

Phytophylaxie procedures
Procédures phytosanitaires

General crop inspection procedure for potatoes

Specific scope

This standard provides guidance on the programme of inspections and surveys needed within the EPPO region to ensure that exported potatoes satisfy the phytosanitary requirements of importing countries. It is limited to export from EPPO member countries and should be used in conjunction with EPPO Standard PM 3/70 *Export certification and import compliance checking for potato tubers*.

Specific approval and amendment

First approved in 2007-09.

Introduction

This standard provides guidance on the programme of inspections (visual examination, sample collection and documentary checks) on potatoes for export.

Inspections are needed to:

- Ensure that potatoes produced within an EPPO country are free from EPPO A1 and A2 pests and meet the national requirements for regulated non-quarantine pests and certification
- Ensure that potatoes can be issued with a phytosanitary certificate indicating that they are 'considered to be free from the quarantine pests specified by the importing contracting party and to conform with the current phytosanitary requirements of the importing contracting party, including those for regulated non-quarantine pests' (ISPM no. 12 *Guidelines for phytosanitary certificates*)
- Determine pest freedom for areas (ISPM no. 4 *Requirements for the establishment of Pest Free Areas*), places of production, production sites (ISPM no. 10 *Requirements for the establishment of pest free places of production and pest free production sites*) and distribution systems (EPPO Standard PM 3/61 *Pest-free areas and pest-free production and distribution systems for quarantine pests of potato*), that may be required by the importing NPPO for potatoes.

This standard covers inspections for production of seed, ware (including processing) potatoes and provides guidance on inspections made:

- In the field before planting
- On seed potato tubers prior to planting
- On the growing crop

- On harvested tubers
- In surveys to determine pest status.

Inspections may involve the collection of samples for laboratory testing.

In order to avoid repetition of the recommendations in EPPO Standard PM 8/1 *Commodity-specific phytosanitary measures for potato*, pest-specific elements of the inspection programme are not given in detail.

The inspection procedures given in this standard should be used in conjunction with those described in EPPO Standard PM 3/70 *Export certification and import compliance checking for potato tubers*.

If an inspection reveals the presence of a quarantine pest, then emergency actions as given in contingency plans will be required (EPPO Standard in preparation). This may involve further inspections and testing in order, for example, to determine the extent of the infection. This standard does not provide guidance on these situations.

A check-list of phytosanitary inspections of potatoes for export is shown in Table 1.

Inspection plan

Each year, the National Plant Protection Organization (NPPO) should draw up an inspection plan for the potato production area under its responsibility, taking into account those factors that may affect the risk of introduction, establishment and spread of quarantine pests. It may be relevant to define:

- Potato production areas according to their similarity for environmental and production conditions

Table 1 Check-list of phytosanitary inspections that may be required for potatoes for export

