

12 March 2019

Economic Commission for Europe

Steering Committee on Trade Capacity and Standards

Working Party on Agricultural Quality Standards

Specialized Section on Standardization of Seed Potatoes

Forty-sixth session

Geneva, 18-19 March 2019

Item 3 of the provisional agenda-

Draft guide on minituber production

Note by the secretariat

The following document contains a draft guide on minituber production prepared by the delegation of New Zealand.

GUIDE FOR SEED POTATO CERTIFICATION SCHEMES IN RELATION TO MINITUBER PRODUCTION FACILITIES IN RELATION TO SEED POTATO CERTIFICATION

Introduction

The production of potato microplantlets and minitubers (G0 seed potatoes) should be conducted within specific guidelines supported or approved by the Certification Authority (CA). The CA is responsible for ensuring that the guidelines are adhered to in relation to the production of potato minitubers and microplantlets. Hence this guide is directed as a resource for the CA.

Facilities used for the production of potato microplantlets material and minitubers that are intended for export should be authorized or operated directly by the National Plant Protection Organization (NPPO) of the exporting country.

The following ISPM's are recommended as guidelines:

- **ISPM No. 10** - REQUIREMENTS FOR THE ESTABLISHMENT OF PEST FREE PLACES OF PRODUCTION AND PEST FREE PRODUCTION SITES (1999)
- **ISPM No. 33** - PEST FREE POTATO (SOLANUM SPP.) MICROPROPAGATIVE MATERIAL AND MINITUBERS FOR INTERNATIONAL TRADE (2010)

In relation to the production of potato microplantlets and minitubers (G0 seed potatoes) used for subsequent multiplication within a seed Scheme the CA's main focus is to ensure that the material produced is;

- True to type
- Disease and pest free
- Traceable to origin of production

Tissue culture laboratory

The CA should audit the tissue culture laboratory used to produce microplantlets to ensure the laboratory maintains the high health status of the nuclear stock, avoid pathogen contamination, and ensure the integrity of the material that is produced. In conducting regular audits, the CA should consider;

1. Appropriate sterile laboratory procedures are applied and documented to avoid contamination of the cultured plant material, e.g., use of sterile tools, laminar flow hood and sterile growing media for aseptic multiplication of plant material, dedicated clothing for operators (e.g., lab coat, overshoes). The laboratory should demonstrate good laboratory practices to maintain high plant health and traceability.
2. Regular visual monitoring of the growing tissue culture plants is conducted to ensure no contamination of tissue culture stocks has occurred.
3. Regular cleaning of all laboratory surfaces including media preparation and growth room. Appropriate management of the tissue culture laboratory to ensure no mites, spiders, or other insects can reside.
4. Records are to be kept facilitating traceability of all lines.
5. Laboratory staff are suitably trained and qualified.

Nuclear micropropagation material for use in a seed potato Certification Scheme

Initial micropropagation material

The CA must ensure appropriate procedures and policies exist in the minituber production facility, specifically;

1. All the *in vitro* propagating material shall have originated from an *in vitro* facility approved by the CA.
2. The nuclear stock must be well labeled to ensure integrity of the variety
3. The nuclear stock entering the tissue culture (TC) laboratory multiplication program must be laboratory tested free from at least the following pathogens;
 - Potato Spindle Tuber viroid
 - *Clavibacter michiganensis* spp. *sepedonicus* (ring rot)
 - *Ralstonia solanacearum* (brown rot)
 - *Pectobacterium* spp. and *Dickeya* spp. (syn. *Erwinia* spp.)
 - Potato viruses, X, Y, S, M and A
 - Potato Leaf roll virus
 - *Liberibacter* (note not in UNECE Standard but suggest inclusion)

Other pathogens and pests may be tested at the discretion of the Certification Authority.

Potato varieties and or accessions that have positive detections for any of the above pathogens must be removed from the production unit.

Records are to be kept of testing protocol, testing results and sources of original material.

The CA must maintain any, and all, commercial confidentiality relating to material.

All potato varieties produced by the microplantlet and/or mintuber production facility must be registered with the CA.

All material entering the Scheme for certification must have been produced in an Authority approved tissue culture laboratory or minituber production facility meeting the standards as determined by the CA. The UNECE standards provide a set of conditions Annex I.

