



Food and Agriculture
Organization of the
United Nations



International Plant Protection Convention
Protecting the world's plant resources from pests

INTERNATIONAL STANDARD FOR PHYTOSANITARY MEASURES 40

ISPM 40

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International movement of growing media in association with plants for planting

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INTERNATIONAL STANDARDS FOR
PHYTOSANITARY MEASURES

ISPM 40

**International movement of growing media in
association with plants for planting**

Produced by the Secretariat of the
International Plant Protection Convention
Adopted 2017; published 2017

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Publication history

This is not an official part of the standard

2004-11 SC recommended topic *Soil and growing media* (2005-004) be added to the work programme

2005-04 CPM-7 added topic *Soil and growing media* (2005-004)

2007-05 SC approved Specification 43

2010-06 EWG drafted ISPM

2011-05 SC returned draft to steward for review in consultation with a small group of SC members

2011-11 SC discussed topic briefly because a revised draft was not available

2013-01 Steward revised draft in consultation with a small group of SC members

2013-05 SC revised and approved draft for member consultation

2013-07 Member consultation

2014-05 SC-7 revised and approved draft for SCCP

2014-06 SCCP

2014-10 Steward revised draft after SCCP

2014-11 SC revised and approved draft for CPM adoption

2015-03 Formal objections received 14 days prior to CPM-10

2015-05 SC reviewed formal objection (SC small group formed)

2015-11 SC revised draft and approved for SCCP 2016 (third consultation)

2016-07 Third consultation

2016-11 SC revised draft and recommended to CPM-12 (2017) for adoption

2017-04 CPM-12 adopted the standard.

ISPM 40. 2017. *International movement of growing media in association with plants for planting*. Rome, IPPC, FAO.

Publication history last updated: 2017-04

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Adoption

This standard was adopted by the Twelfth Session of the Commission on Phytosanitary Measures in April 2017.

INTRODUCTION

Scope

This standard provides guidance for the assessment of the pest risk of growing media in association with plants for planting and describes phytosanitary measures to manage the pest risk of growing media associated with plants for planting in international movement.

Growing media moved as a separate commodity, contaminating a commodity or used as packaging material are not considered in this standard.

References

The present standard refers to International Standards for Phytosanitary Measures (ISPMs). ISPMs are available on the International Phytosanitary Portal (IPP) at <https://www.ippc.int/core-activities/standards-setting/ispms>.

Definitions

Definitions of phytosanitary terms used in this standard can be found in ISPM 5 (*Glossary of phytosanitary terms*).

Outline of Requirements

Pest risk analysis (PRA) should provide the technical justification for phytosanitary import requirements for growing media in association with plants for planting.

The origin and the production method of components of growing media can affect the pest risk of the growing media associated with plants for planting. Growing media should be produced, stored and maintained under conditions that prevent contamination or infestation. These conditions will depend on the type of growing medium used. Growing media may need to be appropriately treated before use.

The production methods for plants for planting may affect the pest risk of growing media associated with these plants for planting.

Pest risk management options related to growing media in association with plants for planting – including phytosanitary measures such as treatment, inspection, sampling, testing, quarantine and prohibition – are described in this standard.

BACKGROUND

Soil as a growing medium is considered to be a high-risk pathway because it can harbour numerous quarantine pests and a number of other growing media are also recognized pathways for the introduction and spread of quarantine pests. The pest risk of growing media in association with plants for planting depends on factors related to both the production of the growing media and the production of the plants, as well as the interaction between the two.

Many countries have legislation in place to regulate the movement of growing media, particularly soil or soil as a component of growing media, but not necessarily for growing media associated with plants for planting. Growing media, particularly soil, are often prohibited. While it is possible to remove growing medium from some plants for planting, it may be difficult to completely avoid the movement of growing media in association with plants for planting. Some plants can survive transport only when moved in growing medium.

IMPACT ON BIODIVERSITY AND THE ENVIRONMENT

Pests associated with the international movement of growing media in association with plants for planting may have negative impacts on biodiversity. Implementation of this standard could significantly reduce the introduction and spread of quarantine pests associated with growing media and consequently reduce their negative impacts. In addition, the application of phytosanitary measures in accordance with this standard could also reduce the probability of introduction and spread of other organisms that may become invasive alien species in the importing country and thus affect biodiversity.

Certain phytosanitary measures (e.g. some treatments with fumigants) may have a negative impact on the environment. Countries are encouraged to promote the use of phytosanitary measures that have a minimal negative impact on the environment.