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|---|--|
| Before planting | <ul style="list-style-type: none"> • Check records to determine that the field is not scheduled or under official restrictions • Ensure that laboratory tests on field soil for <i>Globodera pallida</i> and <i>G. rostochiensis</i>, and optionally for <i>Meloidogyne chitwoodi</i> and <i>M. fallax</i> have been done and are negative (for seed potatoes and as required for ware potatoes). |
| – the field | |
| – the potatoes (optional) | <ul style="list-style-type: none"> • Visually examine seed potatoes for: <i>Clavibacter michiganensis</i> subsp. <i>sepedonicus</i>, <i>Ralstonia solanacearum</i>, <i>Synchytrium endobioticum</i>, <i>Ditylenchus destructor</i>, <i>M. chitwoodi</i>, <i>M. fallax</i>, <i>Tecia solanivora</i>, <i>Tomato spotted wilt virus</i> (TSWV), <i>Potato spindle tuber viroid</i> (PSTVd) and other regulated pests that could contaminate potatoes if they are present in the area or place of production • If appropriate send samples for laboratory analysis. |
| From emergence to the beginning of maturation | <p>Inspect the crop for:</p> <ul style="list-style-type: none"> • EPPO A1 potato pests • EPPO A2 potato pests e.g. <i>C. m.</i> subsp. <i>sepedonicus</i>, <i>R. solanacearum</i>, <i>S. endobioticum</i>, <i>D. destructor</i>, <i>M. chitwoodi</i>, <i>M. fallax</i>, Potato stolbur phytoplasma, PSTVd • Polyphagous quarantine pests e.g. <i>Bemisia tabaci</i>, <i>Helicoverpa armigera</i>, <i>Liriomyza huidobrensis</i>, <i>L. trifolii</i>, <i>Spodoptera littoralis</i> and TSWV • Other pests specified as regulated by the importing country. <p>If relevant collect and send samples to the laboratory for analysis, including samples for surveys (see ‘Inspections and surveys’).</p> |
| Harvest/ after harvest (also includes shortly before harvest if this is appropriate for the pest) | <p>Inspect seed potato tubers for:</p> <ul style="list-style-type: none"> • EPPO A1 potato pests • EPPO A2 potato pests e.g. <i>C. m.</i> subsp. <i>sepedonicus</i>, <i>R. solanacearum</i>, <i>S. endobioticum</i>, <i>D. destructor</i>, <i>M. chitwoodi</i>, <i>M. fallax</i>, <i>T. solanivora</i>, PSTVd • Polyphagous quarantine pests and pests that could infect potatoes if they are present in the area of production e.g. TSWV • Other pests specified as regulated by the importing country. <p>If relevant collect and send samples (even if asymptomatic) to the laboratory for analysis, including samples for surveys (see ‘Inspections and surveys’).</p> |
| Inspections and surveys | <p>Sample seed and ware potatoes (including processing potatoes) at harvest or in the store and send for laboratory testing for <i>C. m.</i> subsp. <i>sepedonicus</i> and <i>R. solanacearum</i>.</p> <p>Visually inspect the growing crop and harvested tubers (by cutting).</p> <p>For <i>R. solanacearum</i> sample as appropriate:</p> <ul style="list-style-type: none"> • Irrigation water from waterways • <i>Solanum dulcamara</i> and other hosts of <i>R. solanacearum</i>, along waterways • Waste water from potato processing premises • Processing waste. <p>Send samples to the laboratory for analysis.</p> |

- The number of inspections and the sampling intensity on the basis of the area of potatoes grown and tonnage produced. Each inspection plan should consider factors that include:
- The total area of potatoes under production and the category of potatoes being produced
- Quarantine pest status in the area
- Previous survey results
- Risk of entry of quarantine pests
- The category/quantity of potatoes intended to be exported
- The phytosanitary requirements of the countries to which the potatoes will be exported
- Requirements of international phytosanitary and certification standards, and their implementation nationally
- Local production and distribution practices
- Characteristics of the production area, including the location of places of production, potato processing and storage premises, waterways and irrigation canals.

Double inspections that involve export inspections and then inspections for systematic surveys should be avoided wherever possible.

The NPPO should have a system whereby they are notified of specific crops to be exported in order that inspection requirements

of importing countries can be applied. This information should be made available at the earliest opportunity to allow sufficient time for the phytosanitary requirements specified by the importing NPPO to be met or if appropriate negotiated.

Inspections

Inspections should be performed by official phytosanitary inspectors (this includes staff authorized by the NPPO). Inspectors should follow the inspection plan. Inspectors should have been trained to inspect for all A1 and A2 pests and other regulated pests specified by the exporting and importing NPPOs. Inspectors should have access to appropriate operating procedures, manuals and pest descriptions. They should also have access to adequate inspection facilities and equipment.

