Department of Agriculture
Government of Western Australia

WESTERN AUSTRALIAN

CERTIFIED

SEED POTATO SCHEME

Incorporating the

National Standard for the

Certification of Seed Potatoes

AGWEST
PLANT LABORATORIES

WESTERN AUSTRALIAN
SEED ADVISORY COMMITTEE

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AGWEST Plant Laboratories website has up to date versions of the registered and certified seed rules and disease diagnostic services.

www.agric.wa.gov.au/agency/agwest/plantlabs

TABLE OF CONTENTS

INTRODUCTION

The Australian potato industry recognises the need for a National Seed Potato Certification Standard, as a prerequisite for positioning itself to capitalise on the opportunities for domestic and international growth of the industry.

GENERAL PURPOSE OF THE STANDARD

Seed certification schemes exist in most potato-producing countries, for three prime reasons. They provide assurances on:

- trueness to type (i.e. that the variety is the one it is represented to be); and
- disease status of the seed; and
- quality of seed.

The purpose of the following National Standard, is to ensure that irrespective of the State of origin of seed potatoes, buyers will receive seed which is certified according to a single nationally agreed standard - this has not been the case. The introduction of a National Standard will, for the first time, afford domestic and export buyers a level of quality assurance, which has hitherto been impossible to provide.

The Western Australian Seed Potato Certification Scheme ('the scheme') is an industry cooperative scheme using the National Standard as a minimum. Areas where the national standard is exceeded include virus testing. The Western Australian Department of Agriculture, through its AGWEST Plant Laboratories business unit, administers the scheme and enforces the industry agreed standards. AGWEST Plant Laboratories inspectors undertake inspections of both the growing crop and harvested tubers, provide advice and certify seed lots which meet the quality standard. Accreditation of seed growers to assess seed lots under SQF 2000 Quality Assurance arrangements is also a feature of the scheme.

Western Australia is isolated from the rest of the world and Eastern Australia by sea and deserts. It was settled by europeans recently, in 1829. Prior to that time indigenous Australians were nomadic hunters and gatherers with apparently little trading contact with other areas. As a result Western Australia is free of most serious pest and diseases including those of potato. At the time of printing Western Australian seed potato production districts are free of the following serious potato pests and diseases.

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Common Name	Scientific Name
• Potato cyst nematode	*Globodera rostochiensis*
• Potato cyst nematode	*Globodera pallida*
• Late blight	*Phytophthora infestans*
• Phoma leaf spot	*Phoma andia*
• Bacterial wilt	*Pseudomonas solanacearum*
• Potato wart	*Synchytrium endobioticum*

- Ring rot — *Corynebacterium sepedonicum*
- Ring Rot — *Clavibacter michiganensis*
- Rubbery rot — *Geotrichum candidum*
- PSTVd — Potato spindle tuber viroid
- Mop-head or mop-top — Potato mop-top virus
- PVY^{NTN} — Potato Virus Y – Necrotic strain
- Andean potato mottle virus — Andean potato mottle virus
- Colorado Beetle — *Leptinotarsa decemlineata*
- Andean potato weevil — *Premnotrypes spp.*
- Potato tuber eelworm — *Ditylenchus destructor*
- Serpentine leafminer — *Liriomyza huidobrensis*

Deleted: <#>PVY^{0*} Potato Virus Y – Common strain ¶

Deleted: <#>Ring Rot *Clavibacter michiganensis*¶
<#>Rubbery rot *Geotrichum candidum*¶

* PVY^{0} has been detected in WA recently in some lines that came from other states. Work in progress to eradicate this disease from Western Australia.

ADMINISTRATION OF THE AUSTRALIAN STANDARD

The National Standards is maintained by the Seed Potato Advisory Group (SPAG), a sub committee of the Australian Potato Industry Council (APIC). Meetings of SPAG are funded by Horticulture Australia Limited.

THE WESTERN AUSTRALIAN STANDARD

INITIAL STOCKS

1. All potato stocks (existing and new cultivars) acquired from whatever source for use as starting material in this Certification Scheme must be visually free of all diseases before being pathogen tested for the presence of the following diseases, either in quarantine, or by any other testing authority approved by APIC:
   - Blackleg and related soft rots caused by *Erwinia* spp.
   - Bacterial wilt, caused by *Ralston solanacearum* (formerly *Pseudomonas solanacearum*).
   - Ring rot, caused by *Clavibacter michiganense* pv *sepodonicum*.
   - Powdery scab, caused by *Spongospora subterranea*.
   - Black scurf, caused by *Rhizoctonia solani*.
   - Silver scurf, caused by *Helminthosporium* sp.
   - Gangrene, caused by *Phoma exigua*.
   - Wilt, dry rot, caused by *Fusarium* spp.

- Wilt, caused by *Verticillium* spp.
- Black dot, caused by *Colletotrichum coccodes*; and
- Potato leafroll virus (PLRV), potato virus A (PVA), potato virus M (PVM), potato virus S (PVS), potato virus X (PVX), potato virus Y (PVY), tomato spotted wilt virus (TSWV), and potato spindle tuber viroid.
- Calico, caused by *Alfalfa Mosaic Virus*.
- Late blight, caused by *Phytophthora infestans*.
- Common scab, caused by *Streptomyces* sp. should be included in this list of diseases when a routine, reliable diagnostic test for this disease has been developed.

The aim of this scheme is to ensure that the stock provided for further multiplication has been tested and found to be free of these diseases.

Such pathogen-tested stocks must be maintained *in vitro* by the testing authority under conditions of high security (to minimise the risk of re-infection), and must be re-tested for the presence of contaminating fungi and bacteria, prior to their release to accredited laboratories for further multiplication. The *in vitro* material is not re-tested again for the specific pathogens listed above. Accredited laboratories can maintain stocks for further multiplication and, if necessary, re-apply to the testing authority for new stocks (see page 13).

LABORATORY MULTIPLICATION OF STOCKS

2. All laboratories and associated facilities (e.g. glasshouses, etc.) which accept pathogen-tested stocks from approved repositories, to produce Generation O (G0) seed, i.e. minitubers, microtubers, plantlets, or other defined propagules must be accredited.

3. Accreditation of laboratories is vested by APIC, in State agencies. The accreditation standards shall be those currently implemented by ViCSPA in Victoria and other participating States.

4. Accredited laboratories will be re-inspected annually, by the approved agent of the APIC sub-committee, to ensure that standards are being maintained.

CERTIFIED SEED GENERATIONS

5. Any generation of seed may be sold as ‘Certified’ provided it meets the minimum rating (i.e. field rating 3). Seed that does not meet the minimum rating of 3 can not be further multiplied for certified seed, and can not be certified.

DEFINITION OF GENERATIONS

Generation 0 (G0)

6. This material must be produced by accredited laboratories.

Generation 1 to 5 (G1-G5)

7. This material may be sold directly for commercial use, or for subsequent multiplication through one or more field generations (such material may include minitubers, microtubers, plantlets, or other defined propagules).

8. This material is produced in the field for a maximum of five generations, as follows (Table 1).

Table 1. Multiplication of certified seed

Seed planted and growing crop	Year	Seed harvested
Minitubers, micro-tubers or plantlets (G0)	1	G1
G1	2	G2
G2	3	G3
G3	4	G4
G4	5	G5

Generation O = (GO) Generation 1 to 5 = (G1 - G5)

FIELD MULTIPLICATION

Selection of paddocks - Disease status

Bacterial wilt

9. Seed can be produced only on properties where the certifying authority is satisfied that there is no apparent risk of bacterial wilt affecting the crop.

Potato Cyst Nematode (PCN)

10. Seed can be produced only on properties where the certifying authority is satisfied that there is no apparent risk of PCN being present. Export crops must be tested according to the prevailing phytosanitary requirements of the importing country.

11. Where PCN testing is required seed can only be grown on land where a negative result has been obtained from a soil testing program using a PCN detection protocol similar to that detailed in Appendix 4 or as approved by the Australian Quarantine Inspection Service. Under no circumstances can seed be grown on land that has previously grown bulbs, corms, or tubers introduced from areas where PCN is known to occur.

