Draft ISPM on *Pest-free potato micropropagative material and minitubers for international trade*

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Reason for the standard

- Many pests associated with potato propagative material
- Potato minitubers and micropropagation material are vegetatively propagated and are intended for further vegetative propagation: increasing the risk of spreading pests
- Certain micropropagation processes can free infected propagative material of pests and therefore can be used as the basis for providing pest-free material for subsequent certification
- Export certification of such material is important and it would benefit from being harmonized

Structure of the standard

1. Responsibilities
2. Pest Risk Analysis
3. Production of Pest-Free Potato Micropropagative Material
4. Production of Pest-Free Minitubers
5. Staff Competence
6. Documentation
7. Auditing
8. Official Verification of Pest Freedom
9. Certification

ANNEX 1 - Requirements for micropropagation facilities

ANNEX 2 - Requirements for minituber production facilities

ANNEX 3 - Criteria for official testing laboratories

APPENDIX 1 - Pests not consistently excluded by conventional micropropagation

APPENDIX 2 - Pests commonly required to be excluded from minituber production

Scope

- The standard provides guidance on the production, maintenance and certification of pest-free potato micropropagative material and minitubers intended to be moved in international trade

- The standard does not apply to movement of field-grown seed potatoes or to potatoes intended for consumption or processing

New definitions

- Potato micropropagative material - plants in vitro of tuber-forming Solanum spp. (includes microtubers)
- Microtuber - a tuber produced in vitro from plants in vitro of tuber-forming Solanum spp.
- Minituber - a tuber produced in a protected environment from potato micropropagative material
- Seed potatoes - tubers (including minitubers) and potato micropropagative material of cultivated tuber-forming Solanum spp. for planting

Responsibilities

- Only facilities officially authorized or operated directly by a National Plant Protection Organization (NPPO) should be recognized for the production of potato micropropagative material
- The NPPO of the exporting country is responsible for auditing the phytosanitary aspects of these facilities and for the phytosanitary aspects of any related seed potato certification scheme
- The NPPO of the importing country is responsible for pest risk analysis (PRA) and should, on request, have access to documentation and to the facilities to enable it to verify that the level of phytosanitary security in the exporting country meets its requirements

Pest risk analysis

- PRA should be carried out in accordance with ISPM No. 11, and ISPM No. 21 as appropriate, to identify regulated pests that may also be specified in a seed potato certification scheme of the importing country

- On the basis of the PRA(s), pests regulated for potato micropropagative material and minitubers respectively should be listed (as described in ISPM No. 19)

Pest risk management

- Appropriate risk management measures are determined based on the PRA. These measures may be integrated into a systems approach, as described in ISPM No. 14
- For potato micropropagative material, the primary phytosanitary measures for managing risks include:
  - testing for the pests specified and regulated
  - management systems for maintenance and propagation of pest-free potato micropropagative material in a closed, sterile environment
- For potato minituber production, the primary phytosanitary measures for managing risks should take into account any PRA information related to the area of production and include:
  - origin from pest-free potato micropropagative material as part of a seed potato certification scheme, if appropriate
  - production in pest-free growing medium under a protected environment operated as a pest-free production site

Establishment of pest-free potato micropropagative material

Establishment of pest-free material

- Plants from which the pest-free plants in vitro are to be derived should be grown through a complete cycle, inspected, and found free from pests
  - For candidate material determined to be infested with pests, recognized techniques (e.g., meristem tip culture and thermotherapy) may also be used to remove or eliminate certain pest(s)
  - in these cases, laboratory testing must be used before multiplication commences

Testing

- Testing programmes should utilise officially operated or authorized laboratories that meet the conditions described in Annex 1 to ensure freedom from specified pests
- Pests tested for may include those not consistently excluded by conventional micropropagation, e.g., viruses, viroids, phytoplasmas and some bacteria (examples provided in Appendix 1)

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Establishment of pest-free potato micropropagative material (cont'd)

Secure phytosanitary environment

- Facilities should be specifically authorized by the NPPO
- Facilities should provide a secure phytosanitary environment for establishing and holding individual plants in vitro from previously untested candidate plants while awaiting required test results
- Since infected and pest-free material may be handled in the same facility, procedures should be implemented to prevent cross-contamination or infection of pest-free material including:
  - control of the entry of staff and use of protective clothing, disinfection of footwear and hand washing on entry
  - chronological records of actions in handling material so that production can be checked easily for cross-contamination and infection if required
  - stringent aseptic techniques between materials of a different pest status
  - disinfection of work areas between handling material of different pest status

Maintenance & propagation of pest-free potato micropropagative material

- Facilities should be operated as pest-free production sites as described in ISPM No 10
- Facilities should:
  - maintain and propagate only officially certified pest-free potato micropropagative material and permit only pest-free material to enter the facility
  - grow other plant species only if this is officially permitted and the other plants have been tested if appropriate and adequate precautions are taken to separate them from the potato plants
- Facilities should operate separately from those that that establish plants in vitro test for pests
- Officially approved operational procedures to prevent entry of pests should be implemented
- Entry of staff should be controlled and the use of protective clothing, disinfection of footwear and hand washing on entry should be required
- Aseptic procedures should be used