1. Seed-potato production

1.1 Before planting – inspection of the field

Documentary checks should be made to ensure that the fields for planting have been tested and are free from *Globodera*

rostochiensis and *G. pallida* and optionally for *Meloidogyne chitwoodi* and *M. fallax*. Additionally, documentary checks should be made to ensure that fields previously infested, by for example, *Clavibacter michiganensis* subsp. *sepedonicus*, *Ralstonia solanacearum*, *Synchytrium endobioticum*, *Potato spindle tuber viroid* (PSTVd), *G. rostochiensis* and *G. pallida* are not used for seed-potato production, unless specific requirements have been met. These include time limits before potatoes may be planted again for seed production with laboratory tests on the harvested tubers (*C. michiganensis* subsp. *sepedonicus* and *R. solanacearum*) or descheduling of fields after an appropriate period (*S. endobioticum*, *G. rostochiensis* and *G. pallida*). See the relevant EPPO Standards on National Regulatory Control Systems (series PM 9) for detail of the specific requirements.

Soil in the field should be sampled and sent to the laboratory for examination for *G. rostochiensis* and *G. pallida* (using methods described in EPPO Standard PM 9/xx, in press) and optionally for *M. chitwoodi* and *M. fallax* (EPPO Standard PM 3/69). Fig. 1 shows suggested schemes for collecting soil samples.

1.2 Before planting – inspection of the seed potato tubers

No inspection is normally done on the seed potato tubers before planting if the appropriate inspections have previously been carried out on the seed potato tubers post harvest. However, inspection of the seed potatoes before planting may be part of the inspection plan, particularly for potatoes imported from other countries or potatoes introduced from another area of production especially if it has a less desirable or different pest status than the one in which the potatoes are to be planted.

1.3 Inspection of the growing crop

Crops should be visually inspected from emergence to the beginning of maturation (leaves, stems, tubers, roots as appropriate for the pest) for all A1 and A2 pests of potato specified in EPPO Standard PM 8/1, and additionally other regulated pests specified by the exporting and importing NPPOs. If symptoms or pests are found in the crop or plants at the field edges, samples should be taken for laboratory analysis. Fig. 2 shows suggested schemes for inspection and sampling during the growing period.

The inspector should examine the crop and other plants which are hosts of potato quarantine pests by covering at least 5% of rows (two rows being examined when walking between them).

Preferably inspections should be performed when visual symptoms of pest infection will be most obvious. If plants are missing, or there are other anomalies within the crop, these places should be checked more carefully.

If traps are used to monitor for aphids these could provide useful information on the health status of the crop. If appropriate,

the inspector may collect other information on health status of the crop from the grower or other staff involved with the crop (e.g. agronomists and technicians).

1.4 Inspection of harvested tubers (including tubers shortly before harvest and tubers presented for marketing)

The NPPO should determine the sampling strategy for inspection and, where required, for testing of tubers based on detecting EPPO A1 and A2 pests and other regulated pests specified by the exporting and importing NPPOs at a specified level of probability. Suggested minimum sampling units and inspection units are given in PM 3/70 *Export certification and compliance checking for potato tubers*. For further guidance on sampling, see EPPO Standard PM 3/66 *Sampling of consignment for visual phytosanitary inspection* and Battilani *et al.* (2005).

As appropriate for the pest, tubers should be inspected shortly before harvest, during or after harvest on the farm or at officially registered potato stores. Inspections should cover EPPO A1 and A2 pests which may cause visible symptoms in tubers (e.g. *C. michiganensis* subsp. *sepedonicus*, *R. solanacearum*, *S. endobioticum*, *Ditylenchus destructor*, *Meloidogyne* spp., *Tomato spotted wilt virus* (TSWV), *Potato spindle tuber viroid* (PSTVd), *Tecia solanivora*) and other regulated pests specified by the exporting and importing NPPOs. If symptoms are observed, samples should be sent as appropriate for laboratory analysis using the relevant EPPO Diagnostic Protocol (series PM 7) if available.

Inspections should be made for every lot of potatoes intended for export. Potatoes should be stored in such a way to ensure traceability, including the name of the grower, the cultivar and the place or field of production. For export certification EPPO Standard PM 3/70 *Export certification and import compliance checking for potato tubers* should be followed.