Rotations

12. Land on which seed generations one to three (G1 - G3) are produced, must not have grown potatoes, or other solanaceous crops for a minimum of five years. Land on which subsequent generations are produced (i.e. G4 and G5) must not have grown potatoes or other solanaceous crops for a minimum of three years.

13. The certifying authority must be satisfied that the land on which the seed crop is to be grown does not have a cropping history which would increase the risk of disease carryover.

Selection of seed

14. Growers may choose the seed generation they intend to grow from any of the following:
    (i) Mini-tubers, micro-tubers or plantlets - available from accredited laboratories.

(ii) Certified seed of generation 1, 2, 3 or 4 (G1, G2, G3, G4) - which they have produced themselves or purchased from another Certified seed grower.

(iii) Seed approved by an authorised officer of AGWEST Plant Laboratories.

15. Proof of purchase in the form of Certified seed labels must be shown to the inspector at the time of the first inspection.

Crop isolation

16. (a) There must be a gap of at least two (2) metres between varieties when they are planted in the same row.

(b) *G0 Sown* - Crops sown with G0 seed must be at least 3 blank rows from crops sown with G1 or G2 Certified seed, at least 10 metres from crops sown with G3 or G4 Certified seed, at least 10 metres from crops sown with G1, G2 or G3 Registered seed and at least 50 metres from any other crop. (Note: 'Any Other Crop' = crops sown with G5 Certified seed or G4, G5, G6 or G7 Registered seed.)

(c) *G1 Sown* - Crops sown with G1 Certified seed must be at least 3 blank rows from crops sown with G2 Certified seed, at least 10 metres from crops sown with G3 or G4 Certified seed, at least 10 metres from crops sown with G1, G2 or G3 Registered seed and at least 50 metres from any other crop.

(d) *G2 Sown* - Crops sown with G2 Certified seed must be at least 3 blank rows from crops sown with G3 or G4 Certified seed, at least 10 metres from crops sown with G1, G2 or G3 Registered seed and at least 50 metres from any other crop.

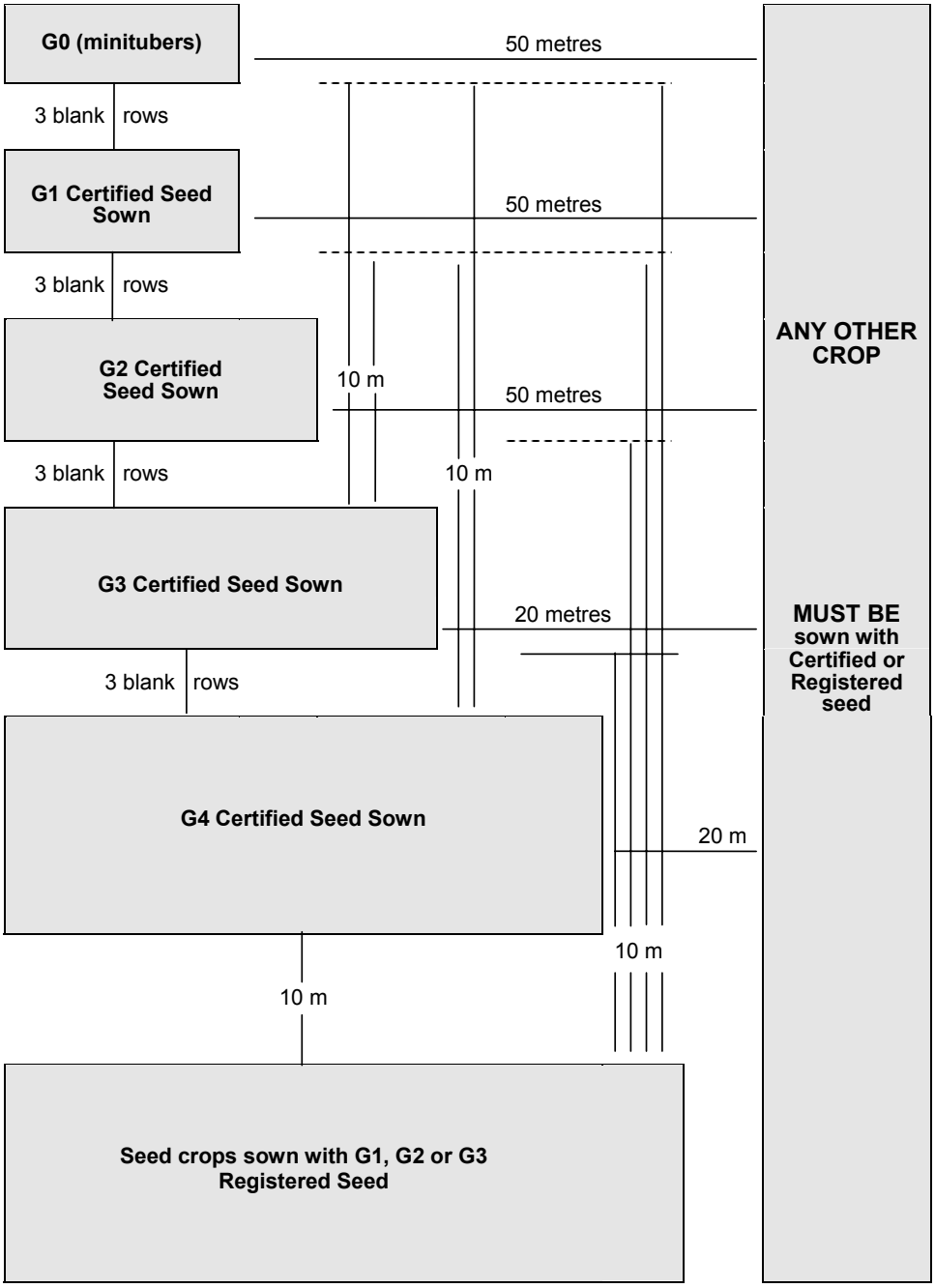
(e) *G3 Sown* - Crops sown with G3 Certified seed must be at least 3 blank rows from crops sown with G4 Certified seed, at least 10 metres from crops sown with G1, G2 or G3 Registered seed and at least 20 metres from any other crop.

(f) *G4 Sown* - Crops sown with G4 Certified seed must be at least 10 metres from crops sown with G1, G2 or G3 Registered seed and at least 20 metres from any other crop.

(g) All plots are to be clearly marked with pegs showing the variety, the seed generation, plot number and, if necessary, the seed class (e.g. Certified or Registered).

(h) Travelling irrigators are not to be used where they would pass from Registered seed crops to Certified seed crops, or from seed crops sown with G2, G3 or G4 seed to seed crops sown with G0 or G1 seed, unless sufficient unplanted area is left for the irrigator to pass through without contact by wheels or hoses.

Figure 1. Summary of isolation rules for Certified seed generations (see above for full description).



17. No ware potatoes from uncertified seed are to be planted on any farm (including leased land) that grows certified seed without the approval of the certifying authority.

FIELD CROP INSPECTIONS

18. Crops that fail to meet the following standards (Table 2) will not be certified.

19. Growers are responsible for notifying AGWEST Plant Laboratories when their crop(s) are at a suitable stage of growth for inspection. As a guide, inspectors must be able to see the base of plants in the fourth row when looking across the crop.

20. All areas on the property on which potatoes are grown must be disclosed and shown to the inspector at the time of the first inspection.

21. Crops may be rejected if they show poor strike, unthrifty plants, undue growth of weeds, severe hail or frost damage, severe damage caused by or suspected to be caused by chemicals, or are too advanced for inspection.

22. There will be a minimum of two inspections of the growing crop by inspectors from the certifying authority.

23. The first, post emergence, will be made close to or at flowering and preferably before row closure.

24. The second, pre senescence, will be made close to, but before the crop starts to mature, or just prior to top removal.

25. All rogued material (tops and tubers) must be removed from the field and destroyed. In certain circumstances, AGWEST Plant Laboratories inspectors may order destruction of foliage to avoid disease transmission to other plots on the same property or other properties.

26. Rouging levels shall be at the discretion of the certifying authority. However, as a general guide, a maximum rouging level of 1% above the defined tolerance should be achievable in a certified crop.

