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NAPPO Regional Standards for Phytosanitary Measures (RSPM)

RSPM No. 32

**Pest Risk Analysis for Plants as Pests – Guidelines for Screening
Plants for Planting Proposed for Import into NAPPO Member
Countries**

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Review

NAPPO Regional Standards for Phytosanitary Measures are subject to periodic review and amendment. The next review date for this NAPPO standard is 2013. A review of any NAPPO Standard may be initiated at any time upon the request of a NAPPO member country.

Approval

This Standard was approved by the North American Plant Protection Organization (NAPPO) Executive Committee on -----and is effective immediately

Signed by:

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Implementation

Implementation plans are attached for this standard.

Amendment Record

Amendments to this Standard will be dated and filed with the NAPPO Secretariat. The most recent version will be posted on the NAPPO website at: www.nappo.org/stds_e.htm

Distribution

This Standard is distributed by the Secretariat of the NAPPO within NAPPO, including Sustaining Associate Members and Industry Advisory Groups, to the FAO International Plant Protection Convention (IPPC) Secretariat and to the Administrative Heads of other Regional Plant Protection Organizations (RPPOs).

Introduction

Scope

This standard applies to plants for planting proposed for entry into NAPPO member countries. The standard provides guidance for screening (i.e., assessing the pest risk potential of) such plants. The scope of this standard does not include contaminating pests that may be unintentionally introduced through the plants for planting pathway, (e.g., weed seeds in seed consignments) or plant parts imported for food or feed purposes.

Plants or plant parts to be permitted entry as a result of this screening process may also require analysis of their potential to serve as a pathway for other quarantine pests. This standard should be used in conjunction with ISPM No. 2 *Guidelines for pest risk analysis*, ISPM No. 11 *Pest risk analysis for quarantine pests* and RSPM No. 24 *Integrated Pest Risk Management Measures for the Importation of Plants for Planting into NAPPO Member Countries*.

References

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Pest risk analysis for quarantine pests, including analysis of environmental risks and living modified organisms, 2004. ISPM No. 11, FAO, Rome.

Phytosanitary principles for the protection of plants and the application of phytosanitary measures in international trade, 2006. ISPM No. 1, FAO, Rome.

Procedures for weed risk assessment, 2005. FAO, Rome

Definitions, Abbreviations and Acronyms

Alien species	<p>A species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce [CBD].</p> <p><i>Explanatory definition in IPPC terms:</i> an alien species [CBD] is an individual or population, at any life stage, of an organism which is non-indigenous to an area and which has been introduced [CBD] into that area [FAO, 2007]</p>
Area	<p>An officially defined country, part of a country or all or parts of several countries [FAO, 2006]</p>
Commodity	<p>A type of plant, plant product, or other article being moved for trade or other purpose [FAO, 2006]</p>
CBD	<p>Convention on Biological Diversity</p>
Establishment	<p>Perpetuation, for the foreseeable future, of a pest within an area after entry [FAO, 2006]</p>
Invasive alien species	<p>An alien species whose introduction and/or spread threaten biological diversity [CBD].</p> <p><i>Explanatory definition in IPPC terms:</i> in the context of the IPPC, an invasive alien species [CBD] is an alien species [CBD] which by its establishment or spread has become injurious to (or had a harmful impact on) plants or plant products, or which by risk analysis [CBD] is shown to be potentially injurious to (or to have a potential harmful impact on) plants or plant products [FAO, 2007]</p>
ISPM	<p>International Standard for Phytosanitary Measures [FAO, 2006]</p>
NPPO	<p>National Plant Protection Organization [FAO, 2006]</p>
Official	<p>Established, authorized or performed by a National Plant Protection Organization [FAO, 2006]</p>
Official control	<p>The active enforcement of mandatory phytosanitary regulations and the application of mandatory phytosanitary procedures with the objective of eradication or containment of quarantine pests or for the management of regulated non-quarantine pests [FAO, 2006]</p>
Pest	<p>Any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products [FAO, 2006]</p>
Pest risk analysis	<p>The process of evaluating biological or other scientific or economic evidence to determine whether a pest should be regulated and the strength of any phytosanitary measures to be taken against it [FAO, 2006]</p>

