Importing Plants at Government Plant Quarantine Stations©

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INTRODUCTION

The Australian Quarantine and Inspection Service (AQIS) operates two post-entry quarantine facilities, which allows the safe introduction of high-risk plant material while protecting Australia from exotic pests and diseases. Access to high-risk material from overseas is essential for Australia's agricultural and horticultural industries to develop and remain competitive.

The Federal Government funds the post-entry quarantine program at the two stations in the form of an "anti-smuggling" subsidy. It is recognised by the Federal Parliament that a full cost recovery program would be prohibitive to plant importers who would otherwise be tempted to smuggle plants into the country.

High health facilities also operate in Brisbane, Hobart, Perth, and Adelaide. They are facilities managed by the state governments under a formal agreement with AQIS. Some of the genetic resource centres also have quarantine arrangements, which allow the introduction of specialist crops, e.g., winter cereals are grown at a quarantine facility in Tamworth that is managed by NSW Agriculture.

The best possible plant growth must be achieved after plants arrive in quarantine. This growth then allows the best opportunity to screen for exotic disease. The condition of plant material upon arrival in Australia and its immediate care in quarantine are major factors in getting plants to re-establish and grow.

THE GOVERNMENT PLANT QUARANTINE STATIONS

The facilities operated by AQIS are the Plant Quarantine Nursery (PQN), Knoxfield (Melbourne, VIC) and the Plant Quarantine Station, Eastern Creek (Sydney, NSW).

The station at Eastern Creek specialises in citrus, rice, clonal grasses, olives, pome fruit, stone fruit, and grape vines. The nursery at Knoxfield specialises in stone fruit, grape vines, berry fruits, potatoes, olives, and sweet potatoes. Both facilities accept other temperate crops and ornamentals.

Many of the "high risk" crops require full disease screening for a wide range of quarantinable viruses, phytoplasmas, fungi, and bacteria (high risk crops are defined in John Fields paper). Active diagnostic testing is undertaken and the time period required for adequate disease screening and virus testing may take from a minimum of 6 months to 3 years depending on the type of plant and the diseases being tested for.

HYGIENE

This is very important in managing a quarantine facility and our practices are based on the UC system.

1) All tools, secateurs, pots, benches, etc. are disinfected. Our secateurs are swabbed with 75% ethanol between each pruning cut.
2) Soilless potting mix is held in bays with a concrete floor and is

covered with shade cloth. Potting mixes are pasteurised at 60°C for 30 min. Our waste potting mix is sterilised and discarded into the nursery field area.

3) Any leaf litter is collected to discourage fungal/bacterial infections. All plant and other nursery waste is collected, bagged, and disposed of by deep burial at an AQIS approved site. The greenhouses and benches are kept clean and free of algal growth or potting mix residue.
4) All the greenhouses have concrete floors, are aphid proof, and all have airlocks with footbaths and hand basins. All the greenhouses have spoon drains with silt traps. All the plants are grown on mesh benches for free drainage. All hose heads are kept off the floor. The potting shed has a concrete floor and is washed down regularly.
5) The nursery is isolated from any production areas and the surrounds are maintained in a weed-free condition. Australian native plants are used in landscaping.
6) Plants are handled only when necessary.
7) Access to the nursery is restricted.
8) Pest monitoring occurs daily and includes using yellow sticky traps to monitor for thrips, white fly, and other flying insects.
9) Plants are managed with knowledge of plant diseases and methods of disease transmission.

CARE OF IMPORTED PLANTS

Prior to importing, we advise importers on the preparation, packing, timing, plant type, and transport methods. Inevitably plants, particularly those with foliage arrive in a stressed condition and that means a decline in plant health. Being transported across the world and undergoing methyl bromide fumigation impacts on the success of getting plants to re-establish. We recommend the following:

1) Good quality plant material, free of disease and pests, mature with strong healthy growth and a strong healthy root system,
2) Time the shipment so that plants are about to emerge from a rest period into one of active growth. They should not be in a "forward state" of growth, i.e., not flush with tender, soft shoots. Deciduous plants are best sent when they are dormant and perennials are best sent when have died down. Evergreen plants must be well "hardened off".
3) Pack the plant material, particularly the roots in clean damp paper or sphagnum moss in sturdy boxes. Bundles of plants wrapped in damp paper may be placed in plastic bags with holes. Avoid wrapping plants directly in plastic as they may sweat in transit. Soil is prohibited and must be washed off prior to packing. If plants are ordered well in advance, a potting mix can be selected that "bare roots" well. Each plant must be labelled but without constricting ties which may bruise the stems.
4) Arrange the quickest transport and label each box clearly with "LIVE PLANT MATERIAL" and the delivery address. To ensure a speedy clearance through customs, a copy of the import permit, phytosanitary documents, and a packing list must be attached in an envelope for easy access to the outside of the box.

