NAPPO
North American Plant Protection Organization
Organización Norteamericana de Protección a las Plantas

NAPPO Regional Standards for Phytosanitary Measures (RSPM)

RSPM 24
Integrated Pest Risk Management Measures for the Importation of Plants for Planting into NAPPO Member Countries

The Secretariat of the North American Plant Protection Organization
1431 Merivale Road, 3rd Floor, Room 140
Ottawa, Ontario, Canada, K1A 0Y9
August 5, 2013

Contents

Review

NAPPO Regional Standards for Phytosanitary Measures are subject to periodic review and amendment. The next review date for this NAPPO standard is 2018. A review of any NAPPO Standard may be initiated at any time upon the request of a NAPPO member country.

Endorsement

This Standard was approved by the North American Plant Protection Organization (NAPPO) Executive Committee on August 5, 2013 and is effective immediately.

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Implementation

See the attached Implementation Plans.

Amendment Record

Amendments to this Standard will be dated and filed with the NAPPO Secretariat.

Distribution

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

Scope

This Standard describes the essential elements required for integrated pest risk management measures associated with the importation of plants for planting by the member countries.

The broad objectives of this standard are to:

- Prevent the introduction and spread of quarantine pests associated with plants for planting imported into NAPPO countries;
- Significantly reduce the risk from other pests that may be associated with plants for planting imported into NAPPO countries;
- Facilitate equitable and orderly trade into and within the NAPPO region, utilizing to the extent possible, best production/management practices.

This Standard is intended as a reference standard and may be used as the basis for more specific commodity standards and/or as the basis for bilateral agreements. This Standard is not intended to supersede any existing NAPPO commodity standard related to the importation of plants for planting.

This standard complements and is consistent with ISPM 36: 2012, *Integrated Measures for Plants for Planting.*

Plants as pests (weeds, invasive species) are not within the scope of this standard.

References

ISPM 1. 2006. *Phytosanitary principles for the protection of plants and the application of phytosanitary measures in international trade.* Rome, IPPC*,* FAO.
ISPM 2. 2007. *Framework for pest risk analysis.* Rome, IPPC, FAO.
ISPM 4. 1995. *Requirements for the establishment of pest free areas*. Rome, IPPC, FAO.
ISPM 5. (Updated annually). *Glossary of phytosanitary terms*. Rome, IPPC, FAO.
ISPM 6. 1997. *Guidelines for surveillance.* Rome, IPPC, FAO.
ISPM 7. 2011. *Phytosanitary certification system.* Rome, IPPC, FAO.
ISPM 8. 1998. *Determination of pest status in an area*. Rome, IPPC, FAO.
ISPM 11. 2013. *Pest risk analysis for quarantine pests*. Rome, IPPC, FAO.
ISPM 12. 2011. *Phytosanitary certificates.* Rome, IPPC, FAO.
ISPM 14. 2002. *The use of integrated measures in a systems approach for pest risk management*. Rome, IPPC, FAO.
ISPM 36. 2012*. Integrated measures for plants for planting*. Rome, IPPC, FAO.
RSPM 5. (Updated annually). *NAPPO glossary of phytosanitary terms*. Ottawa, NAPPO.

Definitions, Abbreviations and Acronyms

Definitions of phytosanitary terms used in the present standard can be found in NAPPO RSPM 5 and in ISPM 5.

Background

Phytosanitary measures are applied by North American Plant Protection Organization (NAPPO) member countries to reduce pest risk associated with the importation of plants for planting. In the past, these measures have been based mainly on quarantine restrictions supported by end product inspection and phytosanitary certification. Recent experience demonstrates that these systems may not always be adequate as evidenced by an increasing rate of pest introduction associated with the import of plants for planting. These pests often cause significant economic and environmental damage. The historical background on the reasoning for the establishment of this standard is contained in Appendix 1 (the NAPPO document *Risk and Risk Management Associated with the Importation of Plants for Planting into NAPPO Member Countries: a Concept Paper*).

Historically, most taxa of plants for planting have moved in international trade without the completion of a specific risk analysis. Additionally, the high level of uncertainty about the risk associated with plants for planting and the damage caused by recent introductions of pests warrant a review of available phytosanitary measures. This includes conducting a pest risk analysis (PRA) as the basis for phytosanitary measures and integrated approaches in managing those risks. Giving due consideration to traditional phytosanitary measures to mitigate pest risk, an integrated approach based on best industry practices is the most effective method to reduce the risk of pest introduction while minimizing disruption to international trade in plants for planting. Placing increased emphasis on these practices is intended to reduce the risk of pest introduction without substantially increasing the regulatory burden or disruption to international trade in plants for planting.