2. Ware-potato production (including processing potatoes)

2.1 Before planting – inspection of the field

Documentary checks should be made to ensure that fields previously infested by certain pests e.g. *C. michiganensis* subsp. *sepedonicus*, *R. solanacearum*, *S. endobioticum*, PSTVd, *G. rostochiensis* and *G. pallida* are not used for ware-potato production, unless specific requirements have been met. These include time limits before potatoes may be planted with laboratory tests on the harvested tubers (*C. michiganensis* subsp. *sepedonicus*, *R. solanacearum*), descheduling of fields after an appropriate period (*S. endobioticum*, *G. rostochiensis* and *G. pallida*) or use of resistant cultivars (to *G. rostochiensis*). See the relevant EPPO Standard on National Regulatory Control Systems (series PM 9) for detail of the specific requirements. Sampling and laboratory testing of soil for

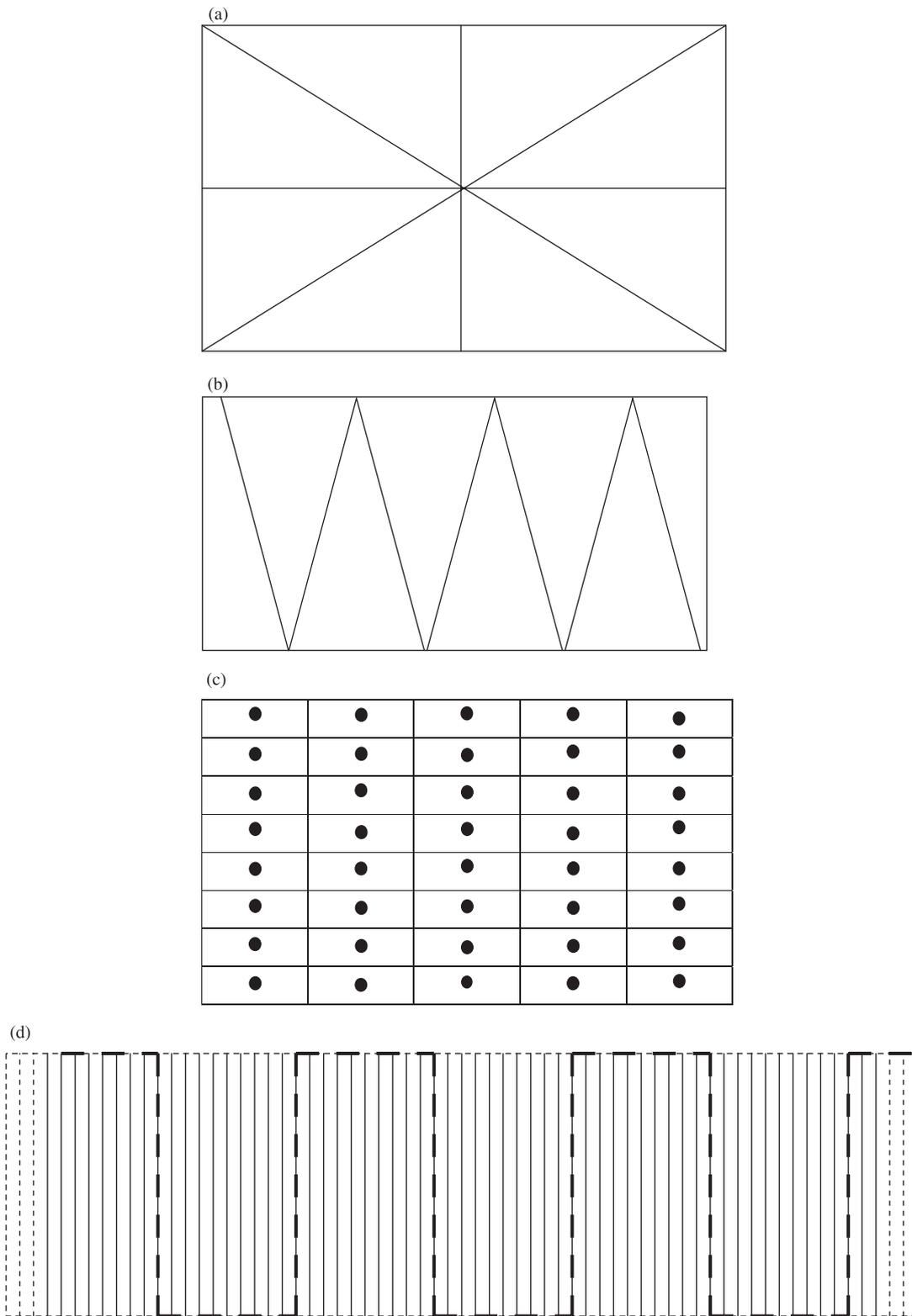


Fig. 1 Examples for sampling soil in bare fields: a) Sampling along diagonal lines of the field and collection of soil cores following a star scheme; b) Sampling and collection of soil cores in a zigzag, aiming to cover the field homogeneously; c) Sampling and collection of soil cores in a grid; d) Soil sampling following a grid (this sampling method can also be used during the growing period). (c) Each rectangle is 100 m² (approximately 16.7 m × 6 m). Take 1 sample from each 100 m². (d) Example: If 100 cores/ha are required then with a 1 m distance between the rows it is necessary to sample ten rows with ten cores per row on a field one hectare in size. Thus on a square field (100 m × 100 m) one row every 10 m will have to be sampled.

