall be scored only if the depth exceeds 1/2 inch.

(e) sunburn (greening) , hollow heart, hollow heart with discoloration, light brown discoloration or brown center shall be permissible.

(f) stem-end discoloration -- serious discoloration extending beyond a depth of 1/2 inch shall be scored unless verified by a department approved pathologist as not being a disease symptom.

(g) immaturity, as indicated by feathering of skin, shall not disqualify provided there is no undue loss of weight from wilting or shriveling of tubers.

(h) sprouts - - not more than 10% of the lot may have sprouts more than 3/4 inch in length. Individual sprouts or clusters shall not be scored on appearance or length if within the 10% tolerance.

(i) oversized, undersized, and sprouts shall be permissible provided the excess tolerance is indicated on the official grade certificate.

(j) freezing injury other than the condition of being frozen or affected by soft rot or wet breakdown shall be scored when removal of the affected area causes a loss of more than 10% of the total weight of the tuber. The tolerance shall be not more than 3 percent for freezing injury.

(k) the tolerance shall be not more than 1% for potatoes which are affected by late blight tuber rot, soft rot or wet breakdown.

4.12.3504 RED TAGS

(1) The official red tag shall be used to designate seed lots that are the equivalent of U.S. No. 2 grade with the following exceptions:

(a) size -- the minimum size shall be 1 1/2 ounces and the maximum shall be 12 ounces.

(b) growth cracks shall not be scored.

(c) surface or russet scab shall not be scored.

(d) cuts and bruises shall be scored when removal causes loss of more than 15% of the total weight of a tuber.

(e) second growth shall not be deliberately removed.

(f) the following blue tag exceptions shall also apply to red tags: air cracks, sunburn (greening) , stem-end discoloration, immaturity, sprouts, oversize, undersize, hollow heart, hollow heart with discoloration, light brown discoloration, brown center, freezing injury, and the tolerance for late blight tuber rot.

4.12.3505 BULK SHIPMENTS

(1) Potatoes shipped in bulk shall meet all official grade and MSU extension potato certification program requirements. All carriers shall be tagged in an appropriate manner.

(2) Official tag carrying information described in this section shall be used and, in addition, the following information must be filled out on the official bulk tag:

(a) inspection certification number;

(b) date inspected;

(c) buyer's name;

(d) date and time loaded;

(e) trucking firm's name and driver's initials;

(f) carrier license or car number; and

(g) approximate weight (100 lbs. occupies about 2.4 cubic feet, or .42 x cu. ft. = number of CWT's) .

Title 80, Chapter 5, Part 1, MCA Certification

80-5-140. Application of sections. A person, firm, association, or corporation that issues, uses, or circulates any certificate, advertisement, tag, seal, poster, letterhead, marking, circular, or written or printed representation or description pertaining to seeds or plant parts intended for propagation or sale or sold or offered for sale in which the words "Montana state certified", "state certified", "Montana certified", or "one year off certified" or similar words or phrases are used or employed is subject to 80-5-140 through 80-5-144.

80-5-141. Rules by Montana state university-Bozeman -- certification agencies. Every person, firm, association, or corporation subject to the provisions of 80-5-140 through 80-5-144 shall observe, perform, or comply with all rules and standards for seed certification established or specified by Montana state university-Bozeman, hereafter referred to as the university, as to what crops grown or to be grown in Montana shall be eligible for certification hereunder, as to the conduct of such certification, either by said university directly or by agents or agencies authorized by it for the purpose, and as to standards, requirements, and forms of and for certification hereunder; provided, however, that not more than one such agent or agency for certification shall be designated for any one specified crop. No certification within the provisions of [80-5-140](#) through [80-5-144](#) shall be made or authorized except by or through said university.

80-5-142. Certification work on self-supporting basis. Certification work, whether conducted by said university or by an agency designated by it, shall be on a self-supporting basis and not for financial profit.

80-5-143. Withholding certification. The said university or its designated agency or agencies may withhold certification from any grower of seeds or plant parts who is engaged in or attempting to engage in any dishonest practices for the purpose of evading the provisions of [80-5-140](#) through [80-5-144](#), including standards and rules laid down by the said university or its designated agency or agencies to cover certification.

