



SCOTTISH SEED POTATOES



INTRODUCTION



Scotland has a long history of seed potato production, from early certification schemes in the 1920s, which considered varietal purity alone, to the current classification system which covers all aspects of production.

All stages of seed potato production in Scotland are under **official government control**.

The Certifying Authority for seed potatoes in Scotland is **SASA (Science & Advice for Scottish Agriculture)** which is responsible for the management and administration of the **Seed Potato Classification Scheme (SPCS)**. SASA is a Division of the Agriculture Food and Rural Communities Directorate of **The Scottish Government**. Classification and marketing is carried out under the Seed Potatoes (Scotland) Regulations 2000 and the Seed Potatoes Amendment (Scotland) Regulations 2005, 2007 and 2009.

The SPCS maintains **high standards** for seed health and purity and operates by exerting official control over initial propagating material, the length of the multiplication chain, and application of strict tolerances for diseases, including those caused by viruses.

Scotland, which is recognised within the European Union as a **Community Grade region**, applies stricter health standards than elsewhere in the EU, and produces and markets only **Pre-Basic** and **Basic** seed potatoes.

Only seed potatoes classified at Community Grade can be introduced into Scotland from the rest of the European Union. This provides a safeguard against the introduction of pathogens such *Clavibacter michiganensis* ssp. *sepedonicus* (ring rot), *Ralstonia solanacearum* (brown rot) and *Potato spindle tuber viroid*, which have never been found in potatoes in Scotland. Imports of seed potatoes from outside of the EU are permitted only through **quarantine** units.

Seed crops in Scotland are grown only on land which:

- has not had potatoes cultivated on it in the preceding **five years** (seven years for Pre-basic); and
- has been found to be free from potato cyst nematodes (*Globodera rostochiensis* and *G. pallida*) by testing of official soil samples before planting; and
- is not known to have had any occurrence of wart disease (*Synchytrium endobioticum*). This disease has not been found in Scotland for nearly 30 years.



SCOTTISH SEED POTATO CLASSIFICATION SCHEME



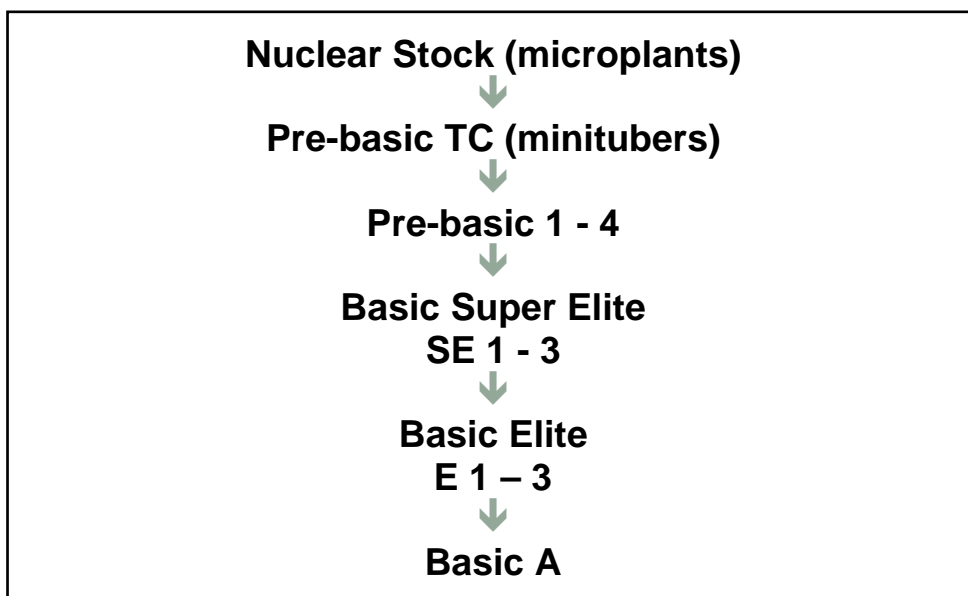
Initial (“nuclear”) stock, from which all Scottish seed crops are derived, is produced by **micropropagation** in the government laboratories at SASA. These tissue cultures are subject to stringent testing to ensure freedom from pathogenic organisms.

Further multiplication is carried out by officially approved commercial micropropagation facilities to produce disease-free minitubers (Pre-basic TC).

These **minitubers** are then released to officially approved growers for cultivation in the field as Pre-Basic (PB).

There is an official limit to the number of generations that can be produced at each class ensuring older stocks are flushed out. Minimum health standards for each class are maintained by inspection of the growing crop.

The following classes of seed potatoes are produced in Scotland:



This is a flush through production system **without clonal selection**.

The disease tolerances for each of the classes are explained below.