Pest risk management	Evaluation and selection of options to reduce the risk of introduction and spread of a pest [FAO, 1995; revised ISPM No. 11, 2001]
Planting (including replanting)	Any operation for the placing of plants in a growing medium, or by grafting or similar operations, to ensure their subsequent growth, reproduction or propagation [FAO, 2006]
Plants	Living plants and parts thereof, including seeds and germplasm [FAO, 2006]
Plants for planting	Plants intended to remain planted, to be planted, or replanted [FAO, 2006]
PRA	Pest Risk Analysis [FAO, 2006]
PRA area	Area in relation to which a pest risk analysis is conducted [FAO, 2006]
Quarantine pest	A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled [FAO, 2006]
Screening process	A risk assessment system designed to evaluate the invasive potential of a species prior to importation or introduction into a new ecosystem [Invasive Alien Species Screening Workshop, 2002]
Spread	Expansion of the geographical distribution of a pest within an area [FAO, 2006]
Taxon	A taxonomic group of any level [International Association for Plant Taxonomy, 2000] (i.e., genus, species, subspecies, etc.)
Weed	A plant that is growing where it is not wanted by humans [FAO, 2005].
	<i>Explanatory note:</i> It may be useful to qualify “not wanted” as meaning some effort is made by some party to remove the plant [FAO, 2005]

Background

Traditionally, NAPPO member countries have taken action to generally prohibit or restrict the importation of plants for planting only if there is specific evidence that importation of that plant could introduce a quarantine pest into the country. Internationally, plants themselves are now being recognized as potential quarantine pests. If the NPPO of a NAPPO member country has reason to believe that a plant for planting may be a quarantine pest itself, the NPPO completes a comprehensive pest risk analysis to examine the available evidence on the subject. The pest risk management stage for plants determined to be quarantine pests typically includes listing the plant as a regulated pest or a prohibited national or federal noxious weed.

Proposals are at various stages of development within NAPPO member countries to implement requirements for screening new plants proposed for import for planting and/or propagation. Current weed risk assessment methods may be too extensive and time consuming to be of practical use in this context. A streamlined screening process that requires less time and documentation would minimize impacts on trade and facilitate compliance. This standard is intended to be used within this new regulatory framework, to provide guidance for screening plants proposed for importation, to determine if they are potential pests. Weeds and invasive alien plant species that are pests and that are absent from an area (or if present, are of limited distribution and under official control) should be considered quarantine pests.

Pest risk analysis (PRA) includes risk assessment and risk management. The risk assessment portion of this standard may be viewed as a screening process that may or may not lead to the risk management stage. While plants as pests are already addressed in ISPM No.11, this standard outlines a streamlined process that excludes unnecessary elements (such as the evaluation of likelihood of entry) and provides additional guidance specific to the assessment of plants for planting. If the plant is determined to be a quarantine pest and the risk associated with its introduction is deemed unacceptable, the plant may be rejected for importation and no further evaluation is required. If the plant is determined not to be a quarantine pest, the plant may require further evaluation as a potential pathway for other pests (as per ISPM No. 11) and the risk management stage would follow the second evaluation. Plants determined not to be quarantine pests may otherwise be imported, subject to general requirements such as an import permit, phytosanitary certificate, and inspection. If insufficient information is available to make a determination as to quarantine pest status, additional studies may be required to generate the information needed for the analysis.

This standard does not prescribe a particular format or method for the screening process. NAPPO member countries may use decision trees, numerical scoring systems, or other models, including the weed risk assessment formats already in place in each country. Any format used should comply with the rights and obligations of contracting parties to the IPPC outlined in ISPM No. 1, including the IPPC principle of transparency. For example, if a numerical scoring tool is used, national guidelines should describe the kind of testing, validation and calibration that the tool undergoes before it is accepted.