REQUIREMENTS

1. Pest Risk Analysis

This standard addresses the pest risk of quarantine pests in growing media, and only growing media that are associated with plants for planting. In some cases, however, regulated non-quarantine pests associated with those growing media may also need to be considered in the PRA.

Phytosanitary import requirements for growing media should be technically justified and based on a PRA in accordance with ISPM 2 (*Framework for pest risk analysis*), ISPM 11 (*Pest risk analysis for quarantine pests*) and ISPM 21 (*Pest risk analysis for regulated non-quarantine pests*). The PRA should include consideration of the factors that affect the pest risk of growing media, described in this standard, and factors related to the production of plants for planting, described in Annex 1 of ISPM 36 (*Integrated measures for plants for planting*). The pest risk posed by plants for planting, as well as that of the associated growing media in which the plants were grown, should be assessed together.

It should be noted that quarantine pests carried with growing medium in association with a plant may be pests of other plants, or may act as a vector for other pests.

2. Factors That Affect the Pest Risk of Growing Media

The production methods for plants for planting may affect the pest risk of the growing media used. While some growing media may pose a low pest risk by nature of their production, they may become contaminated or infested, depending on the type and composition of the growing medium during the production process of the commodity (i.e. growing media in association with plants for planting).

The national plant protection organization (NPPO) of the importing country may take into consideration the pest risk of growing media (as outlined in Annex 1, Annex 2 and Appendix 1) when conducting a PRA to identify appropriate phytosanitary measures. Based on the pests regulated by the importing country, the PRA should include consideration of the pest status in the importing and exporting countries. Furthermore, the pest risk may also depend on:

- whether the growing media are new or reused
- the origin of the growing media
- the components of the growing media
- the measures used in the production of the growing media, including the degree of processing and any treatments applied
- the measures to prevent contamination or infestation of the growing media before planting, such as during transportation and storage, as well as during plant propagation and production (e.g. use of clean starter plant stock, treatment of the irrigation water and avoiding exposure to high-risk growing media)
- the length of the plant's production cycle
- the quantity of growing media present in association with all plants for planting in a consignment.

In the assessment of pest risk, data on historical or existing importation of growing media and their geographical origin may be relevant.

The origin and production method of components of growing media affect the pest risk of growing media. Annex 1 lists common components of growing media and indicates their relative pest risk, assuming that they were not previously used as growing media and that they have been handled and stored in a way that prevents their contamination and recontamination.

Growing media containing organic components (including plant debris) may be more likely to harbour pests and so generally pose greater pest risk than purely mineral or synthetic growing media. If the growing medium consists of organic components, the pest risk may be particularly difficult to assess fully because of the likely presence of unknown organisms and it should be processed in a way that adequately addresses the pest risk.

3. Pest Risk Management Options

The following measures may be used singly or in combination to ensure the pest risk of growing media is adequately managed.

3.1 Growing media free from quarantine pests

Growing media free from quarantine pests may be achieved by:

- using growing media produced in a process that renders the growing media free from pests
- using growing media or their components collected from a pest free area or a pest free production site
- applying appropriate treatments to growing media that are not free from pests, before their use.

Growing media should be produced under a system that allows appropriate trace back and forward of both the media and their components, where appropriate.

Pest free growing media should be stored and maintained under conditions that keep them free from quarantine pests. The growing media should not be exposed to plants, pests, untreated soil, other untreated growing media or contaminated water. If this has not been achieved, the growing media should be treated appropriately before use.

Plants intended to be planted in the pest free growing media should be free from relevant quarantine pests.

The following measures may be used to prevent contamination or infestation of the growing media after planting the plants:

- using clean tools, clean equipment, clean containers, etc.
- keeping the growing media associated with the plants in a pest free area or a pest free place of production
- using water free from quarantine pests
- using physical isolation (e.g. protected conditions, prevention of pest transmission by wind, production on benches separated from contact with soil).

Examples of pest management measures to reduce pest risk that could be appropriate for growing media are available in ISPM 36.

3.2 Treatments

Treatments may be applied at various stages in the production cycle to mitigate the pest risk of growing media. Treatments that may be applied singly or in combination include:

- treatment of growing media before planting or after planting (e.g. steam treatment, heat treatment, chemical treatment, a combination of treatments)
- treatment of fields or planting beds intended for the production of plants for planting

- treatment (e.g. filtration, sterilization) of water or water-based nutrient solution used for irrigation or as a growing medium
- treatment of plants or propagative plant parts (e.g. seeds, bulbs, cuttings) before planting
- removal of growing media¹ (e.g. by root washing or plant shaking).