27. Group 1 diseases (i.e. those which are specifically excluded) automatically preclude the crop from being certified.

Virus testing

28. All Generation 2 sown plots (G3 Harvested) to be tested for Tomato Spotted Wilt Virus, Potato Leafroll Virus, Potato Virus S and Potato Virus X.

29. Five hundred (500) leaves will be tested per grower.

30. Samples may be taken at first or second inspection at the growers preference.

31. First inspection samples detecting virus must have a second set of samples taken at the growers expense to verify roguing has been successful.

Aphid control

32. If at the time of inspection, any aphids (green peach aphid - *Myzus persicae* or potato aphid - *Macrosiphum euphorbiae*) are found in the crop, the grower will be advised that his aphid control has not been sufficiently effective and that steps should be taken to exert control over the aphids. If aphid numbers are considered excessive, the following action will be taken:

    (i) A sample of 100 randomly selected leaves (a middle and lower leaf from 50 plants) will be examined for the presence of aphid colonies. A colony is defined as a leaf containing 3 or more aphids of which at least 2 are wingless.

    (ii) If more than 5 colonies are found, the crop will either be rejected immediately, or the grower may choose to submit a sample of tubers (G1, G2 and G3 - 200 tubers; G4 and G5 - 100 tubers) for post-harvest virus testing. In this case, classification of the crop will depend on the results of the virus testing. All of the samples must test negative for potato leafroll virus.

Crop standards

33. Irrespective of the generation, crops will be rated from 1 to 3, according to the following tolerances for foreign varieties, viruses, and other diseases:

Table 2. Maximum tolerances for diseases and foreign varieties

% of plants	Rating 1		Rating 2		Rating 3	
Inspection	**1st**	**2nd**	**1st**	**2nd**	**1st**	**2nd**
Foreign varieties	0.05	0.00	0.10	0.00	0.10	0.10
Virus diseases	0.10	0.01	0.25	0.10	1.00	1.00
Other diseases	0.25	0.10	0.50	0.25	2.00	2.00
Total diseased plants	0.25	0.10	0.50	0.25	2.00	2.00

- 0.10% = 1 plant in a thousand.
- 0.25% = 1 plant in four hundred.

34. Any generation of seed intended for further multiplication in a seed scheme must be of a rating that is equal to or higher than that of the next generation. [Seed with a rating of 2, for example, can not be upgraded to a rating of 1 in the subsequent generation.] Any seed having a field rating of 3 can not be further multiplied for certified seed.

35. The highest number rating in any category shall determine the overall rating for that crop (e.g. for a foreign variety rating of 1, virus rating of 2, and other diseases rating of 3, then the overall rating = 3).

TUBER INSPECTIONS

36. Certified seed shall be graded by size, weight, or number of tubers and recorded.

37. Certified seed shall be graded A, providing it does not exceed the maximum tolerance levels in Table 3 and Table 4.

Disease/defect tolerances

Three groups of diseases/defects are recognised for the purposes of tuber inspections:

Group 1 - Excluded diseases

Group 2 - Diseases/nematodes

Group 3 - Insect damage/defects

The following tolerances apply to each group of diseases/defects:

Group 1

A **ZERO TOLERANCE** will apply to the following diseases, which automatically precludes the crop from being certified.

Potato Cyst Nematode (PCN) (*Globodera rostochiensis* or *G. pallida*)

Bacterial wilt (*Ralstonia solanacearum*)

Potato spindle tuber viroid

Group 2. Diseases/nematodes

Tolerances are based on the sample as inspected.

Table 3. Disease/nematode tolerances

	Rating (% by tuber count) A
Dry rots (*Fusarium* sp., *Phoma* sp.)	2.0
Black scurf (*Rhizoctonia* sp.)	-*
Silver scurf (*Helminthosporium* sp.)/ Black dot (*Colletotrichum* sp.)	-*
Common scab (*Streptomyces* sp.)	2.0**
Powdery scab (*Spongospora subterranea*)	2.0
Root knot nematode (*Meloidogyne* sp.)	2.0
Soft rots (e.g. *Pythium* sp.)	0.25
Pink rot (*Phytophthora* sp.)	0.25

* The tolerance for these diseases may be negotiated between the seed grower and the seed buyer.

The tolerance should relate to the number of tubers in a sample, with levels of disease present as depicted by Styles A to C in the publication **'Product Description Language - Potatoes'** (ISBN 0 7311 4357 4).

** In Tasmania, the tolerance for domestic seed may be negotiated between the seed grower and the seed buyer.

38. The maximum total permitted tolerance for all diseases in Group 2 is 2%.

Group 3. Tuber defects

Table 4. Defect tolerances

	Rating (% by tuber count) A
Insect damage	1.5*
Malformed tubers	2.0
Mechanical damage	2.0
Stem end discolouration	2.0
Miscellaneous (e.g. sunburn)	1.0
Foreign cultivars	0
Oversize	1.0
Undersize	2.0

* An additional 2% of tubers may show minimal feeding damage (i.e. where these tubers have no more than 2 feeding holes/tuber, not more than 3 mm deep, containing no soil, and the damaged skin is healed). Tuber eyes must not be damaged.

39. Assessment of Group 2 and 3 diseases/defects will be based on visual inspection of unwashed tubers.

40. Tubers shall be **practically free** of soil. Tubers with sprouts in excess of 20 mm length are not eligible for certification.

41. The total acceptable tolerance for Group 3 will be 2.0%*****.

42. Irrespective of the generation assessed, seed will graded **A** provided it does not exceed the maximum prescribed tolerances.

Summary of seed grades

Seed sold to other seed growers

Generations can be transferred and/or traded (1 to 3 in a 4 year scheme, or 1 to 4 in a five year scheme) between registered Certified seed growers and/or contracted producers with an official "Black and White" label. Such seed will have a field rating of 1 or 2 and a tuber rating of A.

Table 5. Summary of seed grades

	Generation	Rating	
		(can be multiplied)	(can not be multiplied)
(In a 5 year scheme)	G1	1A or 2A	3A
	G2	1A or 2A	3A
	G3	1A or 2A	3A
	G4	1A or 2A	3A
	G5*	1A or 2A	3A

* Generation 5 **can not be further multiplied.**

Seed sold as certified seed

Generations 1 to 5 can be sold as Certified seed, with an official 'red' label. Such seed will have a tuber rating of A, a minimum field rating of 3, and will be sold as 'Certified A'. The label will be overstamped with the generation. Such seed will have a field rating of 1, 2 or 3 and must be passed by an inspector or accreditted quality assured grower authorised by the certification authority for the purpose.

Seed growers who use Quality Assurance (QA) programs must comply with the specifications outlined in current Operating Manuals approved by the certifying authorities.

LABELS

Domestic

43. All seed retained for further multiplication within the seed scheme must be accompanied by a black and white label.

44. Certified seed intended for the production of ware crops must be accompanied by a red label.

45. Labels and lettering will be of a standard size and design as determined by the APIC sub-committee and will include the following details:
    - Variety
    - Grower
    - The approved certifying authority
    - Generation
    - Date packed
    - Endorsement by the certifying authority
    - Definition of Certification, and grower's declaration
    - State of origin may be indicated

Export

46. Labels used for export seed will comply with AQIS standards and will include the following details:
    - EXPORT SEED - Produce of Australia
    - Lot No. (only if required)
    - Variety
    - Generation
    - Month harvested
    - Month packed
    - Size
    - Approved certifier
    - Endorsement by the certifying authority
    - Definition of Certification, and grower's declaration
    - Weight

47. All labels (domestic and export) must be serially numbered as proof of certification.

Delivery Note/documentation

48. A Delivery Note (or other appropriate documentation) must accompany every batch of seed sold and a copy retained by the grower. Export seed must comply with the phytosanitary requirements of AQIS and the importing country.

49. The following details will be provided:
    - Variety
    - State of origin
    - Size category/No. of seed pieces
    - Rating (optional)
    - Generation
    - Approved certifier
    - Date of planting
    - Date of top removal/Month of senescence
    - Date of harvest
    - Date of inspection
    - Postharvest fungicide/insecticide treatments applied to the seed
    - Storage conditions (i.e. cool store (degrees C), or ambient)
    - Any other relevant details including growers name and date packed

PACKING AND TRANSPORT OF SEED

50. Seed may only be packed and transported in new sacks, bulk bags or bins (or used bins or bulk trucks if accompanied by a cleanliness declaration certificate).