1. PRE-BASIC MINITUBERS (PB-TC)

Pre-Basic (PB) stocks are the produce of selected clones propagated initially from microplants in tissue culture (TC). These microplants are prepared and tested by SASA to ensure freedom from viruses and from certain fungi and bacteria that can be latent in tubers.



Pre-basic TC seed potatoes are grown from microplants in a pathogen free medium, e.g. hydroponics or peat. Production is normally carried out in a protected environment by officially approved growers for one generation only.

2. PRE-BASIC FIELD GROWN (PB 1 - 4)

PB-TC minitubers may be planted in the field for classification as Pre-basic for one to four generations. At growing crop inspection, all stocks must be 100% pure and true to type, and completely free from *Tobacco vein necrosis virus*, *Severe and mild mosaic virus*, *Leafroll virus*, *Blackleg (Pectobacterium spp.)* and *Witches' broom phytoplasma*.

Stocks of PB class are not often marketed outside Scotland - they form the basis for seed potato production in Scotland and provide a continuous input of healthy material to maintain the high standard of all stocks.

3. SUPER ELITE (SE 1-3)

SE crops are **derived from PB seed**. At the second growing crop inspection, the crop must be 99.95% pure and true to type and within the following disease tolerances:



	%
<i>Severe mosaic virus</i>	0
<i>Leafroll virus</i>	0.01
<i>Mild mosaic virus</i>	0.05
Blackleg (<i>Pectobacterium</i> spp.)	0.25
Blackleg (<i>Dickeya</i> spp.)	0.00

If they meet these tolerances, crops grown directly from PB seed can be classified as SE1 to denote one year of multiplication from PB, whereas crops classified as SE2 or SE3 denote 2 or 3 years from PB.

SCOTTISH SEED CLASSES



4. ELITE (E 1-3)



Elite crops are grown from Pre-basic or Super Elite stocks and at the second growing crop inspection, must be 99.95% pure and true to type and must meet the following diseases tolerances:

	%
Severe mosaic and/or leafroll virus	0.1
Total mosaic and/or leafroll virus	0.5
Blackleg (<i>Pectobacterium</i> spp.)	0.5
Blackleg (<i>Dickeya</i> spp.)	0.0

A 3 year generation limit is applied to Elite stocks in Scotland.

5. CLASS A

Crops not meeting the standards for PB, SE or E at the second growing crop inspection can be downgraded to class A (Basic seed) as long as they are 99.90% pure and true to type and comply with the following disease tolerances:

	%
<i>Severe mosaic and/or leafroll virus</i>	0.4
<i>Total mosaic and/or leafroll virus</i>	0.8
Blackleg (<i>Pectobacterium</i> spp.)	1.0
Blackleg (<i>Dickeya</i> spp.)	0.0

Any crops not meeting these standards are rejected from the classification scheme and cannot be marketed as seed.

The above high health standards are assured by at least two official inspections of each seed crop during the growing season.

Because of its northern climate, Scotland has very few problems with virus diseases and the virus health of Scottish seed potatoes is, therefore, **superior** to that of seed from most other exporting countries.



TUBER INSPECTION AND PHYTOSANITARY CERTIFICATION



SASA, Scotland (UK)	
Basic Seed Potatoes <i>Solanum tuberosum</i>	
Crop No. 38340	
Variety KERR'S PINK	
Grade EC2	Class E
Producer No. UK/S 20273	Date 30/10/2009
Size 35/55mm	Weight 1 tonne
EC Rules and Standards ZP – a6/d1 EC – Plant Passport 000046700025	

Before seed potato consignments can be marketed, or phytosanitary certificates can be issued in case of export of Scottish seed potatoes outside the EU, samples of the tubers are checked for pests, diseases, damage and defects by official inspectors.

All tuber consignments must be packed in their final containers and sealed with official labels (see example on the left) before inspection. The official label confirms

the identity and class of the consignment. It includes the **crop identification number** which ensures full traceability of all Scottish seed potato consignments.

Scotland only produces high quality Pre-basic and Basic seed potatoes and the colour of label for these two categories is white with a purple diagonal stripe and plain white respectively. Scotland does not produce the lower category Certified seed potatoes and consequently Scottish seed potatoes **never** carry a blue coloured label.

Consignments marketed within the EU are inspected to **minimum tolerances** (see table 1 below). There are special minimum tolerances for export outside the EU (and to the Canary Islands) which are applied unless the conditions set by the importing country are stricter.

For more information on all official aspects of seed potato certification and inspection in Scotland, please contact:

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More information on the Scottish Seed Potato Classification Scheme can be found on the SASA website: www.sasa.gov.uk



TUBER INSPECTION TOLERANCES - EU



The following minimum tolerances are used for Basic seed potatoes produced in Scotland for marketing within the EU.