Integrated pest risk management measures for plant imports include such elements as identification and management of risk, documentation of production and pest management practices, auditing and reviewing export programs, and managing pest prevalence during the production process. It focuses on the production process in order to provide an alternative to the current approach which relies on final product inspection for phytosanitary certification

1. General Requirements

1.1 Basis for regulating

NAPPO member countries recognize that integrated phytosanitary measures including new and existing measures and industry practices should provide a more effective basis for preventing the entry and establishment of pests associated with the movement of plants for planting. This approach is based on the reasoning outlined in Appendix 1 and phytosanitary requirements developed through bilateral agreement between the national plant protection organizations (NPPOs) of importing and exporting countries

with significant participation by the private sector (mainly growers) in determining practical and effective measures.

The strength of phytosanitary measures is based on the results of PRA (as defined in ISPM 2: 2007 and ISPM 11: 2004) or other technical justification, and takes into account industry practices which reduce pest risks to an appropriate level. The phytosanitary measures should be more restrictive for high risk material in a vegetative state (e.g., whole plants, cuttings, budwood; see Appendix 1 for additional detail).

1.2 Integrated pest risk management measures

Integrated pest risk management measures are composed of multiple measures. These range in complexity and rigor from those that combine independent measures to those that are more complex and precise such as control point systems (see Appendix of ISPM 14: 2002). The application of the control point concept may be particularly useful for the development of integrated measures.

Integrated measures for pest risk management may provide an alternative to single measures such as disinfestation treatments, or replace more restrictive measures such as prohibition. This approach may also be developed to manage pest risk where no single measure is available.

Pest risk management measures should also take into account industry practices which include mechanisms to:

- identify and define appropriate practices;
- estimate the efficacy of specific practices or procedures;
- monitor and manage operations; and
- make measures official (authorized or implemented by the National Plant Protection Organization, NPPO).

2. Specific Requirements

2.1 Responsibilities of the place of production

The place of production is responsible for identifying, developing and implementing appropriate procedures that meet the requirements of the NPPOs of both the exporting and the importing countries. Participants in the export program must be approved by the NPPO of the exporting country or its designee. Approval is conferred by the NPPO or its designee after the participant meets the conditions. Approval will be withdrawn if the participant fails to meet the conditions at any time.

All documentation required by this standard is maintained by the exporting place of production and made available to official representatives of the exporting and importing country NPPOs upon request. The place of production must be open to necessary and reasonable audit, monitoring and evaluation of compliance by the NPPO of the exporting country, and when necessary, also by NPPO of the importing country.

The management of the place of production must be fully accountable to the NPPO of the exporting country to ensure compliance with the system. Management must specify

the roles and responsibilities of its personnel to perform program activities. The place of production must notify the approving NPPO of deficiencies detected during internal audits.

2.1.1 Training

A training program must be established, documented and regularly conducted at the place of production. The training program must ensure that all those involved in the export program possess the specific knowledge related to the relevant components of the program and a general understanding of the requirements.

2.1.2 Pest management program

The place of production must develop and implement an approved pest management program that contains ongoing surveillance, and procedures for the containment and control of pests to prevent introduction and spread. The place of production must obtain material used to produce plants for planting from sources approved by the NPPO of the exporting country. All sources of plants for planting and the phytosanitary status of those plants must be well-documented and the program for producing propagative material carefully monitored.

2.1.3 Internal audits

The place of production must perform, or designate parties to perform internal audits that ensure that a NPPO approved and documented plan is being followed and is achieving the appropriate level of pest management.

2.1.4 Traceability

The place of production must implement a procedure approved by the NPPO of the exporting country or its designee that documents and identifies plants from propagation through harvest and sale to ensure that plants can be traced forward and back. The system must at least account for:

- the origin of mother stock;
- the year of propagation;
- the place of production;
- geographic location of the field of production;
- location of plants for planting within the place of production;
- the genus; species; variety; hybrid, origin, and
- the purchaser's identity

2.1.5 Documentation of program procedures

A place of production must develop a manual that guides its operation and which includes the following components:

- Administrative procedures (including roles and responsibilities, training procedures);
- pest management plan;
- place of production internal audit procedures;
- management of non-compliant product or procedures;
- traceability procedures;
- record-keeping systems;

2.1.6 Records

A place of production must maintain records on its premises as specified by the NPPO of the exporting country. These records must be made available to auditors for either NPPO upon request. These documents include all the elements described herein and copies of all external audit documents/reports.

