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Review

International variation in phytosanitary legislation and regulations governing importation of plants for planting



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ABSTRACT

The trade in plants for planting (P4P) is one of the major pathways for the introduction of pests. The strong increase in world trade in the past decades appears to have led to an increase in introductions of species transported by this pathway, and highlights the need for effective phytosanitary legislation and measures. The phytosanitary regulations in most countries are based on the International Plant Protection Convention and the World Trade Organisation's Agreement on Sanitary and Phytosanitary Measures, but there are large differences in countries' approaches to managing the risk of introducing invasive alien species through international plant trade. We reviewed elements of the phytosanitary

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legislations of ten countries on all continents and aimed to find regulations that prevent biological invasions. We found large differences in countries' phytosanitary regulations. New Zealand and Australia have the strictest phytosanitary regulations, while Europe maintains a general authorization for P4P imports. The remaining countries have regulations between these extremes. The evidence is sparse regarding the quality of implementation and effectiveness, and impact of individual phytosanitary measures. We recommend that National Plant Protection Organisations collect detailed information on P4P imports and the effectiveness of phytosanitary measures. Such information could provide a basis to improve a country's phytosanitary regulatory framework or could be used in risk assessments.

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1. Introduction

There is increasing evidence that international trade, in particular the trade in live plants for planting (P4P, syn. nursery stock), is a major pathway for the introduction of alien plant pests (both arthropod pests and microbial pathogens; [Work et al., 2005](#); [Kenis et al., 2007](#); [Liebhold et al., 2012](#); [Santini et al., 2013](#)). The trade in P4P continues to see a strong increase in volume ([Liebhold et al., 2012](#); [Eschen et al., 2014](#)), as well as shifts in the origins of the plants, due to moving nursery operations to countries where production costs are lower and the importation of retail-ready plants. For example, European imports of P4P from China have increased fivefold over the past ten years and are now on a par with the volume imported from North America, which remained static ([Eschen et al., 2014](#)). Concomitant with increasing trade will be a similar increase in invertebrate plant pests and infective propagules of plant pathogens ([Liebhold et al., 2012](#); [Brockhoff et al., 2014](#)). There is, therefore, an urgent need to understand the efficacy of existing measures and what measures are needed to reduce and mitigate the risk of introducing pests through intercontinental trade in P4P.

National legislation and regulations are fundamental to providing the regulatory framework for protecting agricultural, forest and other plant resources from alien pests, or to manage such threats. There are a number of possibilities to mitigate the introduction of quarantine pests via trade by effective implementation of regulations, such as measures to ensure low pest prevalence in the exporting country, treatment of consignments, importing dormant plants and restricting import to specific seasons, sizes, or plant condition. If such measures do not reduce the risk to an acceptable level, import of the affected commodities is prohibited. These and other measures have been adopted in national legislations world-wide. Phytosanitary legislation and regulation can be effective in reducing the rate of pest establishments ([Roques, 2010](#); [Hlasny, 2012](#)), but the measures prescribed in national legislations vary and it would be valuable to identify those parts of legislations and regulations most effective in reducing risk.

The legislation concerning the management of risks associated with the import of P4P and the associated dispersal of pests and diseases is, in most countries, based on

international treaties and conventions ([MacLeod et al., 2010](#)), in particular the International Plant Protection Convention (IPPC; [FAO, 1997](#)) and the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement; [WTO, 1995](#)). The IPPC stipulates the use of phytosanitary certificates and the right of countries to regulate the import of certain plant species to avoid entry of pests, to inspect or quarantine specific consignments and to define which pest species are not allowed to enter the country. The SPS Agreement stipulates that countries have the right to decide their own level of acceptable risk, and to apply phytosanitary measures as required to protect plant life or health, as long as these do not discriminate against certain countries or foreign commodities and have the minimal necessary impact on trade. Moreover, any limits on trade set under the SPS Agreement have to be based on science or international standards, such as the International Standards on Phytosanitary Measures (ISPMs) set by the IPPC (except for provisional measures).

The Regional Plant Protection Organizations (RPPOs) were created as regional organisations of the IPPC and are a platform for regional collaboration and in some cases coordinate harmonisation on phytosanitary issues and develop science-based phytosanitary standards for their respective regions. Ultimately some regional standards for phytosanitary measures are adopted by the IPPC as ISPMs and have a global reach. For example, ISPM 36 (Integrated measures for plants for planting, [FAO, 2012](#)) was initiated as the North American Plant Protection Organization's Regional Standard for Phytosanitary Measures 24 (Integrated Pest Risk Management Measures for the Importation of Plants for Planting into NAPPO Member Countries, [NAPPO, 2013](#)). Although ISPMs are not legally binding under the IPPC, WTO Members shall base their sanitary or phytosanitary measures on international standards, guidelines or recommendations, where they exist ([WTO, 1995](#)).

The majority of countries are members of the WTO or contracting parties to the IPPC, and can be expected to comply with their respective obligations, but they have very different approaches to ensuring phytosanitary safety. A country's regulatory design consists of a regulatory framework (phytosanitary legislations, regulations and procedures) and a National Plant Protection Organisation (NPPO) that is responsible for operating the regulation ([FAO, 2004b](#)). The international

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