51. Seed that has been repacked will not be recognised as certified seed unless such packing maintains the identity and integrity of the seed as approved by the certifying authority.

STORAGE OF SEED

52. Each generation of seed must be separated, to prevent lines from being mixed.

53. Seed potatoes must be separated from ware potatoes.

54. Seed lots (generations and varieties) must be clearly and accurately labelled.

DEFINITION OF CERTIFICATION

55. Certification of seed potatoes is strictly limited to the act of endorsing that the seed potatoes have been produced in accordance with these National Standards for Certification of Seed Potatoes.

    The method of determining compliance with standards is visual inspection of the growing crop and inspection of random samples of the graded product.

The National standard does not require that the certifying authorities test for varietal purity. When zero tolerancesare applied, certification does not mean the lot is free from disease, but that none was visually observed during the routine inspections. No warranties, expressed or implied, of quality factors not specified in the National Standards for Certification of Seed Potatoes or merchantability or fitness for any particular purpose is given by the certifying authority in respect to G1,G2,G3,G4 or G5 Certified Seed produced.The Certifying authority disclaims all responsibility and liability for any incorrectness and inaccuracy caused or contributed to by any circumstanses beyond its control.

NOTES ON RULES

To be read in conjunction with the rules.

Initial stocks *(Rule 1)*

Principle of pathogen testing

The production of high quality horticultural planting material is dependent on the use of pathogen tested stocks to ensure that only high health material is released for further multiplication. The benefits of using pathogen tested material is that it ensures a constant source of disease-free stock as the basis for further multiplication.

Potato stocks may originate from a number of sources, including:

- new material imported either as tubers or in tissue culture from overseas which has been pathogen tested by the Australian Quarantine and Inspection Service (AQIS); and
- new potato varieties either selected or bred by agencies in Australia.

Pathogen tested stocks *(Rules 2, 3 and 4)*

Pathogen tested stocks of all the varieties in the scheme are maintained *in vitro* at either the Institute for Horticultural Development (IHD) at Knoxfield, Victoria, or at The Tasmanian Department of Primary Industries Water and Environment. This *in vitro* collection is derived from stock tested for the diseases listed on page 3.

Tubers are microscopically inspected for the presence of powdery scab before being tissue cultured.

The *in vitro* collection is not retested again for specific pathogens. The presence of contaminating fungi and bacteria is tested for annually on non-selective media when the material is multiplied for release to accredited laboratories.

Accredited laboratories

Pathogen tested stock may be multiplied to produce plantlets and/or minitubers and microtubers in any laboratory accredited by APIC or its agents.

Laboratories in four States (New South Wales, Victoria, South Australia and Tasmania) are currently accredited to produce minitubers, microtubers, and plantlets. These are listed in Appendix 2.

Protocol for accreditation

Protocols for accreditation of laboratories are detailed in Appendix 3*.

How the standard operates *(Rules 5, 6, 7, 8)*

Certified seed potatoes are derived from minitubers, microtubers, plantlets or other approved planting material produced in accredited laboratories from pathogen-tested stocks maintained in tissue culture.

Seed potatoes can only be multiplied for up to a maximum of five generations, of which any generation may be sold as 'Certified' seed provided it meets the standard. The **National Standard** permits seed to be certified in only a single quality class designated **A**.

Applications for inspection of crops within the requirements of the **National Standard** must be made to the relevant certifying authority within each State.

Certification will only be accorded if, (i) tubers pass inspection by inspectors of the certifying authority, after the produce has been graded and packed; or, (ii) by the seed grower according to his own QA Manual, where there is an accredited Quality Assurance (QA) system in place. (QA systems currently operate only in Victoria and Western Australia. Growers wishing to participate, must apply to and be approved by either ViCSPA or AGWEST Plant Laboratories).

* Copyright of ViCSPA.

Disease status of selected paddocks *(Rules 9, 10, and 11)*

Seed can only be produced on properties where the certifying authority is satisfied that there is no apparent risk of bacterial wilt and/or potato cyst nematode. This will be established from historical records, appropriate soil sampling surveys (where required), and detailed knowledge of production practices on the farm and the surrounding catchment area and district.

Paddock rotations *(Rules 12 and 13)*

Crop rotation is undertaken to maintain high health status of certified crops. Minimum rotational standards are required to reduce the risk of carryover of soilborne diseases from hosts such as weeds, solanaceous species or other crops. The certifying authority must be satisfied that that there is no apparent risk to the seed crop.

Growers must keep proper records, including whole farm plans which show:

- the paddock boundaries with paddock numbers or names;
- where all potatoes are planted each year; and
- fence line/boundary changes.

Crop isolation *(Rules 16 and 17)*

The isolation requirements for each certified seed generation are as presented in Figure 1.

Isolation requirements are the same for generations 1, 2 and 3.

All plots are to be clearly marked with pegs showing the variety, and the seed generation.

There must be clear separation between varieties when they are planted in the same row.

Field crop inspections *(Rules 18 to 27)*

Growers are responsible for notifying the certifying authority when their crop/s are at a suitable stage of growth for inspection. As a guide, inspectors must be able to see the base of plants in the fourth row when looking across the crop at the first inspection.

The recommended sample size per inspection is:

Crop area (ha)	Sample size
< 4	At discretion of Certifying Officer
> 4	500 plants/ha, with a minimum of 2,000 plants

Counts should include a traverse across the crop as well as along the rows.

All plots should be clearly labelled to define variety and generation.

Crops will be rejected if there is any evidence of bacterial wilt, potato cyst nematode (PCN), or spindle tuber viroid (Group 1 diseases), or where the field rating is greater than 3.

Self sown plants are considered to be foreign plants.

At the time of inspection crops must not exceed the listed permitted tolerances.

Crops submitted for inspection may be rejected at any stage of growth.

Plant samples may be required for laboratory testing for pathogens, and these may be at the grower's expense. The results of these tests can be used as the basis of crop rejection.

In the event that only a part of a paddock is accepted as certifiable, then the rejected plants must be removed from the property before the harvest of the remaining crop. Alternatively, the certifiable part must be harvested, graded, packed and labelled before the harvest of the rejected part with the approval of the certifying authority.

Under exceptional circumstances the certifying authority may approve the upgrade of seed rated as 3, to produce a further generation of seed.

Certification (*Rules 36 to 42*)

The grower must notify the certifying authority when the tubers are ready for certification. An officer of the authority will inspect the unwashed tubers for diseases and defects by examining random samples from each lot of produce presented for inspection. In the case of bulk containers, inspect a sample of 100 tubers and, in bagged lots, inspect all the tubers in the bag. The sample size* will be determined as follows:

Lot size	No. samples to inspect	Pass/fail rate
Less than 10 tonnes	2 to 3 samples	All samples must pass
10 to 20 tonnes	Minimum of 3 samples	Accept 1 borderline sample
20 to 30 tonnes	Minimum of 4 samples	Accept 1 borderline sample
30 to 60 tonnes	Minimum of 5 samples	Accept 2 borderline samples

If the potatoes meet tuber standards at the time of inspection, the seed lot will be approved for final certification and sale.

Seed growers participating in approved QA programs are delegated the responsibility for all post-harvest quality control procedures leading to final certification of seed in accordance with their own QA Manual.

Tubers are to be practically free of soil, and must be of good characteristic shape for the variety.

There is a nil tolerance for presence of the disease bacterial wilt (*Ralstonia solanacearum*), potato cyst nematodes (*Globodera rostochiensis* or *G. pallida*), and potato spindle tuber viroid.

The standard method of grading certified seed potatoes is now based on size dimensions, using a square hole template. Unless otherwise agreed to by buyer and seller prior to delivery, seed shall be graded to a standard of 35 mm to 75 mm. If grading is to be by weight, then tubers will usually be graded within the limits of 35 g to 250 g, unless otherwise agreed to by the buyer and seller.

* Copyright to ViCSPA.