In Victoria, after an initial inspection by the AQIS Nursery Stock Inspectors at the airport or the International Mail Centre, plant material to be grown at PQN Knoxfield is received and treated. Most plant material is fumigated with methyl bromide at a prescribed rate per volume, temperature, and time depending on whether the material is dormant or actively growing. A lot of care is taken to prepare plants for fumigation as methyl bromide has an infamous reputation for killing plants.

PROPAGATION

The care of plants after fumigation is another step in ensuring that propagation or re-establishment is successful. Although the range of ornamental plants grown at the Plant Quarantine Nursery is limited in comparison to the volume of plants being grown in private quarantine facilities, the horticultural staff at Knoxfield have had considerable experience in handling a very wide range of plants. The following comments are based on our experiences of growing fruit, nut, field crops, and ornamentals over a 20-year period. We recommended the following:

1) After fumigation plants are aired for a minimum of 2 h under low light, cool temperature, and high humidity.
2) Propagation or potting up is done as quickly as possible after airing. Any damaged or broken leaves, wilted growing tips, or flowers are removed with disinfected secateurs. If the plant has a lot of foliage it may be trimmed back and root pruning may also be required.
3) Potting media. We always pot into a propagation mix regardless of whether it is cuttings or rooted plants. Our experience shows that an open and well-drained mix will encourage new root growth on rooted plants, which need to be nursed back into good growth. An application of "Plant Starter" may be beneficial. Until the root system takes off again, plants are almost under-potted. Care is taken not to use pots that are too big.
4) Once the plants show signs of growing away and a check on the root system shows new root growth, plants are liquid fed and are potted on into a standard, fertilised potting mix. Once again, care is taken not to use pots that are too big.
5) Watering. Once the plants/cuttings are potted, they are watered in without wetting any foliage. This is critical within the first 24 h after fumigation. If there are any bruised leaves or stems, traces of methyl bromide will have entered the plant tissue and when it contacts with water, bromic acid is formed, burning the tissue and opening the way for plant tissue to begin breaking down. The wound becomes very susceptible to fungal infection, e.g., *Botrytis* or other opportunistic fungi. Cuttings are best left out of a mist bed for the first 24 h and they need to be kept in a very humid environment. We have not had any experience with a fogging system. All imported plant material at Knoxfield is checked every day for watering and watering is by hand. Until plants have re-established or cuttings have rooted, they are watered only when the potting mix is drying out. Until they form new roots, plants that are kept too wet will sit and stagnate.

6) Environment. Initially after potting, plants need to be kept under low light with high humidity to reduce any transpiration stress. Extremes of temperature need to be avoided as well.

Once plants are established and growing well, they are regularly inspected and screened for disease. Virus indexing, if required commences in spring. Herbaceous indexing is completed in 6 to 8 weeks whilst woody indexing may take between 1 to 2 years depending on the crop being tested. Plants are recommended for release when all of the active testing and disease screening is completed with negative results and the minimum growing time has been achieved.

SUMMARY

Post-entry quarantine as described at the Plant Quarantine Nursery, Knoxfield, allows agricultural and horticultural industries access to imported plant material without introducing exotic pests and diseases into Australia. In the previous year (2001) at PQN, Knoxfield, exotic diseases were detected on chestnuts (chestnut blight), blueberries (blueberry rust), and grape vines (corky bark). All of the infected plants were destroyed. Plants released in the previous year (2001) include 102 cultivars of stone fruit, 48 cultivars of berry fruit, and 97 cultivars of grapevine.

Successful disease screening is dependent on successful horticultural practices and the number of plants failing to "grow away" after arriving in post-entry quarantine is minimised by the techniques performed.

Plant Importation©

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The papers by Australian Quarantine and Inspection Services (AQIS) staff outlined many of the legal and formal issues covering importation, as well as what happens to the plants when they come into the country. I am going to cover the actual importation of the plants from a growers perspective.

Plants can either be bought in by person as accompanying baggage or by mail/freight. It is much better to accompany the plants as life will be easier if you are present when the plants are inspected. It is also cheaper.

AQIS is charged with protecting our environment. They will look at plants as a possible disease host and as a potential weed. With the recent discoveries of fire ants, the problems with foot and mouth in the U.K. and the threats of terrorism, AQIS has increased its level and intensity of inspection. Whereas in the past some parcels may have come through the postal system without inspection, it is unlikely this will occur now.

There are three ways that a plant can be imported: seed, plant, and tissue culture. The restrictions vary from one plant variety to another and may also be dependent on the originating country. The level of restriction is related to the level of risk. John explained that there are three risk levels based on the weed potential, disease potential, and relationship to plants of significant economic importance.

The easiest method is via seed. An import permit is not required for seed although there are still restrictions (these are detailed in the ICON database). In general seed will be inspected for contamination and where possible identification. The