The nuclear material will be the foundation for further multiplication of plant material within the seed Scheme. A statement of origin must be supplied to the CA when entering the nuclear material into the Scheme. The CA should ensure the following information is submitted regarding the introduction of nuclear material.

1. Name of supplier
2. Origin of the material
3. Approved producer (Mintiber/TC Lab)
4. Type of material (tissue culture or minituber or micro tuber).
5. Variety and all associated synonyms.
6. Quantity of material (number of tissue culture plantlets).
7. Name of company material supplied to.
8. Date material supplied.
9. Diagnostic report of plant health status especially ensuring the material is free of restricted pathogens which may include any quarantine entry documentation that may apply for material entering a country or region.
10. Variety description to enable certification officers in the field to accurately identify the variety.
11. Description of any treatments applied eg heat treatment to remove viruses

Any tissue culture or minitubers not produced in a approved tissue culture laboratory or minituber production facility should not be eligible for inclusion in the certification Scheme operated by the CA.

No other plants or plant species may be produced in the tissue culture laboratory or minituber production facility.

Production of Minitubers (G0)

The CA should ensure that facilities used for minituber production must be free of diseases/pests specified in the respective Standard. The only material that may enter the minituber production facility are disease/pest-free potato micro propagation material.

Eligible plant material

The CA should stipulate that;

1. Only potato micro-propagative material may be planted.
2. All the *in vitro* propagating material shall have originated from an *in vitro* facility approved by the CA.
3. No other plants or plant species may be produced in the facility.

The location of the minituber facility

The CA should assess the location of the minituber facility in relation to plant pest and disease concerns. Considerations should include:

- The placement of the facility in a disease/pest-free area, or an area that is free or sufficiently isolated from sources of specified diseases/pests.
- The inclusion of a buffer zone around the facility for specified diseases/pests.
- The placement of the facility in a region with low disease/pest prevalence and low vector pressure.
- Production takes place in period of low disease/pest and vector pressure where possible.

The above measures may be negated if the minituber facility has adequate physical and operational safeguards in place to prevent introduction of specified diseases/pests.

The minituber production facility/greenhouse

The CA should ensure that the operator of the minituber facility takes all reasonable husbandry practices for the prevention or spread of pests and diseases. In addition, the growing crop must have been kept free from *Synchytrium endobioticum* (Schilb) Prc., potato viruses, bacterial diseases and from deviations of variety and type.

The generation of minitubers (G0) shall be produced from microplants in a facility protected from external contaminations, insect-proof and on growing medium free from pests and diseases.

One generation only of minitubers can be produced. [Comment by New Zealand: Is this the case for all areas/]

Official visual inspections during the growing period by the CA with a minimum of 2 inspections recorded per production cycle.

The CA may include systematic testing of every lots of minitubers to check the absence of viruses (PLRV, PVA, PVM, PVS, PVX , PVY) and of the absence of quarantine bacteria *Ralstonia solanacearum* and *Clavibacter michiganensis subsp sepedonicus*.

To check varietal identity and purity and absence of diseases, the CA may require a post-control in field for the minitubers (G0) which are produced.

Authorisation of producers of minitubers is given by the CA. Requirements concern appropriate facilities, organisation for traceability, competent staff. In auditing the minituber facility, the CA may record;

1. The type of greenhouse.
2. The physical location of greenhouse.
3. The maintenance of the area around greenhouse eg weed and alternative host free.
4. Controlled entry with authorize access procedures .
5. The use of an anteroom with double door access in the entrance area where protective clothing and overshoes can be donned. The entrance area shall be equipped with a footbath for disinfecting footwear and wash bay for washing and disinfecting hands.

6. All access doors, openings and ventilation openings must be sealed with insect proof mesh with reference to local pests and vectors. The mesh size for the virus netting to isolate the structure, must be in the order of 75 threads per inch. (75 Mesh size).
7. All openings should be sealed between the external and the internal environment of the structure.
8. The floor area of the greenhouse shall be covered in such a manner that the roots of plants kept in containers thereon, cannot penetrate the soil on which the greenhouse is erected (e.g. Cement floors or the separation from soil through a dense membrane).
9. Designated areas for washing and disinfecting containers and cleaning, sorting, packing and storage of minitubers.
10. An appropriate air filtration system, if appropriate.
11. Water used for irrigation filtration and sanitation systems.