Unless an agreed level of presence of the diseases Rhizoctonia (*Rhizoctonia solani*), silver scurf (*Helminthosporium solani*) and blackdot (*Colletotrichum coccodes*) is negotiated between the buyer and the seller and specified in a written contract, their presence on tubers will not be included as tuber defects.

Tuber samples may be taken for disease testing in the laboratory, at the grower's expense.

When a seed lot is rejected or re-graded, it is the grower's responsibility to return used labels to the certifying authority.

Tolerances (*Rules 37 and 38*)

The tolerances which apply for diseases listed as 'Group 2 Diseases/Nematode' (Rule 37), and 'Damage/Defects' (Rule 38) are as represented in the publication **'Product Description Language - Potatoes'**, ExpHORT 2000 Publication No. 71 (ISBN 0 7311 4357 4).

Tubers accorded a quality rating of **A** for Disease/Nematode tolerances (i.e. % of tubers as listed in Table on page 8) must have a surface area cover of less than 5% (represented by **Style A** - see Section 2.2).

Similarly, tolerances for insect damage, malformed tubers, mechanical damage, stem end discolouration, or greening must be less than that depicted by **Style A** - see Section 2.3).

Tubers shall be practically free of soil, with the permitted level of cover no more than that depicted by **Style A** - see Section 2.3).

Tuber inspections (*Rules 36 to 42*)

(a) Growers not participating in a SQF 2000^{CM} Quality Assurance program must advise AGWEST Plant Laboratories three (3) working days prior to the tubers requiring inspection, by completing and submitting a 'Request and Authority for Seed Certification' form (Appendix 7) for each seed lot to be inspected.

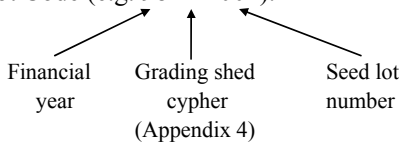
(b) Growers participating in a SQF 2000^{CM} Quality Assurance program approved by AGWEST Plant Laboratories are delegated the responsibility for all post-harvest quality control procedures leading to final certification of the seed in accordance with their own QA Manual. However, these growers are still required to complete and submit a 'Request and Authority for Seed Certification' form for each seed lot to be certified at the time of grading and packing.

(c) 'Request and Authority for Seed Certification' forms must be completed by:

(i) the seed grower and the seed grader (if applicable) signing the declarations;

(ii) for each seed lot, entering:

- the Registered Area Number (from your field inspection results letter);
- the Seed Lot Code (e.g. 98 RA 001).



- variety
- generation
- harvest date
- mass of each container
- number of containers
- total mass of seed lot
- tags used - number and code (e.g. WPR 12345)
- CHEMICAL additives

(d) For all non-QA growers, an authorised AGWEST Plant Laboratories inspector will inspect the tubers for disease and defects by examining random samples of each lot of produce presented for inspection. Tuber grading tolerances are shown in Tables 3 and 4.

(e) **Other general seed tuber specifications**

(i) Tubers to be practically free of soil.

(ii) Tubers must be of good characteristic shape for the cultivar.

(iii) Nil tolerance for bacterial wilt.

(iv) Tubers will normally be graded within the limits of 35 g to 350 g or as otherwise specified by the buyer.

(v) Tubers that are under or oversize may be negotiated between buyer and seller. The AGWEST Plant Laboratories inspector must be advised if this to occur.

(vi) Unless an agreed level of the diseases Silver Scurf (*Helminthosporium solani*) and Black Dot (*Colletotrichum coccodes*) is negotiated between the seed buyer and seller and specified in a written contract, their presence on tubers will not be included as a tuber defect.

(f) If necessary, tuber samples may be taken for laboratory testing, at the grower's expense, to confirm quality for certification.

(g) Tuber inspections are not required for seed lots to be retained by the seed grower for further multiplication as Certified seed. However, growers must still complete and submit 'Request and Authority for Seed Certification' form(s) for all seed lots they retain. WHITE AC Seed labels must be attached to all containers of retained seed at the time of grading and packing.

Labels *(Rules 43 to 47, 50 and 51)*

Growers must contact the certifying authority before grading and packing, to request Certified seed labels for the seed lots to be certified.

Labels must be attached to each container of seed intended for certification, at the time of grading and packing.

Sacks of seed potatoes must be sealed by sewing an official certification label into the mouth of each sack in such a way that other seed can not be introduced or substituted without damaging the label.

When certified seed is packed into bulk containers and then loaded into a bulk truck the following conditions apply:

- Each container of seed potatoes must be labelled with a official label prior to tuber inspection.
- Truck cleanliness - The bulk truck should be treated as a bulk bin and have a signed cleanliness declaration certificate.
- At loading of the bulk truck the labels are to be removed from the containers and only one label is to be given to the driver, to represent that lot of certified seed. The seed grower keeps a record of the label numbers used.
- All labels removed from the containers are to be cut in half and retained for audit purposes.

Official certification labels must be securely attached to prevent loss during transport.

Records must be kept of label numbers used for each seed lot and reported to AGWEST Plant Laboratories on the Request and Authority for Seed Certification form (appendix 7).

Labels must include all the details listed.

Official labels must be destroyed after use.

Growers are responsible for the safe storage and correct use of official labels. The use of official labels for other purposes than those intended may result in exclusion of the grower from the certification process.

(a) For each seed lot that passes tuber inspection, official printed adhesive labels will be issued for attachment to each blank RED Certified seed label. These adhesive labels can be attached either by the AGWEST Plant Laboratories inspector or by the seed grower. In both cases, the labels are attached on the understanding that the seed grower guarantees the contents of the container to be produce of the crop which passed field inspection and complied at the time of inspection of the tubers with the standards prescribed for Certified seed potatoes.

(b) Unless the produce from a provisionally certified crop passes a tuber inspection and the container carries an official RED Certified seed label, the contents are not recognised as Certified seed.

(c) When a lot of seed is rejected or re-graded, it is the growers responsibility to remove the previously attached official labels and return them their AGWEST Plant Laboratories inspector.

Delivery note *(Rules 48 and 49)*

A delivery note must accompany every batch of seed and provide information relevant to the seed lot.

Storage of seed *(Rules 52 to 54)*

Seed potatoes must be isolated from any ware tubers, and stored under conditions which are approved by inspectors of the certifying authority.

The National Standard is predicated on the maintenance of high health status between generations of seed. It is important that seed generations be physically separated and that, wherever possible, bin covers be employed where bins are stacked to minimise contamination between upper and lower bins. Ideally, different generations/varieties should be held in separate storages.

Seed that has been repacked will not be recognised as certified seed unless such packing maintains the identity and integrity of the seed as approved by the certifying authority.

Certified seed which has been packed in bulk containers will be recognised only if the integrity of the lot can be verified.

GENERAL OPERATIONAL PROCEDURES

Certification procedures

Certification of seed potatoes will be undertaken by inspectors of the authority in each State. Responsibility for implementing the **National Standard** has been vested in these authorities, by APIC. Operational procedures (e.g. application for certification, timeliness of requests for crop inspections, documentation, etc.) may vary slightly between States but, nevertheless, will comply in all respects with the **National Standard**.

New growers

New growers must demonstrate their ability to meet the requirements of the National Standard to the satisfaction of the certifying authority.

Access for inspectors

Inspectors from the certifying authorities may inspect crops unaccompanied and without an appointment. However, inspectors will endeavour to make appointments whenever possible.

Testing procedure for Potato Cyst Nematode (PCN)

Random fork testing of unthrifty plants may be undertaken at the final field inspection of seed crops.

(In Victoria there is a current requirement for PCN testing - the protocol is listed in Appendix 4.) This protocol should be adopted by other States if and when required.

Grading and packing

Seed potatoes intended for certification must be harvested, transported, graded, packed, and stored in such a way as to preserve their identity and limit cross contamination by diseases or varieties.

Seed graded on a harvester may be presented for inspection for certification if the tubers are practically free of soil. Paddock picked and hand graded seed potatoes are only eligible for certification if approved by the certifying authority.