2.2 Responsibilities of the NPPOs

The NPPOs of the importing and exporting countries are responsible for collaborating to establish program requirements, including regulations, workplans and compliance agreements as necessary for recognizing and implementing particular import programs. Technically justified modifications to the program may be negotiated.

The administration of program requirements should include such elements as clarification of terminology, testing and re-testing requirements, eligibility, the nomenclature of certification levels, horticultural management, isolation and sanitation requirements, inspection, documentation, identification and labeling, quality assurance, non-compliance and remedial measures, and criteria for post-entry quarantine. The criteria for approving, suspending, removing, and reinstating approval for a particular program should be jointly developed and agreed upon by the NPPOs.

Information is exchanged by the NPPOs through officially designated contact points in each country.

2.2.1 NPPO of the importing country

The NPPO of the importing country is responsible for setting technically justified import requirements and providing specific information and program requirements, including:

- identifying eligible and ineligible plant taxa;
- identifying pests of concern including approved inspection or testing methods;
- specifying the appropriate level of phytosanitary protection;
- describing types and level of assurance required (e.g. elements of certification);
- identifying points requiring verification.

The NPPO of the importing country, in consultation with the NPPO of the exporting country where appropriate, selects the least trade-restrictive measures. The NPPO of the importing country also monitors programs and performs audit inspections, including testing samples for the presence of regulated pests and verifying that procedures follow agreed guidelines.

Other responsibilities and activities of the NPPO of the importing country include:

- communicating requirements;
- establishing permit requirements and issuing permits;
- proposing improvements or alternative options;
- specifying actions to be taken as the result of non-compliance;
- notifying the NPPO of the exporting country of non-compliance;
- providing feedback on the results of monitoring and audit to the NPPO of the exporting country.

The NPPO of the importing country is also responsible for the implementation of any agreed measures in its country.

2.2.2 NPPO of the exporting country

The NPPO of the exporting country should provide sufficient information to the NPPO of the importing country to support the evaluation and acceptance of export programs. This may include:

- specific identification of the commodity, place of production, and expected volume and frequency of shipments;
- relevant production, harvest, packing/handling, and transport details;
- the pest-host relationship;
- pest prevalence and distribution;
- risk management measures proposed for a pest management program, and relevant efficacy data.

A phytosanitary certificate or an equivalent official document should be issued by the NPPO of the exporting country when consignments meet the requirements of the NPPO of the importing country. An import permit may also be required.

Other responsibilities of the NPPO of the exporting country include:

- establishing and maintaining compliance agreements as necessary;
- oversight and enforcement of program provisions;
- arrangements for monitoring and audit;
- maintaining appropriate records.

The NPPO of the exporting country should notify the NPPO of the importing country of non-compliance within the integrity of the system or non-compliance by a place of production that affects the phytosanitary integrity of the commodity. The requirements for notification should be determined by bilateral arrangement.

2.3 Responsibilities of those purchasing plants for planting for export (plant brokers)

Entities that purchase or take possession of plants for planting from an approved place of production for the purpose of exporting those plants without further growing beyond maintaining the plants until export are referred to in this standard as plant brokers. Plants may be held or stored without further growing provided that their phytosanitary security and integrity is maintained (e.g., dormant material held in cold storage or holding plants for the time period required to accumulate plants prior to export). Brokers must be approved by the NPPO of the exporting country or its designee. Approval is conferred by the NPPO or

its designee after the participant meets the conditions of this section.

To maintain certification that a consignment of plants was produced under an approved integrated system, plant brokers must:

- Ensure the traceability of export consignments to an approved place of production. As defined in ISPM 7: 2011, “consignments and their certification should be traceable as appropriate through all stages of production, handling and transport to the point of export”. This element is critical for instances where brokers purchase plants without taking possession of them;
- Maintain the phytosanitary status of the plants in a manner equivalent to an approved place of production from purchase, storage and transportation to the export destination;
- “Ensure the phytosanitary security of consignments is maintained prior to export by maintaining the composition of consignments (avoiding substitution; i.e., “commingling”) and preventing reinfestation (see ISPM 1: 2006,Section 2.9); and
- Document these processes for verifying status and maintaining traceability in a manner sufficient for auditing by the NPPOs.

Approval will be withdrawn if the participant fails to meet these conditions at any time.

Approval may be reinstated upon determination by the NPPO that corrective measures have been successfully completed.

2.4 External Audits

The requirements for auditing should be agreed to bilaterally.

