

## Plant pathology in plant biosecurity

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Detecting and preventing entry of exotic pests at the border is critical for protecting incursions of new plant diseases. Countries which are geographically isolated from any significant landmass (Ex: New Zealand) have stringent plant quarantine screening measures in place, to provide protection from the introduction of exotic plant pests and diseases that may harm agriculture, environment and economy. This is called 'Plant Biosecurity', and consists of a set of measures designed to prevent the entry of regulated plant pests at national, regional and individual farm levels.

The New Zealand Biosecurity Act (1993) provides the necessary law for biosecurity control relating to the exclusion, eradication, and effective management of pests and unwanted organisms entering New Zealand. The Ministry for Primary Industries (MPI) is the government authority in charge of overseeing New Zealand's biosecurity. In order for international trade in plant material to occur, there is a requirement for measures to be in place to minimise the chance that pathogens, including bacteria, fungi, viruses, phytoplasma, nematodes and, insects are present in traded material. These measures are required to facilitate market access for the exporting country and to minimise the risk of new diseases entering the importing country.

International trade in plant germplasm i.e. nursery stock for propagation and seeds for sowing is known to pose a particularly high risk for the introduction of exotic pests. Examples of high risk pests include *Phytophthora ramorum* (Sudden Oak Death), *Pseudomonas syringae*, *Xylella fastidiosa*, *Ceratocystis fimbriata* sensu lato, and phytoplasma. An organism is 'regulated' by MPI if it is not known to be present in New Zealand (or if present in New Zealand, is under official control) and could cause unacceptable consequences (i.e. likely to cause unacceptable economic, environmental, socio-cultural or human health impacts in New Zealand) if it were to enter and establish.

Import health standards are developed to manage biosecurity risk of the pests of concern and are based on pest risk assessment of the relevant import pathway. Import health standards include phytosanitary requirements that must be fulfilled by the exporting country on the intended plant material for export, as well as requirements that must be met in the importing country. Examples of phytosanitary measures that may be applied include additional declarations by the national plant protection organisation of the exporting country for the 'pest free status' of the exported consignments (offshore measure), testing for regulated pests e.g. PCR, ELISA, culture morphology (on arrival/post entry quarantine measure) and growing in an approved post entry quarantine facility for a defined period, during which time plants are visually observed and/or tested for any symptoms of pests or disease. All of these phytosanitary measures are based on pest biology/ plant pathology. The scientific community provides considerable support to plant biosecurity through research in areas such as pest biology and distribution, host range, epidemiology and ecology,