80-5-144. Unlawful use of certification -- penalty. A person, firm, association, or corporation may not issue, make, use, or circulate any document purporting to be or represented as a seed or plant part certification certificate, represent seeds or plant parts as certified, or use the term "Montana state certified", "state certified", "Montana certified", or "one year off certified" or similar words or phrases, without the authority and approval of the university. A person, firm, association, or corporation who violates [80-5-140](#) through [80-5-144](#) is guilty of a misdemeanor and shall be fined not less than \$100 or more than \$500 for each offense.

Title 80, Chapter 5, Part 4, MCA Seed Potato Disease Control Act

80-5-401. Short title. This part may be cited as the "Seed Potato Disease Control Act".

80-5-402. Definitions. As used in this part, the following definitions apply:

(1) "Certified seed potatoes" means potato seed stock that has passed limited field and storage inspections and that has been grown in accordance with the certification rules and regulations of an official seed potato certifying agency of the state or country of origin and certified as such.

(2) "Commercial purpose" means planting or propagating potatoes for the purpose of selling, trading, or otherwise exchanging for profit.

(3) "Department" means the department of agriculture provided for in [2-15-3001](#).

(4) "Person" means an individual, firm, partnership, corporation, company, association, or separate business or legal entity.

(5) "Seed potatoes" or "potato seed" means all varieties of potato tubers, stems, and other plant parts of the herb plant known as *Solanum tuberosum* that are intended or used for seed purposes, planting, propagation, or reproduction.

80-5-403. Imported seed potatoes -- restrictions -- exceptions. (1) To control and prevent the spread of contagious diseases among seed potato stock, seed potatoes may not be imported into this state for any commercial purpose unless the seed potatoes are:

(a) from seed stock produced as a part of a certified seed potato crop in the state or country of origin and certified as being from that stock;

(b) subject to inspection at the Montana receiving point by a federal or state-federal standard grade inspector;

(c) shipped in a clean, disinfected container or transportation carrier; and

(d) accompanied by a United States department of agriculture or state of origin certification of inspection describing the seed variety, seed class, standard grade, quality or condition, and seed source and have affixed to each inspection certificate an official state of origin seed potato certification tag or label.

(2) The provisions of subsection (1) do not apply to any unit of the Montana university system when it is importing into this state potato seed for research or educational purposes.

(3) Seed or commercial potatoes, equipment, machinery, bags, or containers known to be diseased or contaminated with bacterial ring rot, golden nematode, or other diseases designated by department rule may not be brought into this state.

80-5-404. Planting noncertified seed potatoes prohibited -- exceptions. (1) To control and prevent the spread of contagious diseases and viruses among seed potato stock, it is unlawful for any person to plant or produce potatoes, either seed or commercial, from any seed potato stock unless the seed potatoes are:

(a) from seed stock produced as a part of a certified seed potato crop in the state or country of origin and certified as being from that stock;

(b) subject to inspection at the receiving point by a federal or state-federal standard grade inspector if from a source outside the county;

(c) shipped in a clean, disinfected container or transportation carrier; and

(d) for each individual lot of seed potatoes, accompanied by a United States department of agriculture or state of origin certificate of inspection describing the seed variety, seed class, standard grade, quality or condition, and seed source and have affixed to each inspection certificate an official state of origin seed potato certification tag or label.

(2) The provisions of this section do not apply to:

- (a) potatoes grown in home gardens;
- (b) potatoes grown by any unit of the Montana university system for research or educational purposes.

80-5-405. Enforcement -- penalty. (1) The department shall administer and enforce the provisions of this part.

(2) When potatoes are found to be in violation of this part, the department may issue orders:

- (a) restricting transportation of the potatoes;
- (b) requiring treatment or destruction of the potatoes; or
- (c) requiring other disease prevention or suppression measures.

(3) The department may adopt rules governing quarantines to prevent the intrastate or interstate movement of diseases of potatoes from infested areas and adjacent areas. Quarantines may restrict or prohibit the transportation of plants, seed potatoes, machinery, equipment, soil, or other material capable of transporting the disease in any stage of development.

(4) A person violating any provision of this part is guilty of a misdemeanor and upon conviction shall be punished as provided in [46-18-212](#).