2.4.1 Auditing by the NPPO of the importing country

The NPPO of the importing country should evaluate the integrated pest management measures of the NPPO of the exporting country before acceptance. This could consist of documentation review, site visits, and inspection and testing of plants produced under the system. Following approval, the NPPO of the importing country or its designee should monitor and periodically audit the system to ensure that it continues to meet the stated objectives. Audits should include inspection of imported plants for planting, site visits and review of the integrated pest management measures of the NPPO of the exporting country and internal audit processes.

2.4.2 Auditing by the NPPO of the exporting country

The NPPO should arrange for audits of the exporting system. Audits should verify:

- that program participants are complying with the specified standards;
- that the integrated pest management measures continue to meet the requirements of the importing country and/or bilateral arrangements, and;
- that arrangements with designees are complied with.

Audits may be conducted by NPPOs or their designees and may consist of inspection or testing of plants for planting and the revision of documentation and management practices as they relate to the program.

3. Non-compliance

As defined in ISPM 13: 2001, "countries may agree bilaterally on what instances of non- compliance are considered significant…." For example, the detection of regulated pests, deficiencies in documentation, failures to maintain traceability of plants, etc., may indicate that the integrity of the system is compromised. NPPOs should consider that the detection of other organisms may require further investigation to determine if non-compliance exists.

Regulatory responses to program failures should be based on existing bilateral agreements. Contingency plans may be established in advance to ensure that alternative measures are available in the event that all or part of a program fails.

The NPPO of the importing country should specify the consequences of non-compliance to the NPPO of the exporting country. The NPPO of the exporting country should in turn specify the consequences of non- compliance to the participants in the program. These may vary depending on the nature and severity of the infraction. In addition, remedial measures should be specified to enable a suspended or de-certified place of production or plant broker to become eligible for reinstatement or re-certification.

Places of production or plant brokers that do not meet the conditions of the program should be suspended. Plants for planting must not be exported from a place of production or a plant broker that has failed to meet the program requirements.

The effectiveness of remedial measures taken must be verified before reinstatement to the program by the exporting NPPO, and where appropriate, by the NPPO of importing country.

This appendix was adopted by the NAPPO Executive Committee on August 5, 2013.
The appendix is for reference purposes only and is not a prescriptive part of the standard.

Appendix 1: Risk and Risk management Associated with the Importation of Plants for Planting into NAPPO Member Countries

A Concept Paper
Prepared by the NAPPO Plants for Planting Panel
August 3, 2004

Issue

Current phytosanitary measures controlling the importation of plants for planting into North American Plant Protection Organization (NAPPO) member countries do not adequately prevent the introduction of plant pests.

Introduction and Scope

Although various quarantine control measures are employed by regulatory agencies to identify plant pest risks and employ mitigation measures, the historical importation of plants for planting into NAPPO countries has nevertheless seen the introduction of new invasive plant pests. Often these pests cause significant economic and environmental damage. The relative impact of these introductions warrants greater attention by regulatory agencies. This paper reviews many of these reported cases, the impacts of such introductions, the current phytosanitary measures employed at mitigating these introductions and presents options for improving risk management measures. The paper also provides recommendations for the development of a standard for controlling the international movement of plants for planting.

Definitions

Definitions of phytosanitary terms used in the present document can be found in ISPM 5 and in RSPM 5.

Background

Current regulatory controls for the importation of plants for planting into NAPPO member countries have not prevented the entry and in some cases the establishment of many serious economic and environmental pests.

Examples of serious pests introduced or likely to have been introduced on plants for planting include:

Beech scale	*Cryptococcus fagisuga*
Citrus long horned beetle	*Anaplophora cinnensis*
Citrus canker	*Xanthomonas axonopodis pv. citri*
Day lily rust	*Puccinia haemerocallidis*
Dogwood anthracnose	*Discula destructiva*
European larch canker	*Lachnuellela wilkommi*
Glassy winged sharpshooter	*Homalodisca coagulata*
Viburnum leaf beetle	
Pierce's disease	*Xylella fastidosa*
Pink hibiscus mealybug	*Maconellicoccus hirsutus*
Plum pox virus	Plum pox potyvirus
Brown Rot	*Ralstonia solanacearum*, Race 3 (Biovar 2)
Red gum lerp psyllid	*Glycaspis brimblecombei*
Sudden oak death	*Phytophthora ramorum*
Cactus Moth	*Cactoblastis cactorum*
Lobate Lac Scale	*Paratachardina lobata lobata*
Devils tearthumb	*Polygonum perfoliatum*
Japanese knotweed	*Polygonum cuspidatum*
Tropical soda apple	*Solanum viarum*
	Inula britannica
Keek	*Rorippa australis*

The introductions of the citrus long horned beetle and the bacteria *Ralstonia solanacearum* Race 3 (Biovar 2) represent documented examples of pest incursions to North America associated with the importation of plants for planting.