Grading seed off-farm

Approval to grade seed off-farm may be granted by the certifying authority if the following requirements are met:

- Each container of potatoes that is to be moved to the other grower's shed must be clearly labelled showing the grower's name, the variety, and the generation.
- The grader (all parts thereof) and surrounding floor area be cleaned of all loose soil, debris and potatoes prior to and after grading of the other grower's produce.
- The grader is to be washed and disinfected prior to and after grading the other grower's produce.
- All grading waste and soil collected under the grader are to be returned to the grower.
- Floor sweepings are to be disposed of in a dedicated pit or refuse tip; and

- QA growers who are given permission to grade potatoes from another grower are to present such lots for normal tuber inspection.

Records

Detailed records must be kept and made available to the certifying authority as required. The produce may not be accepted for certification if accurate records are not maintained. These include such details as; source of seed and proof of purchase, variety, time of planting, paddock history, fertiliser and chemical applications, and harvest date.

Hygiene management

Seed growers and Certification Officers must ensure that a level of hygiene is adopted which will facilitate the production of high quality certified seed.

- Access to seed crops should be limited to personnel authorised by the grower.
- All operations to be performed on seed crops of different generations should be undertaken such that work commences on the crop of the highest health status (i.e. G2 before G4). Personnel and machinery should never move from a crop of lower status to a crop of higher status without hygiene precautions being implemented.
- Travelling irrigators should not be used where they would pass from seed crops sown with G3, G4, or G5 seed to seed crops sown with G1 or G2 seed, unless sufficient unplanted area is left for the irrigator to pass through without contact by wheels or hoses.
- The headlands normally left for machinery movement must not be planted, and must be kept free of weeds.
- The packing shed should have a concrete floor.
- Lighting over the grading table should be to the satisfaction of the certifying authority.
- Agricultural chemicals and produce are not to be stored in the same area.
- Sprout suppressants are not to be used or stored in or near the potato grading or storage areas.
- The shed surrounds are to be kept tidy, free of rubbish and weeds.
- Soil and crop debris is not allowed to accumulate in sheds. Waste potatoes, soil and crop debris are to be regularly removed from the shed and surrounding areas and disposed of in a dedicated pit or waste disposal facility.
- Waste should not be returned to potato paddocks.
- All containers used for storage (e.g. bins) of seed should be washed between seasons, or more frequently as required.
- Machinery should be cleaned with a hospital grade disinfectant (approved sterilant) as required.
- A designated area should be provided for cleaning and disinfection of machinery and equipment.
- Packing sheds and machinery should be thoroughly cleaned between seasons.

Variety selection

Registered seed growers who have a selection program for the maintenance and improvement of varieties, may grow small plots of such seed potatoes up to generation 10 (G10) providing:

- The plots meet the visual health and varietal purity standards specified.
- The plots are clearly identified and kept separate by two blank rows from G4 seed plots, and 20 metres from G2 and G3 seed plots.
- The area grown and varieties under selection are recorded on the application form, and
- The produce is not sold as certified seed.

Failure to observe requirements of the National Standard

Growers who fail to observe the requirements of the **National Standard** governing the production of seed potatoes or, who act in any way against the successful implementation of the standard, may be excluded from the scheme.

Growers whose crops fail to meet the required standards for certification either partly, or wholly, in two successive years may also be excluded from the scheme.

APPENDICES

Appendix 1. Definition of terms

Accreditation

Accreditation means the official process in which laboratories are approved by APIC to produce planting material for further multiplication.

Accredited laboratory

Accredited laboratory means a laboratory approved by APIC to produce minitubers, microtubers and plantlets for further multiplication.

APIC

APIC means the Australian Potato Industry Council - the peak industry authority ultimately responsible for the administration and operation of the **National Standard**.

Certification

'Certification' is the grower's warranty that the seed potatoes have been produced and visually inspected in accordance with the **National Standard for Certification of Seed Potatoes**, and that it conforms to the genetic, pest and disease, and physical tolerances prescribed by that Standard.

Certification authority

Certification Authority means the authority in each State, in which responsibility for maintenance of the **National Standard** has been vested by APIC. Currently these are; NSW Agriculture, Primary Industries South Australia, AGWEST Plant Laboratories, ViCSPA, and the Department of Primary Industries, Water and Environment, Tasmania.

Defect

Defect means a non-infectious tuber abnormality caused by such things as insects, mechanical damage, or other factors causing abnormal features.

Disease

Disease means a condition caused by an infectious agent such as a fungus, bacterium, nematode, or virus.

Disease/defect tolerances

Disease/defect tolerances means the maximum permitted incidence of disease, or plant defect present in either the growing crop, or on harvested tubers, to meet a defined quality standard.

Field rating

The assessment of the health and varietal purity of the growing crop at the times of inspection by the certifying authority.

Inspector

Inspector means a designated and appropriately accredited officer of a certifying authority responsible for certifying seed.

In vitro

In vitro means potatoes grown in tissue culture in the laboratory.

Label

The official certification tag attached to each unit of certified seed.

Pathogen

Pathogen means a disease causing agent (e.g. fungus, bacterium, nematode, virus.)

Pathogen tested

Pathogen tested means tested for, and found to be free of disease causing agents as listed.

Plot

A crop sown with a unique seed source, on land with a common history through the rotational period specified, and sown within a 10 day period.

Quality assurance

The systematic control of quality factors of a product through the whole production process to ensure that it meets market specifications. It applies to the growing, harvesting, grading, packing, transporting and marketing of certified seed potatoes to satisfy the needs of the customer.

Scheme

Scheme means the procedures whereby the **National Standard** is implemented.

Tuber rating

The assessment of the health/defects of harvested tubers, by the certifying authority.

Appendix 2. Laboratories accredited to produce minitubers, microtubers and plantlets

1. Agronico Pty Ltd
   175 Allport Street
   LEITH TAS 7315
2. F. & I. Baguley
   Heatherton Road
   CLAYTON VIC 3168
3. D.A. & B.R. Carter
   'Cottle Wolly'
   CROOKWELL NSW 2583
4. CleanGROW
   PO Box 199
   TOORADIN VIC 3890
5. Hill's Transplants Pty Ltd
   RSD 947
   DEVONPORT TAS 7310
6. Institute for Horticultural Development
   Private Mail Bag 1
   HEALESVILLE VIC 3777
7. L.G. & J. Shaw
   RMB 5265
   Dehnerts Track
   BEECH FOREST VIC 3249
8. Sunrise Seed Potatoes
   PO Box 312
   LA TROBE TAS 7307
9. Technico Pty Ltd
   PO Box 111
   BOWRAL NSW 2576
10. Wrightsons Seeds
    PO Box 578
    WAIKERIE SA 5330
11. Yates Botanicals Pty Ltd
    30 Hensons Road
    SOMERSBY NSW 2250

Appendix 3. Protocol for laboratory accreditation*

The authority for accreditation of laboratories which produce initial stocks for further multiplication in the scheme is currently vested in ViCSPA, whose responsibilities include annual inspection of laboratories, and auditing of procedures as outlined below.

1. Maintenance of *in vitro* nucleus stock

- Nucleus stock is primarily maintained by the Authorised Laboratory/s and is subject to the specified conditions outlined in the contract between APIC and the Authorised Laboratory/s. A similar agreement would be required by APIC before approval is granted to supply plantlets for the production of minitubers or other products to accredited laboratories from sources other than the Authorised Laboratory.

2. Production of minitubers/plantlets

2.1 Care of in vitro *plantlets*

- Maintain in sterile sealed containers on a sterile growth medium.
- Hold under hygienic conditions in a suitable growth room or cabinet which is regularly cleaned and disinfected.
- All subdivision and transfer of *in vitro* plantlets must be done in a laminar-flow contamination control cabinet using aseptic techniques.
- Clearly label all containers.
- Replace **annually** with plantlets derived from pathogen-tested nucleus stock or from cultures maintained in accordance with item 2.2(C) of the agreement.

2.2 The laboratory

- Restrict access to authorised staff and supervise visitors.
- Keep clean and tidy at all times.
- Dust must not be allowed to accumulate.
- Wash floors and wipe benches regularly with a hospital grade disinfectant at the rate recommended on the label.
- Change outdoor footwear to clean laboratory slippers or overshoes before entering the laboratory.
- Wear clean, regularly laundered coats which are used exclusively in the laboratory area.
- Wash hands with soap and water on entering.
- Remove and sterilise contaminated cultures immediately.
- Keep sterile, unused culture tubes containing growth medium in a dedicated coldroom or refrigerator if storing for more than two weeks.
- Smoking is not permitted in the laboratory

NB: No plant material or cultures of any species which has not been pathogen-tested, is permitted to be processed, multiplied, or stored in an APIC accredited laboratory.