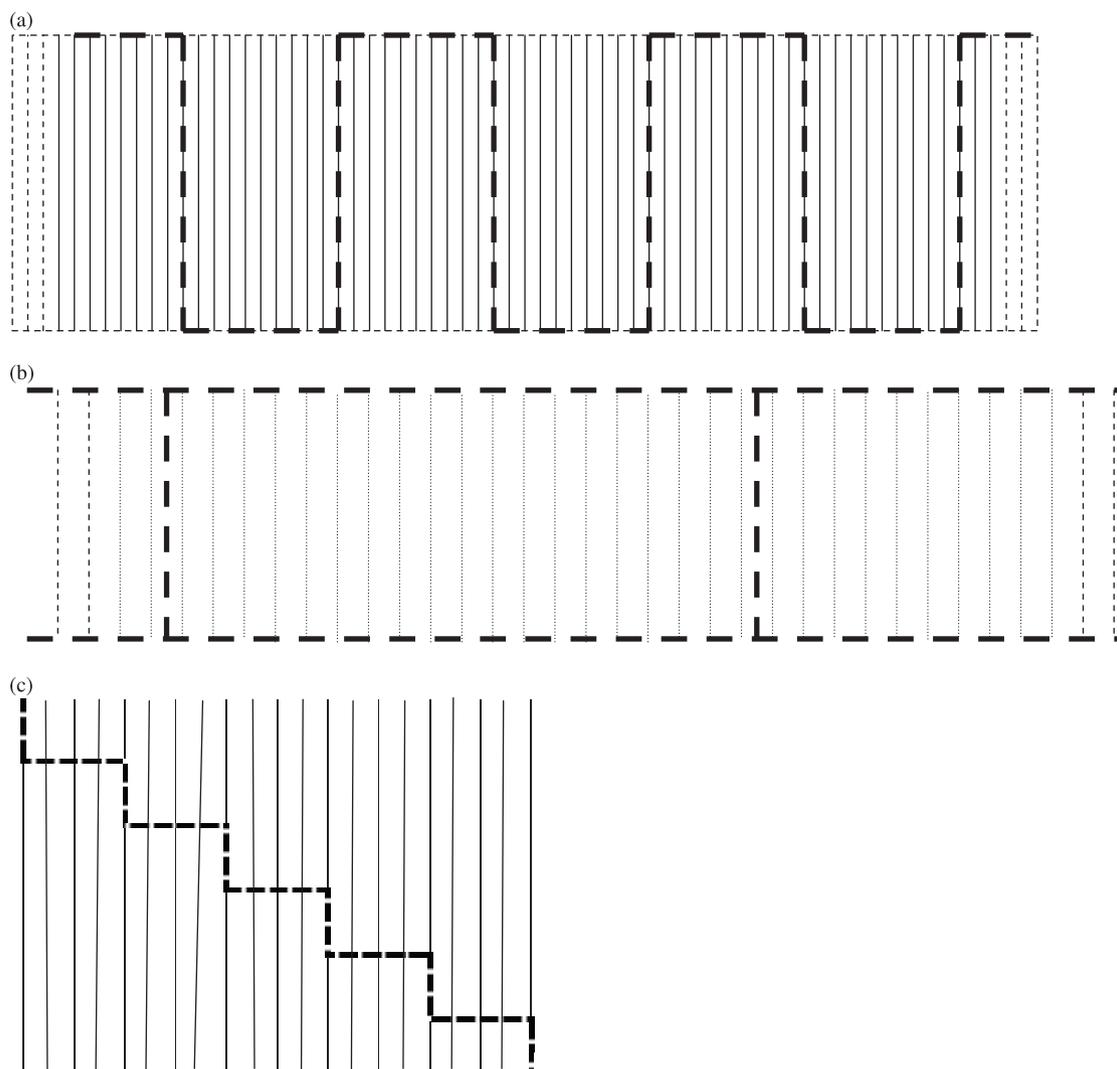


Fig. 2 Example of route through crops to perform visual inspection during the growing period.
 — — — — = Route through crop.

freedom from pests (e.g. *G. rostochiensis* and *G. pallida*) may be required for export to some countries.

2.2 Before planting – inspection of seed potato tubers

The same requirements as for seed potatoes (1.2) apply.

2.3 Inspections during the growing period

Inspections should be made to ensure compliance with national regulations and for those pests specified by the importing NPPO.

If traps are used to monitor for aphids these could provide useful information on the health status of the crop. If appropriate, the inspector may collect other information on health status of the crop from the grower or other staff involved with the crop (e.g. agronomists and technicians).

2.4 Inspection of harvested tubers

Inspections should be made to ensure compliance with national regulations and for those pests specified by the importing NPPO. In particular inspections should be made for the occurrence of *S. endobioticum*. Some countries may require the collection and testing of soil from the tubers to ensure freedom from *G. rostochiensis*, *G. pallida* and *S. endobioticum*. In addition, there may be a need to sample and test wash waste from facilities that process potatoes to be exported washed, to ensure freedom from *S. endobioticum*.

3. Inspections and surveys

Inspections may be required to determine the pest free area status of the exporting country, an area within the country (ISPM No. 8 *Determination of pest status in an area*), places of production, production sites (ISPM No. 10 *Requirements for*

the establishment of pest free places of production and pest free production sites) and distribution systems (EPPO Standard PM 3/61 *Pest-free areas and pest-free production and distribution systems for quarantine pests of potato*).

Surveys are recommended annually for *C. michiganensis* subsp. *sepedonicus* and *R. solanacearum* (see EPPO Standards PM 9/2 and PM 9/3, respectively). This requires sampling seed and ware potatoes (including processing potatoes) at a level determined in the inspection plan at the harvest or in the store and laboratory testing using the relevant EPPO Diagnostic Protocol (series PM 7). In addition the growing crop may be visually inspected and harvested tubers inspected by cutting tubers.

In the case of *R. solanacearum*, the survey may also require the collection and laboratory testing of:

- Surface water used for irrigation especially downstream from the waste discharges of potato industrial potato processing or packaging premises or domestic sewage outfalls
- *Solanum dulcamara* and other hosts of *R. solanacearum*, along waterways
- Samples of washing, discharge or waste water, and waste from potato processing and packaging premises
- Samples of sludge from industrial water waste conditioning processes.