Outline of Requirements

This standard provides a framework that includes a screening process specifically for new plants proposed for entry through international trade into a NAPPO member country, region, or otherwise into an area where it is not yet present. It is consistent with ISPM No. 11, and is intended to be used in conjunction with that standard, as appropriate. In some cases, text from ISPM No. 11 has been included (as referenced below) for convenience. As in ISPM No. 11, the process consists of three stages: 1: Initiation; 2: Screening process (risk assessment in ISPM No.11); and 3: Outcome (risk management in ISPM No. 11). The specific requirements parallel those of ISPM No. 11, but with important differences.

PEST RISK ANALYSIS FOR PLANTS AS PESTS

Stage 1: Initiation

In the case of plants for planting, the initiation stage involves identifying the plant proposed for importation and its intended habitat; and defining the PRA area (area in relation to which the pest risk analysis will be conducted).

1.1 Initiation points

The process may be initiated as a result of:

- a request to import a new plant for planting into the PRA area
- the review or revision of phytosanitary policies and priorities.

1.2 Identification of the plant

The NPPO should confirm that the scientific name provided by the importer is the currently accepted name. The NPPO may request a voucher specimen of the plant proposed for importation, including a seed sample.

“The identity of the [plant] should be clearly defined to ensure that the assessment is being performed on a distinct organism, and that biological and other information used in the assessment is relevant to the organism in question” (ISPM No.11).

“The taxonomic unit for the [plant] is generally species. The use of a higher or lower taxonomic level should be supported by scientifically sound rationale” (ISPM No.11). In the case of taxonomic levels below the species (i.e., subspecies, variety, cultivar), the NPPO’s decision should be based on evidence demonstrating that factors such as differences in adaptability to environmental conditions, ability to exploit resources, ability to defend against herbivory or grazing/browsing, reproduction or propagule dispersal are significant enough to affect phytosanitary status.

From this point forward, this standard uses the term “the plant” to mean the plant taxon identified in this step.

1.3 Identification of the intended habitat

The NPPO should identify the intended habitat for the plant. “The intended habitat is the place where the plants are intended to grow, and the unintended habitat is the place where the plants are not intended to grow” (ISPM No. 11).

In most cases, plants for planting will be imported for cultivation, and the intended habitat will be agricultural, horticultural, or other areas subject to human disturbance. The plants “will enter the PRA area and then be maintained in [the] intended habitat, probably in substantial numbers and for an indeterminate period...the risk arises because of the probability that the plant may spread from the intended habitat to unintended habitats within the PRA area, and then establish [and spread] in those habitats” (ISPM No. 11).

However, in some cases, a plant may be proposed for introduction into natural or undisturbed habitats. In such cases, the intended use of the plant may increase the risk of environmental consequences (see Section 2.3, below), and the NPPO may need to notify, and coordinate with, other (e.g., environmental) authorities, as appropriate, in the decision making process.

1.4 Identification of PRA area

The PRA area is the area for which the PRA is conducted. It is usually a country, but can also be an area within a country, or an area covering all or parts of several countries [e.g., the area covered by a Regional Plant Protection Organization (RPPO)] (ISPM No. 2). “The PRA area should be defined as precisely as possible in order to identify the area for which information is needed” (ISPM No. 11).

1.5 Information

“Information gathering is an essential element of all stages of PRA. It is important at the initiation stage in order to clarify the identity of the [plant and] its present distribution [...]. Other information will be gathered as required to reach necessary decisions as the PRA continues. Information for PRA may come from a variety of sources” (ISPM No. 11).

For new importations, the importer and exporter should be encouraged to provide as much information as possible about the plant proposed for importation. The NPPO may provide a list of acceptable sources of information, e.g., independent or published information in addition to the importer’s experience and knowledge.

1.5.1 Previous PRA

“A check should also be made as to whether [the plant has] already been subjected to the PRA process, either nationally or internationally. If a PRA exists, its validity should be checked as circumstances and information may have changed” (ISPM No. 11).

