

[1] International movement of growing media in association with plants for planting (2005-004)**[2]**

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[3] CONTENTS [to be inserted]**[4] Adoption**

[5] This standard was adopted by the Commission on Phytosanitary Measures in [Month 201-].

[6] INTRODUCTION**[7] Scope**

[8] 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.

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

[10] References

The present standard also refers to other International Standards for Phytosanitary Measures (ISPMs).

ISPMs are available on the IPP at <https://www.ippc.int/core-activities/standards-setting/ispms>.

[11] **Definitions**

[12] Definitions of phytosanitary terms can be found in ISPM 5 (*Glossary of phytosanitary terms*), revised annually.

[13] In addition to the definitions in ISPM 5, in this standard the following definition applies.

[14] Soil: Naturally occurring growing medium (except peat) consisting of a mixture of minerals and organic material.

[15] **Outline of Requirements**

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

[17] The origin and the production method of constituents 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. Growing media may need to be appropriately treated before use.

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

[19] Pest risk management options related to growing media in association with plants for planting – including phytosanitary measures such as treatment, inspection, sampling, testing, post-entry quarantine and prohibition, as well as production methods – are described in this standard.

[20] **BACKGROUND**

[21] A number of growing media are recognized internationally as pathways for the introduction and spread of quarantine pests. Soil as a growing medium is considered to be a high-risk pathway because it can harbour numerous 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 of the two.

[22] Many countries therefore regulate the import of growing media in association with plants for planting. Growing media, particularly soil, are often prohibited. While it is possible to remove growing media from some plants for planting, it may be difficult to completely avoid the movement of growing media associated with plants for planting. Some plants can survive transport only when moved in growing media. This standard provides guidance on internationally harmonized phytosanitary measures to minimize the probability of introduction or spread of quarantine pests with the movement of growing media in association with plants for planting.

[23] **IMPACT ON BIODIVERSITY AND THE ENVIRONMENT**

[24] 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.

[25] 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.

[26] **REQUIREMENTS**

[27] **1. Pest Risk Analysis**

[28] Phytosanitary import requirements for growing media in association with plants for planting should be technically justified. This technical justification should be based on PRAs 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*), including the consideration of 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 ISPM 36 (*Integrated measures for plants for planting*). Plants for planting and associated growing media are usually assessed together.

[29] Pests that may be associated with growing media include: bacteria, phytoplasmas, fungi, oomycetes, nematodes, viruses, viroids, insects, mites, molluscs, plants as pests and seeds of plants as pests. 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.

[30] **2. Factors that Affect the Pest Risk of Growing Media Associated with Plants for Planting**

[31] The production methods of 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 during the production process of plants for planting.

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

- [33] • whether the growing media is new or reused
- [34] • the origin of the growing media
- [35] • the constituents of the growing media
- [36] • the measures used in the production of the growing media, including degree of processing and any treatments applied
- [37] • the measures to prevent contamination or infestation of the growing media before planting (e.g. during transportation and storage) and during plant propagation and production (e.g. elimination of the exposure to soil, treatment of the irrigation water)
- [38] • the length of the plant's production cycle
- [39] • the quantity of growing media associated with each individual plant
- [40] • the purpose of the plants for planting associated with the growing media (e.g. whether plants are to be grown as annuals or perennials, whether they are to be grown indoors or outdoors, whether they are to be grown in urban areas, field or nursery).

[41] In the assessment of pest risk, data on historical or existing import of soil or other growing media may be relevant.

[42] The origin and the production method of constituents of growing media both affect the pest risk of growing media associated with plants for planting. Annex 1 lists common constituents of growing media and indicates their relative pest risk under the assumption that they were not previously used as growing media and that they have been handled and stored in a way that prevents their contamination or infestation.

[43] Growing media containing organic constituents may be more likely to harbour pests than purely mineral or synthetic growing media. Growing media consisting of plant debris generally pose a greater pest risk than mineral or synthetic growing media. If soil is part of the growing medium the pest risk may be particularly difficult to fully assess because of the likely presence of many different pests and other organisms.

[44] **3. Pest Risk Management Options**

[45] The following measures may be used singly or in combination, for example as part of a systems approach applied to plants for planting (ISPM 14 (*The use of integrated measures in a systems approach for pest risk management*)) to ensure the pest risk is adequately managed.

[46] Additional options may be developed and used by the NPPO of the exporting country to manage the pest risk to the growing media posed by quarantine pests.

[47] 3.1 Growing media free from quarantine pests

[48] Production of plants for planting should be initiated from growing media free from quarantine pests. This may be achieved by:

[49] using growing media produced in a process that renders the growing media free from pests

- [50] • planting the plants in a pest free area or in a pest free production site
- [51] • using growing media or its constituents collected from a pest free area or a pest free production site
- [52] • applying appropriate treatments to growing media that are not pest free, before its use.

[53] Growing media should be produced under a system that allows appropriate trace back and forward of both the media and its constituents, where appropriate.

[54] 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 or other untreated growing media. If this has not been achieved, the growing media may need to be appropriately treated before use.

[55] Plants intended to be planted in the pest free growing media should be free from quarantine pests. The plants may need to be treated before planting to prevent contamination or infestation of the growing media by quarantine pests.

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

- [57] • keeping the plants (with the associated growing media) in a pest free area or pest free place of production
- [58] • using water free from quarantine pests
- [59] • using physical isolation (e.g. protected conditions, prevention of pest transmission by wind, production on benches separated from contact with soil).