Disease, pest, damage or defect	Individual tolerance ¹	Individual tolerance for surface area cover	Group tolerance ¹	Collective tolerance groups II, III & IV ¹
Quarantine organisms (Group I)			NIL	
Wart disease (<i>Synchytrium endobioticum</i>)	NIL	-		
Potato tuber eelworm (<i>Meloidogyne chitwoodi</i> , <i>M. fallax</i>)	NIL	-		
Potato cyst nematodes (<i>Globodera rostochiensis</i> , <i>G. pallida</i>)	NIL	-		
Ring rot (<i>Clavibacter michiganensis</i> ssp. <i>sepedonicus</i>)	NIL	-		
Brown rot (<i>Ralstonia solanacearum</i>)	NIL	-		
Potato tuber moth (<i>Phthorimaea operculella</i>)	NIL	-		
Potato spindle tuber viroid	NIL	-		
Colorado beetle (<i>Leptinotarsa decemlineata</i>)	NIL	-		
Rots (Group II)			0.5%	
Rots including Blight (<i>Phytophthora infestans</i>)	0.5%	-		
Blackleg/bacterial soft rot (<i>Pectobacterium</i> spp.)	0.5%	-		
Blackleg (<i>Dickeya</i> spp.)	0.0%	-		
Gangrene (<i>Phoma foveata</i>), Dry rot (<i>Fusarium</i>), Wet rot (<i>Botrytis cinerea</i>)	0.5%	-		
Surface diseases (Group III)			4.0%	
Skin spot (<i>Polyscytalum pustulans</i>)	0.5% (2.0% ²)	12.5%		
Black scurf (<i>Rhizoctonia solani</i>)	3.0%	12.5% (25% ²)		
Common scab (<i>Streptomyces scabies</i>)	4.0% (5.0% ²)	25.0% (33% ²)		
Powdery scab (<i>Spongospora subterranea</i>)	3.0%	12.5%		
Other defects and damage (Group IV)			2.0%	
Externally blemished or atypically shaped tubers ³	2.0%	-		
Superficial necrosis by PVY	0.1%	-		
Total (Groups II, III and IV)				4.0%
Soil			1.0%	
Dirt or other extraneous matter	1.0%	-		

¹ Tolerances are by weight; ² Applies to Class A only; ³ Includes tubers wrinkled or dehydrated due to silver scurf (*Helminthosporium solani*);

TUBER INSPECTION TOLERANCES – NON-EU



The following minimum tolerances are used for Basic seed potatoes produced in Scotland for export outside the EU (and to the Canary Islands) unless the importing country's requirements are **stricter**.

Disease, pest, damage or defect	Individual tolerance ¹	Individual tolerance for surface area cover	Group tolerance ¹	Collective tolerance groups II, III & IV ¹
Quarantine organisms (Group I)			NIL	
Wart disease (<i>Synchytrium endobioticum</i>)	NIL	-		
Potato tuber eelworm (<i>Meloidogyne chitwoodi</i> , <i>M. fallax</i>)	NIL	-		
Potato cyst nematodes (<i>Globodera rostochiensis</i> , <i>G. pallida</i>)	NIL	-		
Ring rot (<i>Clavibacter michiganensis</i> ssp. <i>sepedonicus</i>)	NIL	-		
Brown rot (<i>Ralstonia solanacearum</i>)	NIL	-		
Potato tuber moth (<i>Phthorimaea operculella</i>)	NIL	-		
Potato spindle tuber viroid	NIL	-		
Colorado beetle (<i>Leptinotarsa decemlineata</i>)	NIL	-		
Rots (Group II)			0.2%	
Rots including Blight (<i>Phytophthora infestans</i>)	0.2%	-		
Blackleg/bacterial soft rot (<i>Pectobacterium</i> spp.)	0.2%	-		
Blackleg (<i>Dickeya</i> spp.)	0.0%	-		
Gangrene (<i>Phoma foveata</i>), Dry rot (<i>Fusarium</i>), Wet rot (<i>Botrytis cinerea</i>)	0.2%	-		
Surface diseases (Group III)			1.5%	
Skin spot (<i>Polyscytalum pustulans</i>)	0.5%	12.5%		
Black scurf (<i>Rhizoctonia solani</i>)	1.5%	12.5%		
Common scab (<i>Streptomyces scabies</i>)	1.5%	12.5%		
Powdery scab (<i>Spongospora subterranea</i>)	1.5%	12.5%		
Other defects and damage (Group IV)			3.0%	
Externally blemished or atypically shaped tubers ²	1.0%	-		
Superficial necrosis by PVY	0.1%	-		
External necrosis by other viruses	2.0%	-		
Total (Groups II, III and IV)				4.7%
Soil			0.5%	
Dirt or other extraneous matter	0.5%	-		

¹ Tolerances are by weight; ² Includes tubers wrinkled or dehydrated due to silver scurf (*Helminthosporium solani*).