1.6 Conclusion of initiation

In the case of plants for planting, the result of the initiation stage is the identification of a plant proposed for importation and planting in a particular habitat in the PRA area. The potential for entry into the PRA area is a certainty, but the plant itself may not actually be a pest. The remainder of the process must focus on whether the plant is a quarantine pest and its potential impacts in the PRA area.

Stage 2: Screening Process

The screening process for plants for planting involves determining whether the plant meets the definition of a quarantine pest, and assessing the level of risk it presents in the PRA area. The process consists of three steps:

- assessment of geographical and regulatory criteria
- assessment of the probability of spread and establishment

- assessment of potential economic and environmental consequences

If the steps are applied sequentially, the screening process can take a “decision-tree” format, in order to eliminate many plant species from further analysis early in the process (see Figure 1).

2.1 Assessment of geographical and regulatory criteria

A quarantine pest must be absent from the PRA area, or present but not widely distributed and under official control.

2.1.1 Presence or absence in PRA area

The presence or absence, and distribution of the plant if applicable, should be determined for the PRA area.

Plants for planting that have been intentionally introduced into the PRA area and are not subject to containment (e.g., cultivated plants) should be considered present in the PRA area. Plants present only for scientific purposes under adequate containment are not considered present.

2.1.2 Regulatory status

If the plant is present but not widely distributed in the PRA area, it may still be a quarantine pest if it is under official control or expected to be under official control in the near future.

A plant may be considered “not widely distributed” in the PRA area if it has not reached the limits of its potential area of distribution either in the field or in protected conditions, and it is not limited to its present distribution by climatic or other conditions. There should be evidence that, without phytosanitary measures, the plant would be capable of additional spread.

2.1.3 Conclusion of the assessment of geographical and regulatory criteria

If it has been determined that the plant meets the geographic and regulatory criteria of a quarantine pest, the screening process should continue. If the plant does not fulfill these criteria, the plant is not a quarantine pest and the screening process may stop. The plant may be eligible for import (see Section 3.1, below), however, the NPPO may require analysis of its potential to serve as a pathway for other quarantine pests.

In the event that no information on distribution can be found, the NPPO may assume the plant is absent from the PRA area and the PRA process should continue.

2.2 Assessment of the probability of spread and establishment

In this step, the NPPO gathers evidence to determine the probability that the plant will spread and establish outside the PRA area.

“Reliable biological information should be obtained from areas where the [plant] currently occurs. The situation in the PRA area can then be carefully compared with that in the areas where the [plant] currently occurs and expert judgment used to assess the probability of [spread and] establishment” (ISPM No. 11). The probability that the plant will be able to spread and establish in the PRA area will depend on climatic and ecological conditions in the PRA area and biological characteristics of the plant.

2.2.1 Climatic and ecological suitability in the PRA area

Climate matching and climatic modeling systems may be used to compare climatic and ecological data from the known distribution of the plant with that in the PRA area.

Examples of factors to consider are:

- Suitability of climatic conditions in the PRA area
- Climate change
- Distribution and abundance of suitable habitats in the PRA area
- Abiotic factors or natural barriers that might limit spread or establishment (e.g., soils, topography, elevation, land cover)
- Susceptibility of available habitats to invasion
- Presence or absence of natural control agents or pollinator species

2.2.2 Biological characteristics of the plant

Biological characteristics of a plant will affect its ability to spread and establish in the PRA area.

Examples of factors to consider are:

- Natural dispersal mechanisms (e.g., wind, water, animals)
- Reproductive potential (e.g., method of reproduction, reproductive output, storage tissue, dormancy)
- Growth rate and growth habit (e.g., rapid growth to reproductive maturity, dense or smothering growth habit)
- Potential for rapid or ongoing adaptation (e.g., ability to colonize or adapt to a wide variety of habitats; stress tolerance; inheritable adaptive traits, likelihood of hybridization)
- Defense mechanisms (e.g., allelopathy or secondary metabolites to protect against herbivory or grazing, or specialized defense structures)
- Resistance (or susceptibility) to herbicides or other control methods

The NPPO may also consider the likelihood the plant will be dispersed in the PRA area by human activity (e.g., intentional human movement, or unintentional movement with commodities or conveyances).

