

### Prioritisation of Pests in a pest list

The risks associated with the movement of plant commodities should be assessed according to the accepted principles of Pest Risk Analysis (PRA) the different aspects of which are documented in a series of International Standards for Phytosanitary Measures (FAO, 2007).

PRA provides a structured approach to facilitate the identification and, in some cases, the quantification of the risks involved. It can range from a comprehensive assessment of the risks posed by all pests associated with a particular commodity (e.g. vegetative planting material). This might involve the collection of detailed information, from all available sources, on all aspects of the biology and life history of each pest identified as a potential risk. This can be both time consuming and expensive, and depending on the commodity involved, is sometimes unnecessary. An alternative approach, acceptable with some commodities (e.g. tissue culture plantlets), involves a quick assessment, based on expert judgement, which can be both quick and cheap. Opinion from a number of experts may be required depending on the nature of the pest(s) and commodity involved.

In all cases, the PRA process starts with the pest list (above). Once all known pests (and potential pests) associated with a commodity have been identified, it is then necessary to prioritise them so that only those pests posing a credible risk need to be considered further. Risk profiles associated with movement of different types of plant material can be used in the prioritisation (Table 1).

Vegetative planting Material (growing plants, cuttings)	Tubers, corms, bulbs etc.	Seeds	Tissue culture plantlets
High risk	High risk for some pests (e.g. viruses, latent bacterial infections)	Medium risk (e.g. seed borne viruses and bacteria)	Low risk

Thus movement of vegetative planting material, with or without soil, and tubers, corms and bulbs of various crops pose a high risk of transmission of all classes of organism although the risk associated with arthropod infestation might be expected to be lower than that posed by bacteria, viruses and fungi due to the ability to detect arthropods (in many cases) visually or microscopically during the inspection procedures. Where leaves are present, lesions associated with fungi or bacteria may also be visible. Viral, viroid and phytoplasma infection or latent infection by bacteria (e.g. *Ralstonia solanacearum* in potato tubers) will not be detected in vegetative plant material without specific serological or molecular detection methods which may have to be targeted to specific pests.

Seeds present a lower risk of transmitting pests than vegetative planting material because not all pests are seed transmissible and a range of treatment methods is available to kill any pests that may be present. Surface infestation by arthropod pests may also be detected by sampling and low resolution microscopy.

The safest way to move living plants across international borders is as tissue culture plantlets produced from pathogen-tested mother plants. In this material, arthropod pests can readily be detected by visual or microscopic inspection. Most bacterial and fungal infection/contamination may also be detected visually as these organisms will

generally grow readily on the growing medium used to maintain the tissue culture plantlets. Some viruses, viroids, phytoplasmas and latent or nutritionally exacting bacteria (e.g. *Xylella* spp.) may not be detected visually and specific tests are, therefore, required to detect these organisms. For any plant commodity to be transferred by tissue culture, steps are taken to exclude pests by heat or other treatment following meristem tip culture. Species of viruses, viroids and phytoplasmas known to infect the plant are assayed using internationally accepted, validated tests, carried out on both the mother plant and after establishing plantlets in tissue culture. Only tissue culture plantlets testing negative are retained; the material testing positive is destroyed. Documentation is provided by the exporting country/institute, identifying the tests carried out and the health status of the plantlets. Some or all tests may also be carried out on samples of the plantlets by the recipient country.

In prioritising pests prior to movement of vegetative propagating material internationally, pest lists of exporting and recipient country in relation to the commodity should be consulted to determine which pests present a quarantine hazard in the recipient country. Consideration may also be given to the distribution of pests in both countries and the existence of Pest Free Zones. Where high-risk planting material (i.e. non tissue culture) is to be transported all pests and diseases on the country lists should be considered and categorized. Conversely, when material is to be shipped in tissue culture form, arthropod pests, fungi and most bacteria can be given low priority unless there are known risks relating to latency. Viruses, viroids, phytoplasmas and some bacteria will be given high priority. The highest priority will be accorded those viruses, viroids, phytoplasmas and bacteria which have quarantine status in the recipient country.

Agreement should be reached between the exporting and importing countries on the range of tests to be carried out on the mother plants and tissue culture plantlets and the documentation to be provided by the exporting country confirming the procedures carried out to ensure freedom from pests. Further testing of samples by the recipient country prior to multiplication and field planting should ensure freedom from the priority pests .