2.3 Polyhouses or glasshouses

- Must be aphid proof and houses constructed after 1 January 1998 must have Thrip proof net on all meshed areas.
- Must have an ante-room entry with outer and inner doors which seal adequately to exclude insects.
- In high use facilities (hydroponic systems) floors must be concrete with adequate drainage to allow regular cleaning. Weedmat over a 75 mm layer of crushed rock may be approved in low traffic systems, providing all pathways and work areas are concreted. The accreditation officer or agent may direct the accredited laboratory to repair and/or replace damaged weedmat.
- Each poly/glasshouse must have two footbaths of a hospital grade disinfectant (changed weekly), one located in the ante-room, adjacent to the inner door and the second outside the entrance door.
- Prior to planting, the floors, walls, and benches must be thoroughly hosed with water and then drenched with a hospital grade disinfectant.
- Staff are forbidden to enter poly/glasshouses after field work unless they have showered and clothing and footwear is changed.
- Dedicated clean footwear and laboratory coats are also recommended in the poly/glasshouse locations.
- Hands should be either thoroughly soap washed, or clean surgical gloves worn before handling plants or minitubers.
- Plant debris or potting mix must not be allowed to accumulate on floors or benches.
- Smoking is not permitted.

2.4 Potting mix

- Potting mixes containing soil or river sand must not be used.
- An open well-drained mix such as pine bark/sand or perlite/peat is preferred.
- Potting mix must be steam/air pasteurised at 60°C for 1 hour, preferably just prior to use. Live steam may be used, but care should be taken to avoid nutritional disorders caused by overheating.
- Organic soil-less potting mixes which are composted to a minimum temperature of 65°C for a minimum time of three weeks may be substituted for steamed mixes, providing they are hygienically handled and pre-packaged in plastic before leaving the manufacturer and contain no non-sterile additives. The potting mix must be used immediately the package is opened. Peat or peat substitute additives must conform to current AQIS health and quality standards. Accredited laboratories that are using composted potting mixes must provide to APIC a written assurance from the suppliers to indicate that the potting mix complies with the APIC standard.
- Purchased potting mixes must be in new containers.
- An appropriate fertiliser program or nutrient solution must be used to ensure adequate plant growth.
- Pots, boxes, trays or troughs must be either new or disinfected by steam or a hospital grade disinfectant, just prior to use.

- The potting mix is to be stored in clean, hygienic and dedicated receptacles that can be disinfected.

2.5 Planting and maintenance

- *In vitro* plantlets must be handled hygienically when deflasking and planting.
- Label all plant containers clearly with cultivar name and planting date.
- Pots, boxes, trays or troughs must be raised as high as practicable above floor level (preferably on 1 metre high bench with mesh top).
- Minimise physical contact with plants during the growing period (e.g. staff, hoses, etc.).
- Care must be taken to provide optimum watering regimes - over-watering must be avoided, particularly in the cooler months.
- All plants should be carefully examined at least once a week for aphids, thrips and other insect pests and any unthrifty, off-type or diseased plants removed immediately.
- Appropriate disease and insect control programs must be implemented and APIC notified of any disease or insect problems which may affect either the health of minitubers or subsequent seed generations.
- The use of yellow card sticky traps in the houses for insect monitoring is highly recommended, and these should be checked for the presence of insects on a weekly basis.
- Water supply must be from a clean source and regularly tested or treated to minimise risk from water-borne pathogens.
- Re-circulated nutrient solutions used in hydroponic minituber production must be treated and tested to minimise risk from water-borne pathogens.

2.6 Leaf sampling

- In the case of minituber production, leaf samples, for ELISA testing for viruses, will be collected by the APIC Accreditation Officer, or an authorised agent after 3 months' growth (but before senescence) and consist of one mature leaflet taken from every 20th plant which is bulked into batches of no more than 20 leaflets per sample bag.
- Each sample bag of each batch is numbered and dated and its location noted on a bench plan, so that traceback can occur if an infected plant is found.
- The leaf samples are ELISA tested for viruses and the results of these tests and observations of the Accreditation Officer will be forwarded to the laboratory and to APIC.
- In the case of plantlet production, leaf samples will only be collected for virus testing if aphids or thrips have been detected in the poly/glasshouse, or if the plantlets remain in the poly/glasshouse for more than one month from deflasking.

2.7 Harvesting (not applicable to plantlet production)

- Where applicable, remove haulms by cutting with a sterile knife or secateurs or by pulling with clean gloved hands, at least 2 weeks before harvest to allow the tuber skins to mature.
- When harvesting minitubers from hydroponic systems, use clean gloved hands and ensure that tubers are correctly labelled and allow them to dry in the shade in a well ventilated area.

- Remove and discard all defective tubers (**notify the Accreditation Officer if any diseased tubers are found**).
- Grade into groups of similar sized tubers.
- Leave to cure for at least one week before storage.
- Pre-condition before despatch to ensure tuber dormancy is broken.

2.8 Storage (not applicable to plantlets)

- Store at 4-5°C in a dedicated coolroom.
- Pack for storage in either new or disinfected plastic mesh bags (e.g. orange or onion bags), or in clean disinfected mesh bottom trays or boxes.

2.9 Transport (as appropriate for the product)

- Place minitubers in their mesh bags in strong, new and clean containers to prevent disease contamination or damage in transit - avoid extremes in temperature.
- Plantlets should be transported in stratified trays to minimise damage in transit - avoid extremes in temperature.
- Ensure each batch is clearly labelled with cultivar name and line or clone (if applicable) and the number of minitubers or plantlets.

2.10 Records

- Accurate records of all significant laboratory and poly/glasshouse observations should be maintained.
- Records are to be available for scrutiny by the APIC Accreditation Officer, or authorised agent prior to the despatch of minitubers or plantlets.

3. Varietal purity

- The methods for the handling and storage of cultures, plantlets and tubers must be such that the identity of each cultivar, line and clone is maintained at all times.

4. Verification

- A sample of 6 to 10 minitubers per production batch is to be provided for the purpose of verification of variety type and checking for mutations or off-types.
- These tubers are to be at least 15 mm in size and are to be delivered to the responsible APIC officer before 10 December each year. The tubers are to be ready for immediate planting.
- It is expected that the tubers will be field grown at selected locations, in plots of similar varieties with a different coloured variety as a spacer. An appropriate officer will be responsible for regular inspections of the plots. Accredited laboratories will be promptly notified of any discrepancies in the growing plots.

5. Supply of *in vitro* cultures to other laboratories

- APIC is the custodian of the Certified public potato variety collection on behalf of the potato industry. The *in vitro* cultures derived from this collection are not to be sold or provided to other laboratories, companies or countries without APIC's written consent.

Appendix 4. Protocol for PCN testing

The following protocol is based on recognised international procedures and is currently accepted by Australian certifying authorities.

The sample of soil is collected before planting and the soil assessed for the presence of PCN at a laboratory approved by the certifying authority. A seed lot can not be certified until the result of the test from the area in which it was grown has been received with a negative result for the presence of PCN.

- Contractors or other persons authorised by the certifying authority will supervise sampling. Soil will be collected on a 10 metre by 10 metre grid. The soil collected from 2 hectares will be aggregated and assessed as one sample.
- The preferred sampling time is just before, or soon after planting.
- Seed growers are to provide at least two people to assist with sampling.
- It is the grower's responsibility to notify the contractor that he is ready for sampling.
- All areas of generations 2 to 4 (i.e. G2, G3, and G4) must be sampled.
- 25% of the total area of generation 5 intended for sale, must be sampled.
- New growers - all areas of certified seed are to be sampled unless documentary proof in the form of farm plans and independent verification that potatoes have not been grown on the farm, is provided. In the absence of formal proof, new growers will be required to have all of their certified seed crops sampled for a period of four years.
- Potatoes from areas which have been sampled can be certified only after written results confirming that no PCN was found, are received from the laboratory.
- The certifying authority may request documented proof of rotation.
- Each sample collected must be clearly identified to enable an accurate 'trace back' to where the sample was collected.