2.2.3 Conclusion on the probability of spread and establishment

“The overall probability of establishment and spread should be expressed in terms most suitable for the data, the methods used for analysis, and the intended audience. This may be quantitative or qualitative, since either output is in any case the result of a combination of both quantitative and qualitative information” (ISPM No. 11).

If the evidence indicates that the plant is likely to spread and establish in the PRA area, the screening process should continue. If the evidence suggests the plant is unlikely to spread and establish in the PRA area, the plant is not a quarantine pest and the screening process may stop. The plant may be eligible for import (see Section 3.1, below), however The NPPO may require analysis of its potential to serve as a pathway for other quarantine pests.

In the absence of sufficient information, the uncertainties should be identified and the PRA process should continue.

2.3. Assessment of potential economic and environmental consequences

In this step, the NPPO gathers evidence to determine the plant’s potential to have economic or environmental consequences. Effects considered may be direct or indirect, and may be expressed in the short or long term.

“Information should be obtained from areas where the plant occurs naturally or has been introduced. This information should be compared with the situation in the PRA area” (ISPM No. 11).

If the plant is recognized as a weed or invasive plant in other parts of the world, information may be available concerning its economic or environmental impacts. If the plant has not been widely introduced or has not previously been considered a weed or invasive plant, such information may not be available. However, it may possess intrinsic characteristics that indicate it could cause significant harm to other plants.

2.3.1 Economic consequences

Examples of factors to consider are:

- Crop losses, in yield and quality
- Control measures, their efficacy and cost
- Effects on existing production practices
- Effects on domestic and export markets, including in particular effects on export market access
- Changes to producer costs or input demands, including control costs
- Changes to domestic or foreign consumer demand for a product resulting from quality changes
- Feasibility and cost of eradication or containment
- Capacity to act as a host or vector for other pests
- Social and other effects (e.g., tourism, reduction in land values).

2.3.2 Environmental consequences

“The coverage of the IPPC definition of plant pests includes weeds and other species that have indirect effects on plants, and the Convention applies to the protection of wild flora.” (ISPM No. 11, Annex 1).

“To protect the environment and biological diversity without creating disguised barriers to trade, environmental risks and risk to biological diversity should be analyzed in a PRA” (ISPM No. 11, Annex 1).

Examples of factors to consider are:

- Reduction of keystone plant species
- Reduction of native plant species that are major components of ecosystems (in terms of abundance or size), and endangered or threatened native plant species, including effects below species level where there is evidence of such effects being significant
- Significant reduction, displacement or elimination of other plant species
- Significant effects on plant communities
- Significant effects on designated environmentally sensitive or protected areas
- Significant changes in ecological processes and the structure, stability or function of an ecosystem (including further effects on plant species, soil properties, erosion, sedimentation, water table changes, increased fire hazard, nutrient cycles, etc.)
- Environmental and other undesired effects of control measures
- Effects on human use (e.g., water quality, recreational uses, tourism, cultural uses, animal grazing, hunting, fishing); and costs of environmental restoration.

Effects on human and animal health (e.g., toxicity, allergenicity, effects on food webs or other trophic levels), water tables, tourism, etc. may also be considered, as appropriate, depending on the NPPO’s authority.

2.3.3 Intrinsic plant characteristics linked to invasiveness

In addition to evidence of economic or environmental consequences (e.g., reports of weedy or invasive behavior elsewhere in the world) the NPPO may consider whether or not the plant possesses intrinsic characteristics that may predict invasiveness. Considerable research has been aimed at identifying biological and genetic characteristics that may be correlated with invasiveness. For example, invasiveness in pines has been linked to seed mass, length of juvenile period and interval between good seed crops. The characteristics may be different from those discussed in section 2.2.2 related to the plant’s ability to spread and establish. Selection of intrinsic plant characteristics associated with invasiveness should reflect the most recent scientific research available.