The citrus long horned beetle was introduced into Tukwilla, Washington in August, 2001, on maple bonsai from Korea. 369 trees had been imported for commercial sale. During a period of post entry quarantine, in which the plants are held at the importer's residence, certification officials observed beetles flying out of the bonsai into surrounding wild lands. At the same time, a second nursery reported collecting the same insect from related imports. Citrus long horned beetle is a serious pest of more than 40 hardwood and fruit trees (including maple, poplar, oak, pear and cherry). To contain the introduction

of citrus long horned beetle, certification officials removed and replaced about 1000 homeowner and wild trees, with an additional 1500 being treated with a systemic insecticide.

In 2003, *R. solanacearum* Race 3 (Biovar 2) infected geranium cuttings were shipped to North American greenhouses from Kenya, Guatemala and Costa Rica as propagation material. Before the disease was detected, the plants for planting were further distributed to hundreds of United States (U.S.) greenhouses and several Canadian greenhouses. *R. solanacearum* Race 3 (Biovar 2) is a serious pest of potatoes and other solanaceous crops. It also affects other horticultural species. Eradication efforts for the introduction of this bacterium have required expenditure of significant government resources in sampling, testing and the destruction of infected plant material along with economic costs to the horticulture industry estimated to exceed $5 million USD.

Finally, the glassy winged sharpshooter, an insect vector of the bacteria *Xylella fastidosa*, which causes serious grape and peach diseases, is thought to have been introduced into California as egg masses attached to plant material that was moved from the eastern United States into California. This is also an important means of artificial movement within the state. While this is not a country to country importation issue it demonstrates the movement of a pest on plants for planting.

The direct association of a pest with a particular plant for planting pathway is often difficult to confirm. Often pests are introduced and become established long before detection of the organism can be made. In the case of red gum lerp psyllid (*Glycaspis brimblecombei*), it is believed that plants for planting imported or smuggled into the U.S. in the early 1990's are responsible for outbreaks of the pest in southern California and later in Mexico in the late 1990's. Until 1998, the pest remained undetected until damage to eucalyptus along a freeway in Los Angeles county prompted scientists to examine the cause. Since this time natural spread of the insect has resulted in significant damage to eucalyptus in 25 Mexican states.

The pathogen *Phytophthora ramorum* which causes Sudden Oak Death (SOD) is known to be moved with plants for planting. This was illustrated in 2004 when the pathogen was found on nursery stock distributed to multiple destinations throughout North America from a nursery later found infested. It is known to have spread in Europe via plants for planting. Rhododendron, camellias, viburnum and a growing list of other ornamental and forest plants are known to be hosts. It has since been spread to un-infested locations in North America and Europe numerous times on plants for planting.

Phytophthora ramorum exemplifies several difficulties in mitigating risks from pathogens that might move on plants for planting. Only five years after symptoms were noticed on hosts, did scientists determine the causal agent, which was new to science. Nearly a decade after host symptoms were noticed, science has not developed a complete host list.

In many of these cases, a pest may be unobtrusive in its native range, but become a significant threat as a newly introduced organism or when the organism is

provided suitable conditions. As such, often regulators and scientists are unaware of risks associated with the introduction of any new organism. For example, hemlock woolly adelgid (*Adelges tsugae*) was first discovered in the Pacific Northwest in 1924, where its impacts have been very inconsequential. The insect was later found in Virginia in the mid-1950s, and was not recognized as a significant problem till the 1990's, where now the insect is threatening the survival of eastern hemlock in many areas. Since the insect requires live material to enable long distance spread, it is likely the insect was moved to eastern North America on plants for planting.

In many cases, the introduction of new exotic pests necessitates costly eradication programs or results in direct economic impacts to homeowners, the agricultural and forest sectors and environmental losses to North America. For example, the detection of plum pox virus to the eastern United States and Canada in the late 1990's is presumed to be the result of an unapproved importation. Since its introduction both the United States Department of Agriculture and the Canadian Food Inspection Agency have been engaged in a multi-year eradication effort. The direct costs for the eradication effort in Canada are $139 million dollars Canadian from 2000 through 2004. The direct costs for the eradication effort in United States are $39.5 million dollars US from 1999 through 2004.

The plum pox virus situation may represent the result of a classic case of smuggling. Although this paper does not evaluate options for the control of smuggling, this one situation clearly demonstrates the potential impacts of pests moving with plants for planting.