Combined establishment and maintenance facilities

- Establishment facilities may also carry out maintenance provided that strict procedures are adopted to prevent cross-infection of maintained pest-free plants from other material. These procedures include:
  - use of separate laminar flow cabinets and instruments for the maintained material and for other material
  - scheduled audit tests on the maintained material
- Pest-free plants in vitro established and maintained in these facilities may be propagated further to produce minitubers, or may be exported
- Additional requirements for micropropagation facilities (e.g., structural components) may be required depending on the pests present in the area and the results of PRA

Production of pest-free minitubers

- Minituber production facilities should operate as pest-free production sites
- The only potato germplasm allowed to enter the facility should be pest-free potato micropropagative material. Plants of other plant species may be permitted to be grown in the facility if:
  - PRA has been conducted and, if appropriate, plants have been tested and found to be pest-free before entering the facility
  - adequate precautions are taken to separate them from the potato plants
- A systems approach (as described in ISPM No. 14) may be required to reduce the risk of introduction of pests
- Production should be in a protected environment and additional precautions may include:
  - location in a pest-free area, or well isolated from specified pests
  - use of a buffer zone around the facility
  - location of the facility in an area with low pest and vector pressure
  - production at a time of year of low pest and vector pressure
- These measures may not be required if adequate physical and operational safeguards are in place

Production of minitubers (cont'd)

- The facility should be a growth room, glasshouse or, if appropriate, a screen house, that will prevent the entry of pests
- Entry of staff to the facility should be controlled with good hygiene measures
- Decontamination of the facility should be possible if required
- Growing medium, water supply and fertilizer should be pest-free
- Monitoring for the specified pests and vectors should occur during production and, if necessary, pest control measures or other corrective actions should be undertaken and documented
- The facility should be cleaned after each production run
- Minitubers should be handled, stored, packed and transported under conditions preventing infestation
- Additional requirements for minituber production are in Annex 3

Operational aspects

- Staff should be trained and competent in:
  - Appropriate in vitro propagation and maintenance techniques, and diagnostic testing as relevant
  - following administrative and record-keeping procedures
- Related staff records should be maintained by the NPPO
- A management systems manual should document:
  - the phytosanitary management system
  - policies and objectives of each facility and testing laboratory
  - details on control measures that prevent cross-infection between the pest-free material and other material and all laboratory test procedures

Operational aspects (cont'd)

- Identity and traceability of all propagative material should be documented, and records of all tests maintained for at least five years
- Records that determine pest-free status should be maintained for as long as the micropropagative material is maintained
- All facilities and operational systems should be audited by the exporting NPPO at least annually. The importing country may request to participate in audits
- It should be verified that each lot of micropropagative material meets the importing country requirements for pest-freedom
- Compliance with the seed potato certification scheme of the exporting country may also have to be officially verified
- In conjunction with phytosanitary certification, seed certification labels may assist with lot identification. Such reference numbers should appear on phytosanitary certificates

Annex 1 – Criteria for testing labs

Requirements for official testing laboratories include:

- competent staff with relevant knowledge and experience and appropriate equipment to conduct microbiological, serological, molecular and bioassay tests
- relevant validation data for the tests conducted
- procedures to prevent cross-contamination of samples
- isolation from production facilities
- a management systems manual describing: policy, organizational structure, work instructions, and testing standards and any quality management procedures

Annex 2 – Micropropagation facilities

Requirements for micropropagation facilities include:

- physical structural elements that prevent pest entry (door types, filters, positive air pressure, UV lamps)
- appropriate hygiene facilities and practices
- separation of areas with different function a wash room, media room, subculture room and growth room
- appropriate equipment for micropropagation and growth (laminar flow cabinets, growth rooms with appropriate regime control)
- programme for periodic disinfection/fumigation of the
- monitoring programme for air-borne contaminants
- inspection and disposal procedure for contaminated material

Annex 3 – Minituber facilities

Requirements for minituber facilities include appropriate:

- Physical structure
  - door design, insect-proof screening, isolation from soil, air filtration, provisions for good hygiene
- Environment controls
  - temperature, light and humidity controls, misting apparatus
- Crop management
  - pest monitoring, hygiene practices, disposal procedures, lot identification and separation
- Growing media, fertilizer, water
  - soil-free medium, pre-planing sterilization of medium, prevention of medium contamination, deep-well spring water or treated water, use of inorganic fertilizer or treatment of organic fertilizer
- Post-harvest handling
  - sampling for post-harvest tuber testing, appropriate storage, new containers for packing minitubers, prevention of contamination by pests and vectors, cleaning and disinfection

Appendices - pest lists

Appendix 1 - Pests not consistently excluded by conventional micropropagation techniques and that are commonly tested for:

- mainly viruses, but also some viroids, bacteria and phytoplasmas listed

Appendix 2 - Pests commonly required to be excluded from potato minituber production

- includes bacteria, fungi, insects, nematodes and protozoa