Factors such as temperature may affect the results of treatments. Also, some pesticides may only suppress, rather than eradicate, pest populations. Verification of the effectiveness of a treatment after application may be necessary.

After treatment, appropriate measures should be taken to avoid recontamination or reinfestation.

3.3 Inspection, sampling and testing

The places of production and the processing or treatment procedures for growing media may be inspected, monitored or approved by the NPPO of the exporting country, which should ensure that phytosanitary import requirements are met.

Plants for planting and associated growing media may need to be inspected to determine if pests are present or to determine compliance with phytosanitary import requirements (ISPM 23 (*Guidelines for inspection*)). However, most pests in growing media cannot be detected by inspection alone and testing may be required.

The NPPO of the importing country may require or undertake sampling and testing of the growing media associated with plants for planting (ISPM 20 (*Guidelines for a phytosanitary import regulatory system*); ISPM 31 (*Methodologies for sampling of consignments*)). However, sampling and testing may not detect some types of pests, in particular at low-level contamination or infestation of the growing media. To verify that required measures have been carried out, testing may include testing for indicator organisms (easily detectable organisms whose presence indicates that required measures failed to be effective or were not implemented).

3.4 Quarantine

The NPPO of the importing country may require quarantine for growing media attached to plants for planting, to reduce the pest risk. Quarantine allows for options such as testing, observation for signs or symptoms, and treatment for plants for planting and growing medium attached to the plants, during a quarantine period.

Quarantine may also be used for monitoring in cases where knowledge about the pest risk is incomplete or there is an indication of a failure of measures taken in the exporting country (e.g. a significant number of interceptions).

3.5 Prohibition

In cases where the measures outlined above are not deemed applicable, feasible or sufficient for growing media in association with certain plants for planting, the entry of growing medium in association with plants for planting may be prohibited.

¹ In some cases, removal of growing media may be followed by replanting in not previously used pest free growing media shortly before export, if accepted by the NPPO of the importing country.

This annex is a prescriptive part of the standard.

ANNEX 1: Common components of growing media ranked in order of increasing relative pest risk

The approximate ranking provided in this table is for components of growing media that have not previously been used for planting and have been handled and stored in a way that prevents contamination or infestation (e.g. they are free from soil).

The table outlines the relative pest risk posed by different components of growing media, but not in association with plants for planting.

Components of growing media	Facilitate pest survival	Comments
Baked clay pellets	No	Inert material
Synthetic media (e.g. glass wool, rock wool, polystyrene, floral foam, plastic particles, polyethylene, polymer stabilized starch, polyurethane, water-absorbing polymers)	No	Inert material
Vermiculite, perlite, volcanic rock, zeolite, scoria	No	Heat of production renders vermiculite and perlite virtually sterile
Clay	No	
Gravel, sand	No	
Paper, including corrugated cardboard	Yes	High level of processing
Tissue culture medium (agar-like)	Yes	Autoclaved or sterilized before use
Coconut fibres (coir/coco peat)	Yes	Pest risk depends on level of processing
Sawdust, wood shavings (excelsior)	Yes	Size of particles and heat treatment may affect the probability of pest survival
Water	Yes	Pest risk depends on source and treatment
Wood chips	Yes	Size of particles may affect the probability of pest survival
Cork	Yes	Pest risk depends on level of processing
Peat (excluding peat soil)	Yes	Pest risk is lower where the origin has had no agricultural exposure (e.g. certified bogs). Peat may contain seeds of plants as pests.
Non-viable moss (sphagnum)	Yes	Pest risk depends on level of processing. Living moss (sphagnum) may contain seeds of plants as pests.

Other plant material (e.g. rice hulls/chaff, grain hulls, coffee hulls, fallen leaves, sugar-cane refuse, grape marc, cocoa pods, oil palm shell charcoal)	Yes	Pest risk is reduced if treated or from a clean non-infested source
Bark	Yes	Pest risk depends on source (potential to harbour forest pests) and degree of processing or fermentation
Biowaste	Yes	Pest risk depends on source and degree of processing
Compost (e.g. municipal or agricultural composted waste, humus, leaf mould)	Yes	Pest risk depends on source and degree of processing or fermentation. Seeds of plants as pests are common.
Soil	Yes	Pest risk can be reduced if treated
Tree fern slabs	Yes	Pest risk depends on source and treatment
Vermicompost	Yes	May include remains of undigested organic material. Vermicompost should be prepared early as required, and treated to eliminate any organism before using as a growing medium.

This annex is a prescriptive part of the standard.