Trade in plants for planting in the three NAPPO member countries continues to increase, driven by increasing world trade in general, changes in production practices and the pursuit of new, exciting horticultural opportunities and consumer demand. There is also an increase in trade between NAPPO countries and non-traditional markets, for which the status of pests native to these areas is not well understood. Changes in the production practices also favor the introduction of new pest organisms by producing large numbers of plants for planting, e.g. geraniums, tropical foliage and poinsettias in off shore facilities for importation and final grow out in NAPPO countries.

It is also important to note that currently a low percentage of imported plants are being inspected. With increasing volumes, inspection resources are being stretched beyond capacity. “US imports of propagative material, unrooted cuttings and slips of plants expanded 500 percent in value from 1992 to 2002."(ERS/USDA FLO-2003).

Current situation

The current regulatory framework for entry of plants for planting into the NAPPO member countries is broadly *permissive.* Known risks are regulated according to a continuum of strategies ranging from prohibition to visual inspection upon arrival. Unless specific restrictions apply, virtually any type of plant from anywhere in the world is enterable with reliance on visual inspection as the primary mitigation measure. Modern risk analyses have been performed only in limited cases. In short, current

regulation of plants for planting is list- dependent, reactive, and heavily based on old information.

By contrast, the regulatory framework employed for fruit and vegetable imports into the NAPPO region is highly *restrictive*; proposed commodity imports from a specific country are subject to risk assessment and mitigation as a precondition for entry. While some believe this approach should be taken with plants for planting, there are practical limitations to conducting thorough risk analyses for the thousands of genera and species that may be moved internationally. In an attempt to balance pest risk concerns and resource limitations, Canada recently initiated efforts to require risk analysis for plant for planting imports involving either new plant types, or new places of origin for plant types that have a history of entry into the country.

The consequences of pest introduction may vary depending on the resource at risk. Although pest risk assessments should consider all resources at risk, regulatory responses seldom distinguish between short and long-term resources and may not provide adequate protection.

Most plant for planting imports enter the three NAPPO countries based on either pre-entry visual inspection by foreign certification officials or by the certification officials of the NAPPO country posted overseas, sometimes followed by visual inspection of the import at the time of entry. The number of plant species prohibited from entry or those required to be held in post- entry quarantine by any of the three NAPPO countries is relatively small. In some cases, prior to the approval for entry, the regulatory agency completes a pest risk assessment for the commodity.

These regulatory strategies fail to account for a number of important factors such as:

1. Regulatory agencies tend to rely on historically based lists of known quarantine pests.
2. Infested plant material can be source of infection indefinitely, and pest detection often occurs long after establishment.
3. Most plant material can be imported with only a port of entry inspection.
4. Pest risk analyses of imported plants often have a high degree of uncertainty because of the following:
    - uncertain origin of material
    - transhipments
    - mother stock
    - wild collected material
    - pest impact on host and non-host plants
    - pest impact in native environment is an unreliable indicator of behavior in new ecosystems
    - pathogens are often not as well understood as arthropods.
    - many potential quarantine pests are obscure or unknown to science and the regulatory community

- of potential for genetic change or variability in pests or hosts
- increasing trade from non-traditional sources

5. Visual inspection at point of entry remains the primary tool of regulatory agencies. However:
   - resources to inspect have not kept pace with the rapidly increasing volume of imports resulting in inspection of a reduced sample size and number.
   - increased difficulty in detecting pathogens, smaller pests and low pest population densities.
   - pesticides may mask pest and disease symptoms
   - disease symptoms may be latent or masked at inspection
   - non-visual detection methods for many plant pests particularly pathogens are not available.
   - variation in inspection intensity between ports of entry because of work load or local policy.
   - type of packaging can influence the rigor of inspection.

6. Considerable variation in pest management programs exists among export producers, from wild plant collectors to commercial entities. Best management practices are neither required nor encouraged, but are commonly used by some entities.

The current situation emphasizes import control at the point of entry, thereby placing the economic and environmental burden on the importing country. Exporting producers have lower accountability in meeting phytosanitary import requirements.

Risk Management

Current regulatory measures are insufficient to ensure adequate protection for NAPPO countries in today's trading environment. Regulatory officials, the horticulture industry and the environmental community from the three countries agree that the adoption of more effective phytosanitary measures is needed to prevent the economic and environmental impacts associated with pest introductions on plants for planting.

Pest risk varies depending upon the type of plant for planting being imported, and how it has been produced and transported. For example, seeds or pollen are generally viewed as presenting lower risk, whereas plants with roots, and especially plants established in growing media, are viewed as high risk, given that they can be associated with a broad array of pests linked to the vegetative parts of the plant, and inspection may be more difficult. Commercial production systems with comprehensive pest management programs may reduce pest risk.