Appendix 5. Future adoption of higher standards

In the future, should APIC wish to implement a higher rating for tuber quality (i.e. **AA** standard) as part of the National Standard, the following maximum tolerances for tuber quality may be applied as shown in the following Tables:

Group 2. Disease/nematode tolerances

Tolerances are based on the sample as inspected.

Table 1. Disease/nematode tolerances

	Rating (% by tuber count)	
	AA	**A**
Dry rots (*Fusarium* sp., *Phoma* sp.)	1.0	2.0
Black scurf (*Rhizoctonia* sp.)	1.0	-*
Silver scurf (*Helminthosporium* sp.)/ Black dot (*Colletotrichum* sp.)	0.5	-*
Common scab (*Streptomyces* sp.)	1.0	2.0**
Powdery scab (*Spongospora subterranea*)	0.0	2.0
Root knot nematode (*Meloidogyne* sp.)	1.0	2.0
Soft rots (e.g. *Pythium* sp.)	0.1	0.25
Pink rot (*Phytophthora* sp.)	0.0	0.25

* The tolerance for these diseases may be negotiated between the seed grower and the seed buyer.

The tolerance should relate to the number of tubers in a sample, with levels of disease present as depicted by Styles A to C in the publication **'Product Description Language - Potatoes'** (ISBN 0 7311 4357 4).

** In Tasmania, the tolerance for domestic seed may be negotiated between the seed grower and the seed buyer.

The maximum permitted tolerance for all diseases in Group 2 is 1% for **AA**, and 2% for **A** (4% in Tasmania only).

Group 3. Tuber defects

Table 2. Defect tolerances

	Rating (% by tuber count)	
	AA	**A**
Insect damage	0.7	1.5*
Malformed tubers	1.0	2.0
Mechanical damage	1.0	2.0
Stem end discolouration	1.0	2.0
Miscellaneous (e.g. sunburn)	0.5	1.0
Foreign cultivars	0	0
Oversize	0.5	1.0
Undersize	1.0	2.0

* An additional 2% of tubers may show minimal feeding damage (i.e. where these tubers have no more than 2 feeding holes/tuber, not more than 3 mm deep, containing no soil, and the damaged skin is healed). Tuber eyes must not be damaged.

The total acceptable tolerance for Groups 2 and 3 will be 1.0% for **AA,** and 4.0% for **A**.

Irrespective of the generation assessed, seed will graded **AA**, or **A**, where **AA** is superior to **A**.

Appendix 6. Application for inspection of potato crops

AGWEST
Plant Laboratories

OFFICE USE ONLY

APPLICATION FOR INSPECTION OF POTATOES CERTIFIED AND REGISTERED SEED PRODUCTION

2001/2002

BOTH SIDES OF A SEPARATE FORM TO BE USED FOR EACH PROPERTY

(PLEASE PRINT)

Full name of property owner/applicant .....

Postal address ..... Postcode .....

Property address .....

Telephone number ..... Facsimile number .....

(NOTE: All correspondence will be forwarded to the property owner.)

Plot no.	Variety	Plant date	Est. harvest date	Area (ha or mini tuber no.)	Seed sown				Location name number	Farm paddock name
					Class (√)		Gen.	Source or label no.		
					Cert.	Regist.				

Return to: Dale Spencer
Manjimup Horticultural Research Institute, Locked Bag No. 7
MANJIMUP WA 6528
E-mail: dspencer@agric.wa.gov.au

Fees: Including GST

Application fee	$99.00
Plot fee, per plot	$27.50
Area fee, per hectare	$52.80

Do **NOT** send payment with this form. You will be invoiced after field inspections are completed.

By: **One week after first sowing**

Enquiries: Telephone: (08) 9777 0000
Facsimile: (08) 9777 0001
Mobile: 0419 950 725

DECLARATION

I declare that the above listed varieties have been sown to meet the rules of the Certified and/or Registered Field Crop Schemes, and agree to the required inspections being made.

Signature: _____ Date ___ / ___ / ___

Appendix 7. Application for tuber inspection or registration

WESTERN AUSTRALIAN SEED POTATO CERTIFICATION SCHEME

REQUEST AND AUTHORITY FOR SEED CERTIFICATION

PART 1 FULL NAME AND POSTAL ADDRESS OF PERSON RESPONSIBLE FOR ALL CHARGES:

Name: .....

Address: ..... Postcode: .....

SIGNATURE: .....

PART 2 GROWER DECLARATION

NOTE: To be completed and signed by the OWNER/MANAGER/LEASEE of the property on which the seed was harvested.

I declare that the seed described below was harvested from the Registered Area Number indicated below.

GROWERS NAME: ..... **SIGNATURE:** .....

PART 3 SEED GRADERS DECLARATION (Where the tubers are graded by a third party)

I declare that the seed described below was processed from the seed delivered by the person above.

SEED GRADERS NAME: ..... **SIGNATURE:** .....

Registered area number	.....	.....	.....	.....
Seed lot no.	.....	.....	.....	.....
Variety	.....	.....	.....	.....
Generation	.....	.....	.....	.....
Harvest date	.....	.....	.....	.....
Mass of each container ...	.....	.....	.....	.....
Number of containers	.....	.....	.....	.....
Total mass	.....	.....	.....	.....
Tags used	No.	No.	No.	No. .....
(Enter colour coding and numbers)	to	to	To	To .....
	No.	No.	No.	No. .....
	to	to	To	To .....
Chemical additives	.....	.....	.....	.....

Appendix 8. Grading shed cyphers

Code	Grading plant	District
AJ	J. Allen	Albany
AR	R. Arthur	Rosa Brook
AT	T. Allen	Albany
AY	G.P. Ayres & Sons	Albany
BK	T.A. Barker	Albany
BO	J. Bocian	Albany
BR	G. Britza	Esperance
BT	D. Bendotti	Pemberton
CH	E. Challis	Rosa Brook
DL	A.H. Darnell	Rosa Brook
FR	J.A. Forrest	Busselton
FX	T. Fox	Pemberton
IP	G. Ipsen	Manjimup
MH	McGrath & Heidrich	Borden
MK	P.J., B.M. & A.P. Meiklejohn	Esperance
MS	MAES	Manjimup
NL	N.R. Lee	Albany
PA	L. Eldridge	Albany
PB	Ackley & Westcott	Albany
PE	Creed & Esler	Esperance
PG	L. Henderson	Bremer Bay
RA	L. Radomiljac	Northcliffe
SP	Southern Packers	Manjimup
TH	W.K. & B. Thomas	Borden
WP	S. & P. Wolfe	Albany
WR	R.T. Wolfe & Co.	Albany

Appendix 9. Deliver document (provisional)

DELIVERY NOTE

The Grower

Address: .....

Phone: .....

Signature: ..... Date: .....

Grower information

Seed lot code or paddock number	02BC001	02BC002	02BC003
Variety	Russet Burbank	Atlantic	Nadine
Generation	G3	G4	G3
Planting date	1 January 2002	5 January 2001	10 January 2001
Top removal date or month of senescence	May 2002	May 2002	May 2002
Irrigated or dryland	Irrigated	Irrigated	Dryland
Harvest date	5 June 2002	5 June 2002	5 June 2002
Other			

Grading information

Container type	Bulk	½ tonne bin	500
No. of containers	1	50	100
Label Number Range from label	TR0001	TR0021	TR0071
to Label number	TR0020	TR0070	TR0170
Graded size range (mm or grams)	50-100 mm	70-170 g	150-225 mm
Post harvest treatment	Tecto	Tecto	Tecto
Storage conditions (coolstore or ambient)	5 degrees coolstore	5 degrees coolstore	5 degrees coolstore
Tuber inspection date			

Carriers name: .....

Signature: ..... Date: .....

Transport type (circle): Refrigerated / Tautliner / Tarped / Bulk

Destination: .....

Departure date: ..... Time: .....

Arrival date: ..... Time: .....

DSC\HOLLAND,MARK\WA CERT SEED RULES INCL NAT STDS 2001_02.DOC