ANNEX 2: Examples of growing media and the measures that may effectively manage their pest risk when associated with plants for planting

Growing medium	Water and nutrients	Measures	Examples
Growing medium that has been sterilized (e.g. by heat to a specified temperature for a specified duration)	Sterilized, treated or filtered water supply (free from pests)	Maintained in conditions to prevent pest infestation	Plants grown from seed under protected conditions
Inert material such as perlite or vermiculite	Sterilized water-based nutrient solution	Maintained in conditions to prevent pest infestation	Plants for hydroponic cultivation where the absence of pests can be verified
Tissue culture medium	Incorporated in sterile medium	Maintained in aseptic conditions	Tissue cultured plants transported in closed containers
Water	Water or water-based nutrient solution	Sterilized, treated or filtered water may be required	Plants rooted in water

This appendix is for reference purposes only and is not a prescriptive part of the standard.

APPENDIX 1: Examples of common combinations of plants for planting and growing media moved internationally

Plant type	Growing media	Comments
Artificially dwarfed nursery stock	Soil	The plant roots are typically very difficult to wash free from soil. The plants may be transplanted to soil-free growing media and grown in greenhouses using integrated risk mitigation measures in an effort to minimize the pest risk associated with them.
Bare root nursery stock	Soil or none	Bare root is a technique of arboriculture whereby a field-grown tree or shrub is dug to be placed in a dormant state. The nursery stock may be shaken to remove some of the soil, or it may be washed free from all soil and growing media. The size and root structure of the plant and the type of soil has a large impact on whether soil can be removed from the root system.
Dormant bulbs and tubers, tuberous roots and herbaceous perennial roots	Soil, peat or none	Bulbs, tubers (including corms and rhizomes), tuberous roots and herbaceous perennial roots are generally propagated and grown in fields but shipped dormant and free from growing media. However, dormant bulbs may sometimes be packed as "growing kits", with growing media. These growing media may be considered as a separate commodity (packing material) provided the plants are not rooted in the media.
Epiphytic plants	Tree fern slabs, bark, non-viable moss (sphagnum), volcanic cinder, rock	Epiphytic plants, such as bromeliads and orchids, are often shipped in association with tree fern slabs, bark, wood, coconut husk, coconut fibre, non-viable moss (sphagnum), volcanic cinder, rock and so forth. These materials are generally intended for support and ornamentation rather than being true growing media.
Liners, whips	Various (including peat, vermiculite, soil as a contaminant)	These young plants are generally rooted in soil or in soil-free growing media in containers or trays.
Ornamental and flowering houseplants	Various (including synthetic media, vermiculite, perlite, coco peat)	The plants may be field-grown in soil, grown as containerized nursery stock, or grown as potted greenhouse plants in soil-free growing media
Plants grown from seed	Various (including peat, vermiculite, perlite)	Annuals and biennials are generally grown from seed in growing media and moved as rooted in growing media
Plants rooted in water or water-based nutrient solution	Water or water-based nutrient solution	Some plants may be grown from cuttings in water or in water-based nutrient solution, with or without synthetic growing media
Rooted herbaceous cuttings	Various (including peat, coco peat, synthetic media, non-viable moss (sphagnum))	Rooted herbaceous cuttings are generally rooted in soil-free growing media that may be contained in peat-pots or coco-pots. The roots are tender and the growing media cannot be removed without injuring the plants.
Tissue cultured plants	Sterile, agar-like	Tissue cultured plants are produced in association with sterile agar-like growing media. They may be shipped in sealed aseptic containers or ex-agar.

Plant type	Growing media	Comments
Trees and shrubs	Soil	Older trees and shrubs, including specimen trees, are often moved in the nursery trade as dug trees or “ball and burlap”
Turf or grass sod	Soil	Turf or grass sod contains a large amount of soil

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IPPC

The International Plant Protection Convention (IPPC) is an international plant health agreement that aims to protect cultivated and wild plants by preventing the introduction and spread of pests. International travel and trade are greater than ever before. As people and commodities move around the world, organisms that present risks to plants travel with them.

Organization

- ◆ There are over 180 contracting parties to the IPPC.
- ◆ Each contracting party has a national plant protection organization (NPPO) and an Official IPPC contact point.
- ◆ Nine regional plant protection organizations (RPPOs) work to facilitate the implementation of the IPPC in countries.
- ◆ IPPC liaises with relevant international organizations to help build regional and national capacities.
- ◆ The Secretariat is provided by the Food and Agriculture Organization of the United Nations (FAO).

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