2.3.4 Conclusion on potential economic and environmental consequences

If there are clear indications that the plant is likely to have unacceptable economic or environmental consequences in the PRA area, then the plant meets the definition of a quarantine pest and the PRA should continue with the consideration of risk management

options (see Section 3.2, below). If there are no clear indications that the plant will have economic or environmental consequences and no intrinsic indicators of invasiveness, then the plant is not a quarantine pest and the screening process may stop. The plant may be eligible for import (see Section 3.1, below), however the NPPO may require analysis of its potential to serve as a pathway for other quarantine pests.

2.4 Degree of uncertainty

Estimation of the probability of a plant for planting spreading and establishing in the PRA area and its potential economic and environmental consequences involves many uncertainties. In particular, this estimation is an extrapolation from the situation where the plant occurs to the hypothetical situation in the PRA area. It is important to document the areas of uncertainty and the degree of uncertainty in the assessment, and to indicate where expert judgment has been used. This is necessary for transparency and may also be useful for identifying and prioritizing research needs.

Stage 3: Outcome

As a result of the screening process, three outcomes are possible:

- The NPPO determines that the plant is not a quarantine pest
- The NPPO determines that the plant is a quarantine pest
- The NPPO lacks sufficient information to make a determination regarding quarantine pest status

Generally, the conclusions from a risk assessment process are used to decide whether risk management is required and the strength of measures to be used. In the case of plants for planting, the screening of the proposed plant itself as a potential quarantine pest may be the first step in a tiered risk analysis. Risk management options depend on the outcome of the screening process, as follows:

3.1 Possible Outcome 1 – the plant is not a quarantine pest

If the NPPO determines that the plant is not a quarantine pest, the plant is eligible for import based on its own risk potential. This outcome may lead to an assessment of the plant as a potential pathway for the introduction of other quarantine pests. The conclusions from this second assessment would lead to the risk management stage, and would depend on the associated quarantine pests identified in the pathway risk assessment.

3.2 Possible Outcome 2 – the plant is a quarantine pest

If the NPPO determines that the plant is a quarantine pest and the risk associated with its introduction is unacceptable, the NPPO may prohibit import of the plant. In some cases, the NPPO may also consider the potential benefits of importing the plant (e.g., through an economic cost/benefit analysis). At their discretion, NPPOs may issue import permits for prohibited plants for specific research in containment.

3.3 Possible Outcome 3 – insufficient information

In some cases, the NPPO may lack sufficient information to make a determination regarding quarantine pest status. This outcome may result when there is very little information available and a country's screening process designates a minimum amount of information as necessary for reaching a conclusion. Alternatively, this outcome may result when the information available does not lead to a definitive conclusion as to quarantine pest status.

In this case the plant may be re-assessed when additional information becomes available. The NPPO should provide guidance to the importer as to the type of additional information that would be required to re-assess the plant. Examples of further study may include directed research in the country of origin or experimental trials in containment.

4. Documentation

4.1 Documentation requirements

“The IPPC and the principle of “transparency” (ISPM No. 1) require that countries should, on request, make available the rationale for phytosanitary requirements. The whole process from initiation to pest risk management should be sufficiently documented so that when a review or a dispute arises, the sources of information and rationale used in reaching the management decision can be clearly demonstrated” (ISPM No. 11).

The PRA does not need to be long and complex. A short and concise PRA may be sufficient provided justifiable conclusions can be reached after completing the process.

The main elements to be documented in this process are:

- Purpose of the analysis
- Identity of the plant
- PRA area
- Sources of information
- Probability of spread and establishment
- Consequences
- Degree of uncertainty and information gaps, if any
- Outcome of screening process and rationale
- Date of completion and the NPPO responsible for the analysis, including if appropriate names of authors, contributors and reviewers.

Figure 1: A Screening Process for Plants for Planting – Decision Tree Approach