Appropriate risk management options must be developed for each of the various types of material that may be imported. Mitigation options may incorporate an array of regulatory strategies such as commercial production and handling systems approaches, new or improved treatment technologies, improved detection techniques, diagnostic

testing and sampling, and post-entry quarantine.

Conclusion

There are significant environmental and economic risks associated with current practices and safeguards for the international movement of plants for planting.

The following are general recommendations for improving phytosanitary measures that would reduce the risk of pest entry:

1. Enhance and harmonize regulatory philosophy for the importation of plants for planting into NAPPO member countries
2. Enhance and harmonize plant pest detection and management techniques to reduce the risk of pest and subsequent movement among NAPPO member countries.
3. Regulatory agencies should adopt measures that ensure plants for planting are grown, commercialized, and transported internationally in a manner that reduces pest risks to agriculture, forestry and the environment to an acceptable level.
4. Shift mitigation measures from primary reliance on visual inspection and sampling to comprehensive production systems controls at origin.
5. Improve and harmonize pest risk assessments for taxa from new sources and for new taxa before importation is permitted.
6. Encourage the development of regional and international standards for these recommendations.

Recommendation

NAPPO should establish standards for managing the pest risks associated with the importation of the broad range of plants for planting based on a systems approach taking into consideration the guidelines described in ISPM 14: 2002 and concepts drawn from ISPM 10: 1999. The key elements should include:

1. Commitment by producers and the NPPO in the exporting country to develop and meet appropriate certification standards.
2. Training and certification of staff within a producing facility to meet the requirements of the certification standard.
3. Ongoing pest management within facilities to meet good management practices and quarantine pest freedom.
4. Documentation that verifies that the system is operating in a compliant manner.
5. Ongoing oversight of the production process to ensure compliance with the NAPPO standard both internally by the producer and externally by NPPO's involved with the system.
6. Verification by the NPPO of importing country that the product meets the approved certification standard.

There are many possible pathways and levels of pest risk within the broad category of plants for planting, depending on plant taxon and type of plant material (e.g. seeds, whole plants, cuttings, bulbs, tubers, budwood, germplasm, etc.). However, one of the highest risk pathways that needs to be addressed first is plants for planting that are moved into NAPPO member countries in a vegetative state (e.g., whole plants, cuttings, budwood, etc.) in the ornamental and horticultural trade.

An Analysis or Regulatory Options and Management Tools Follows:

Analysis of Regulatory Options		
Option	**Pros**	**Cons**
No restrictions	• Unrestricted importationof all genera/varieties/cultivars/hybrids • Ease in implementing following legislative changes • Least restrictive to trade	• Potentially catastrophic impact on plant health (e.g. chestnut blight, Dutch elm disease) • Increases in pest introductions • Losses of export markets, • Losses of native species/bio-diversity • Increased cost of production/pest management • Reduced agriculture/forestry productivity
Current approach	• Requires no major regulatory changes or regulatory costs • Effective in detecting pests that are present in large numbers or visually evident. • Prohibition of high value high risk species is generally efficacious in mitigating known risks associated with these imports • The same approach is widely used and accepted by most countries. • Allows relatively free access to new horticultural materials	• Proven high potential for entry of quarantine and regulated non-quarantine pests based on issues of ability to detect, sampling size. • Frequent need to carry out eradications or control programs. • Loss of export markets associated with pest establishment. • Direct productivity losses to producers from pest establishment. • Resource intensive for regulators • Potentially catastrophic to environment and ecosystems. • Decreasingly effective

Analysis of Regulatory Options			
Option	**Pros**		**Cons**
Modified requirements	**Increased inspection at port of entry**	• Improved interception rate • Other benefits as indicated above	• Increased cost for regulatory agencies • Fails to account for difficulties in detection, increasing trade volumes, etc. • Trade volumes still affect ability to sample. • Inability to detect pests that may not exhibit visual symptoms at the time of shipment (i.e. pathogens)
Modified Requirements	**Preclearance (e.g. End product inspection in exporting country)**	• Interception of pests at country of origin resulting in reduced risk of introduction of pest in importing country. • Better control of the logistics of inspection.	• More costly than inspecting at port of entry • Risk of re-infestation prior to shipment • Fails to account for difficulties in detection. • Trade volumes still affect ability to sample. • Inability to detect pests that may not exhibit visual symptoms at the time of shipment (i.e. pathogens)