Access control to the tissue culture laboratory and or minituber production facility

The CA should specify that the;

1. Access to the facility for workers should be controlled and is limited to authorized access only.
2. Provision should be made for the wearing of protective clothing, disinfection of footwear and hand cleansing.
3. It should be possible to decontaminate the facility as needed.

Production of minitubers

The CA should ensure that the operator of the minituber facility takes all reasonable husbandry practices for the prevention or spread of pests and diseases.

Growth Medium, nutrients and water

The growing medium, fertilizer used, and any water used shall be free from disease causing organisms, or have been effectively decontaminated.

1. Use of soilless medium.
2. Fumigation / disinfection / sterilization of growth medium for plants.
3. Transport and storage conditions of growth medium to avoid contamination.
4. Use of borehole / spring water or municipal water.
5. Appropriate treatment of water.
6. Regular testing of water.
7. Use of inorganic nutrients.
8. Appropriate treatment of organic nutrients.

Plant containers

The plant containers used by the minituber production facility shall be of a such a nature that it can be easily sanitized and are isolated from the ground.

The CA should audit the procedures for the sanitation of the containers that is used and ensure the procedures are appropriate to prevent introduction of pest and diseases.

Crop management

The CA should determine appropriate management systems are in place to ensure;

1. Plants in the minituber production facility

- (a) be clearly identified according to variety;
 - (b) be true to variety;
 - (c) be cared for in a manner that is conducive to the cultivation of seed potatoes;
2. There are procedures to prevent the occurrence of variety mixes, *in vitro* potato plants shall be separated from each other by a suitable separation in order to prevent variety mixes from the adjacent planting, during the growing and harvesting processes.
 3. *In vitro* propagating material has complied with the phytosanitary status required by the CA or international standard. Phytosanitary status indicates that the propagating material has been tested in the controlling laboratory approved by the authority as such and registered with the NPPO or CA, in accordance with recognized methods. Material that does not meet the phytosanitary conditions as determined by the Authority must not be used in minituber production.
 4. The minituber facility is be monitored during the growing season by the CA for the specified diseases/pests at specified intervals through appropriate methods/techniques. At least 2 visual inspections of the growing crop must be conducted by the CA should occur during the production cycle.
 5. Precautions or corrective actions against disease/pests must be documented by the facility operator and audited by the CA.
 6. Regular and effective fungicide and or insecticide spray programs should be documented by the facility operator and may be audited by the CA.
 7. Aphid monitoring in greenhouses should be compulsory. Two to four aphid traps of which the surface has been covered with an adhesive strip should be placed in every greenhouse, one trap in each quadrant. The date on which the traps were affixed, must be noted. All observations during the monitoring action shall be noted. The monitoring and associated documentation may be audited by the CA.

Sanitation

The CA should assess sanitation procedures that are used by the facility operator.

The facility operator should ensure;

1. Appropriate hygienic practices for handling plant material.
2. Sanitation during growth includes regular removal of plant debris.
3. Appropriate discarding procedures.
4. Proper disinfection of facilities between plantings.
5. No growth of algae on floor or wet walls.
6. The facility should be thoroughly disinfected after each production cycle or growing season.

Post-harvest handling

The CA should ensure the facility operator has appropriate systems for post harvest handling including;

1. Appropriate storage conditions. The minitubers must be handled, packed, stored and transported in such a manner that infestation by specified diseases / pests are prevented.
2. Sorting and packaging according to requirements for certification.
3. New containers be used for packing of minitubers.
4. Cleaning and disinfection of any equipment and storage facilities.

Record keeping

The CA should assess documented evidence of the;

1. Floor plan (Lay out of varieties planted) for each greenhouse.
2. Traceability of all the minitubers produced
3. Correct labelling of each production.
4. Disease test results.

Competence and awareness of personnel

The CA should collect evidence of;

1. Qualified staff.
2. Continuous training and evaluation.

Labelling of material produced

When the minitubers meet the requirements, the minitubers can be certified as Pre-Basic seed class (PBTC) by the CA and can be labeled appropriately.