[60] 3.2 Treatments

[61] Treatments to mitigate the risks associated with quarantine pests in the growing media may be applied at various stages in the production cycle of plants for planting. Treatments that may be applied singly or in combination include:

- [62] • treatment of growing media before planting (e.g. steam treatment, heat treatment, chemical treatment or a combination of treatments)
- [63] • treatment of fields or planting beds intended for the production of plants for planting
- [64] • treatment (e.g. filtration, sterilization) of water or water-based nutrient solution used for irrigation or as growing medium
- [65] • treatment of plants before planting
- [66] • treatment of growing media in association with plants for planting
- [67] • removal of growing media¹ (e.g. by root washing or plant shaking).

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

[69] After treatment, appropriate measures should be taken to avoid contamination or infestation.

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 authorized by the NPPO of the importing country.

[70] **3.3 Inspection, sampling and testing**

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

[72] 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.

[73] 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. Therefore, testing may include testing for indicator organisms (easily detectable organisms whose presence indicates that required measures failed to be effective or were not implemented, and that the growing media may contain quarantine pests).

[74] **3.4 Post-entry quarantine**

[75] The NPPO of the importing country may require post-entry quarantine (PEQ) for plants for planting associated with growing media to verify compliance with phytosanitary import requirements or to apply phytosanitary measures before the release of the consignment. PEQ may be the only option apart from prohibition for pests not easily detectable.

[76] 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), PEQ may be an option for monitoring.

[77] **3.5 Prohibition**

[78] In cases where the measures outlined above are not deemed applicable, feasible or sufficient for growing media (in particular soil) in association with certain plants for planting, the entry of consignments of plants for planting associated with those particular growing media may be prohibited.

[79] This annex is a prescriptive part of the standard.

[80] **ANNEX 1: Common constituents of growing media** ranked in order of increasing relative pest risk

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

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

[83]

Constituents of growing media	Support pest survival	Comments
Baked clay pellets	No	Inert
Synthetic media (e.g. glass wool, rock wool, polystyrene, floral foam, plastic particles, polyethylene, polymer stabilized starch, polyurethane, water-absorbing polymers)	No	Inert
Vermiculite, perlite, volcanic rock, zeolite, scoria	No	Heat of production renders vermiculite and perlite virtually sterile
Pure clay	No	
Pure gravel, sand	No	

Paper	Yes	High level of processing
Tissue culture medium (agar-like)	Yes	Autoclaved or otherwise sterilized before use
Coconut fibres (coir/coco peat)	Yes	Risk depends on level of processing (e.g. <i>Bursaphelenchus cocophilus</i> , the red ring nematode, has been found in the husks of fallen nuts)
Sawdust, wood shavings (excelsior)	Yes	Size of particles may affect the probability of pest survival
Water	Yes	Risk depends on source and treatment
Wood chips	Yes	Size of particles may affect the probability of pest survival
Cork	Yes	Risk depends on level of processing
Peat (excluding peat soil)	Yes	Risk is lower where the origin has had no agricultural exposure (e.g. certified bogs). Seeds of plants as pests are common.
Non-viable moss (sphagnum)	Yes	Risk depends on level of processing. Seeds of plants as pests are common in living moss (sphagnum).
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	Risk is reduced if treated or from a clean non-infested source
Bark	Yes	Risk depends on source (potential to harbour forest pests) and degree of processing or fermentation
Biowaste	Yes	Risk depends on source and degree of processing of material
Compost (e.g. humus, leaf mould)	Yes	Risk depends on source and degree of processing or fermentation
Soil	Yes	Risk can be reduced if treated
Tree fern slabs	Yes	
Vermicompost	Yes	May include remains of undigested organic material

[84] This annex is a prescriptive part of the standard.

[85] **ANNEX 2: Examples of growing media and measures that may effectively manage the pest risk of the growing media associated with plants for planting**

[86]

Growing medium	Water/nutrients	Measures	Examples
Water	Water or water-based nutrient solution	Sterilized, treated or filtered water may be required	Plants rooted in water
Tissue culture medium	Incorporated in sterile medium	Maintained in aseptic conditions	Tissue cultured plants transported in closed containers
Inert material that is not capable of supporting pest growth (e.g. perlite)	Sterilized water-based nutrient solution	Maintained in conditions to prevent pest infestation	Plants for hydroponic cultivation where the absence of pests can be verified
Growing medium that has been sterilized (e.g. by heat to a specified temperature for a specified duration)	Pest free (sterilized, treated or filtered) water supply	Maintained in conditions to prevent pest infestation	Plants grown from seed under protected conditions

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

[88] **APPENDIX 1: Examples of plants for planting in international movement and the growing media commonly associated with them**

[89]

Plant type	Growing media	Comments
Plants rooted in water or water-based nutrient solutions	Water	Some plants may be grown from cuttings in water or in water-based nutrient solutions, with or without synthetic growing media.
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.
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, 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.
Rooted herbaceous cuttings	Various (including peat, coco peat, synthetic media, non-viable moss (sphagnum))	Rooted herbaceous cuttings are generally rooted and moved 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.
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.

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.
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.
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.
Bare root nursery stock	Soil or none	Bare root is a technique of arboriculture whereby a field-grown tree or shrub is dug up in order to put it into 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 the ability to remove soil from the root system.
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 risks associated with them.
Trees and shrubs with soil	Soil	Older trees and shrubs, including specimen trees, are often moved in the nursery trade as dug trees or "ball and burlap". This material includes a large volume of soil.
Turf or grass sod	Soil	Turf or grass sod contains a large volume of soil and is a potential pathway for many soil pests.