Analysis of Regulatory Options			
Modified Requirements	**Clean stock systems approach**	• Experience with systems approaches indicates that these systems favour ongoing pest control at origin. • International guidelines exist. • Pest management program reduces pest incidences broadly. • Year-round pest detection. • Higher quality product. • Lower regulatory cost. • Regulatory actions are taken against specific offending exporters rather than at a country reducing impacts to other producers. • Expanding inspection resources by using accredited industry personnel.	• High start up (e.g. training) and/or maintenance costs for industry/regulatory agencies. • May require significant incentives for countries to establish certification systems. • May be perceived as an overly expensive cost of production. • Need maintenance of good audit/oversight mechanisms by the NPPOs of the exporting and importing countries.
Modified Requirements:	**Allow only tissue culture and seed subject to clean stock program and post-entry quarantine**	• Very low risk. • Allows for entry of new genera /varieties/cultivars/ hybrids. • Lower inspection/pest management costs. • Low environmental impact	• High maintenance of administrative costs associated with post-entry activities. • Lengthy process to get products from import to marketable state. • Not suitable for some genera /varieties /cultivars/hybrids, micro-propagation or process of production is not known. • Highly restrictive to trade and likely to increase smuggling. • Open to trade challenge

Prohibition	• Assured protection against pests	• Highly trade restrictive and likely to increase smuggling. • Scientifically unjustified

Management Tools Available		
Phytosanitary Measures	**Pros**	**Cons**
Visual inspection	• Current situation (No cost implications) • Accommodates large volumes • Least demanding of technical expertise	• Responsibility of NPPO of importing country (risk at port of entry) • Difficult to ascertain quarantine status at port of entry • Difficult to detect pathogens,
Testing by NPPO of importing country	• Detection of difficult to see pests • Detect lower population levels • Higher level of discrimination	• High cost • Tests not developed for many pests • Appropriate sample size problematic • Requires high technical expertise
Phytosanitary Certification at origin	• Current situation • At origin • International recognition	• Responsibility of NPPO of exporting country • Difficult to ascertain quarantine status at port of entry • Pest list specific, ignores potential quarantine pests • High reliance on visual inspection • End product inspection • Difficult to detect pathogens, internal & minute pests • Receiving country has limited control over issuance of phytosanitary certificates
Pest Risk Analysis (PRA)	• Identifies known pests • Establishes pest risk • Establishes mitigation measures	• Potential quarantine pests not identified • Limited pest information for some areas • High initial investment cost to NPPO of importing country • Requires high technical expertise

Management Tools Available		
Phytosanitary Measures	**Pros**	**Cons**
Additional certification requirements	• Current situation for some taxa • Free of specific quarantine pests • At origin	• Responsibility of NPPO of exporting country • Limited current use • Difficult to ascertain quarantine status at port of entry • List-specific, ignores potential quarantine pests
Preclearance	• Current situation for some taxa • At origin • Reduced workload at port of entry	• Responsibility of NPPOs of exporting and importing countries • Reliance on visual inspection • Relies on end product inspection
Post entry quarantine (International term) • under special permit • destined to a NPPO-approved facility	• Low risk of pest introduction for high risk material • High confidence • Allows limited entry for otherwise prohibited taxa	• Responsibility of NPPO of importing country • High cost, facilities and staff • Limited capacity • Long period in quarantine

Management Tools Available		
Postentry quarantine (US/Mexico term) • under permit with the NPPO of importing country with written agreement between the state of destination and the grower	• Entry of larger amounts of lower risk material	• Responsibility of NPPO of importing country • High cost, staff • Long period in quarantine • Reliance on visual inspection • End product inspection
Prohibit entry	Most protective	• Responsibility of NPPO of importing country • Highly restrictive to trade • Likely to increase smuggling

Management Tools Available		
Systems approach (e.g. clean stock program)	• Responsibility of exporter, NPPOs provide oversight, validation, verification • Production system designed to reduce pest risk with the use of best management practices • At origin • Reduce risk of quarantine pests and potential quarantine pests • Verification at grower, port of entry, importer • Growers benefit from reduced actions against products • Reduced workload at port of entry	• More expensive for growers & NPPOs • Requires development of standards and validation and verification
Tissue culture only	• Free of most pests • High confidence if mother plants are pest free	• Responsibility of NPPO of importing country • Difficult to ascertain quarantine status at port of entry • End product inspection • Highly restrictive to trade
Seed only	• Few pests seed borne	• Responsibility of NPPO of importing country • Highly restrictive to trade • Prohibits import of clonal material • Likely to increase smuggling • Pathway for weed seed contaminants • End product inspection
Treatments (e.g. pesticide treatment, heat treatment)	• Highly effectively against some known pests	• Some have negative environmental impacts • Can be phytotoxic • Limited treatments for pathogens • May be difficult to verify