References

- Battilani P, Sanguineti MC, Saccardi A, Pasqua di Bisceglie D, Traversa F & Mazzucchi U (2005) A sampling protocol to detect latent infections in potato tubers. *Bulletin OEPP/EPPO Bulletin* **35**, 477–481.
- IPPC (1995) *Requirements for The Establishment of Pest Free Areas*. ISPM no. 4. IPPC Secretariat, FAO, Rome (IT).
- IPPC (1999) *Determination of Pest Status in an Area*. ISPM no. 8. IPPC Secretariat, FAO, Rome (IT).
- IPPC (1999) *Requirements for the Establishment of Pest Free Places of Production and Pest Free Production Sites*. ISPM no. 10. IPPC Secretariat, FAO, Rome (IT).
- IPPC (2002) *Guidelines for Phytosanitary Certificates*. ISPM no. 12. IPPC Secretariat, FAO, Rome (IT).

Corrigendum

EPPO would like to update the reference in the following standards:

EPPO Standard PM 3/70 (1) Export certification and import compliance checking for potato tubers

In the section “Inspection procedure in importing countries”, 4th paragraph, the sentence “*For further guidance on sampling, see EPPO Standard PM 3/66 ‘Sampling for visual inspection of consignments’*” is replaced by “*For further guidance on sampling, see ISPM no. 31 Methodologies for sampling of consignments (FAO, 2008).*”

The following reference should be added to the reference list:

FAO (2008) ISPM No. 31, *Methodologies for sampling of consignments*, IPPC Secretariat, Rome (IT).

EPPO Standard PM 3/71 (1) General crop inspection procedure for potatoes

In the section “1.4 Inspection of harvested tubers (including tubers shortly before harvest and tubers presented for marketing)”, 1st paragraph, the sentence “*For further guidance on sampling, see EPPO Standard PM 3/66 Sampling of consignment for visual phytosanitary inspection and Battilani et al. (2005)*” is replaced by “*For further guidance on sampling, see ISPM no. 31 Methodologies for sampling of consignments and Battilani et al. (2005)*”

The following reference should be added to the reference list:

FAO (2008) ISPM No. 31, *Methodologies for sampling of consignments*, IPPC Secretariat, Rome (IT).

EPPO Standard PM 3/73 (1) Consignment inspection of *Fragaria* plants for planting

In the section “Sampling for visual inspection and laboratory testing”, subsection “Sampling for visual inspection (general aspects)”, 3rd paragraph the sentence “*The size of the unit of inspection (= minimum number of individuals to be examined) should be determined on the basis of lots taking into account the statistical background provided in EPPO Standard PM 3/65 Sampling of consignments for visual phytosanitary inspection*” is replaced by “*The size of the unit of inspection (= minimum number of individuals to be examined) should be determined on the basis of lots taking into account the statistical background provided in ISPM no. 31 Methodologies for sampling of consignments.*”

In the 4th paragraph of the same section and subsection the last sentence “*Sample sizes are indicated in Table 2(b) of EPPO Standard PM 3/65 Sampling of consignments for visual phytosanitary inspection.*” Is replaced by “*Sample sizes are indicated in Table 1 of ISPM no. 31 Methodologies for sampling of consignments.*”

The following reference should be added to the reference list:

FAO (2008) ISPM No. 31, *Methodologies for sampling of consignments*, IPPC Secretariat, Rome (IT).

References

- OEPP/EPPO (2006) Export certification and import compliance checking for potato tubers. *Bulletin OEPP/EPPO Bulletin* **36**, 423–424.
OEPP/EPPO (2007) General crop inspection procedure for potatoes. *Bulletin OEPP/EPPO Bulletin* **37**, 592–597.
OEPP/EPPO (2008) Consignment inspection of *Fragaria* plants for planting. *Bulletin OEPP/EPPO Bulletin* **38**, 396–406.