GUIDANCE

Plant Pass Guidance

Support materials and forms

June 2021

PLANT PASS SCHEME

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Plant Pass Scheme
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Updates

The Plant Pass Scheme is a science-based framework to help producers identify, control, manage and avoid biosecurity risk. The Scheme and standards are based on work undertaken early in 2018 following experience early in the myrtle rust response that underscored the crucial role that plant producers play in early detection of pests, their containment and slowing their spread following a pest incursion. Subsequent discussions identified the opportunity to develop a systematic approach to plant production industry biosecurity risk management.

Revisions will be ongoing as the Scheme's experience and/or new science inform the need for change. Revisions published on the Scheme's website [plantpass.org.nz] and participants advised of the changes and new documents, so they can ensure that they are referring to the most recent documents.

Those wishing to provide recommendations for change should send these in writing to The Scheme Manager or by email to office@nzppi.co.nz.

Acknowledgements

Plant Pass acknowledges and is appreciative of the support of many industry members and stakeholders who assisted in the development of the Scheme; funding from the Ministry for Primary Industry, Department of Conservation, Auckland Council and forestry and horticultural industry bodies, the guidance of project Steering and Working Groups, feedback and advice from industry members and stakeholders, and Kiwifruit Vine Health's generously allowing the Scheme to extract from and draw heavily upon their work and the Kiwifruit Plant Certification Scheme.

Disclaimer

While the Scheme's objective is to allow certification of plant producers and confidence that plants they produce have been grown under conditions of high biosecurity risk and hazard management, there remains the possibility a proportion of plants may contain biosecurity pests. Plant Pass and its partners accept no liability for claims regarding the presence of pests in any plants produced by registered and/or certified producers. While the objective of the Scheme's standards and guidance is to minimise the potential risk pest, no party can guarantee that adherence to these standards and guidance will reduce such risk to zero.

PLANT PASS SCHEME

Plant Pass Guidance
Support materials and forms

This document collates Plant Pass standalone guidance materials and templates.

Contents include:

- **Standalone Guidance Sheets**
  - Plant Pass Resources
  - Role Description Scheme Implementation Manager
  - Staff Induction
  - Staff Training
  - Toolbox meeting
  - Signage
  - Visitors
  - Sanitation Procedures
  - Crop Monitoring Procedures
  - Pest identification and diagnostics
  - Traceability procedures
  - Propagule Collection
  - Growing Areas - boundary control
- **Form Templates**
  - Nursery details
  - Staff Training Record
  - Toolbox meeting
  - Visitor Record
  - Self-Assessment and Corrective Action record
  - Hygiene procedure checklist
  - Crop monitoring record
  - Inwards goods inspection
  - Trusted Supplier List
  - Plant Source record
  - Growing media goods inspection

Editable Microsoft Word copies are available – contact the Plant Pass (interim email john@nzppi.co.nz)

Plant Pass Resources

Contents

1. Plant Pass Support 1
2. Plant Pass Scheme Documents 1
3. Specific Modules 1
4. Additional Plant Pass Materials 1
5. New Zealand and international biosecurity and best practice materials 2

Items listed in **orange** and key starting documents for producers starting off with the Plant Pass.

1. Plant Pass Support

Plant Pass is working on support mechanisms. In the meantime, the workshops and micro-credential above are a good start.

2. Plant Pass Scheme Documents

- **Scheme Overview** – the what, why and how.
- **Entry Checklist** – 20 Steps to tick off for better biosecurity management – a starting point for producers.
- **Nursery production Flow** – how plants and risk move through a "typical" nursery.
- **Hazard Management Checklists** – the Audit checklists. Provide good prompts for identifying key issues.
- **Core Standard** – Plant Pass certification criteria.
- **Plant Pass Guidance** – a huge amount of material that you can work though as you build your system.
- **Nursery Manual Template** – useful to get started on procedures and records manual.
- **Scheme Rules** – certification and Plant Pass system rules.

3. Specific Modules

For producers growing specific crops or at risk from specific pests.

- Myrtle Rust Specific Module
- Phytophthora Specific Module
- Kauri Dieback Schedule

4. Additional Plant Pass Materials

The Scheme has additional materials that will help too:

- **Standalone Guidance Sheets**
  - **Getting Started**
  - Plant Pass Resources
  - Role Description Plant Pass Scheme Implementation Manager
  - Staff Induction
  - Staff Training

  - Toolbox meeting
  - Signage
  - Visitors
  - Sanitation Procedures
  - Crop Monitoring Procedures
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  - Trusted Supplier List
  - Plant Source record
  - Growing media goods inspection

5. New Zealand and international biosecurity and best practice materials

Videos

- Nursery and Garden Industry Queensland
  https://www.youtube.com/user/NGIQvideo/videos
- Greenlife Industry Australia
  http://nurseryproductionfms.com.au/video
- Farm Biosecurity Australia
  https://www.farmbiosecurity.com.au/videos/

Information Guides

- Greenlife Industry Australia Nursery Papers – Twenty plus years of nursery best practice research and guidance
  https://www.greenlifeindustry.com.au/Section?Action=View&Section_id=46
- Farm Biosecurity Australia
  https://www.farmbiosecurity.com.au/
- Australia's Nursery Production Farm Management System – a huge resource
  http://nurseryproductionfms.com.au/downloads/
- Phytosphere 2016 – BMPs for Producing Clean Nursery Stock – Comprehensive protocols in light of California's Sudden Oak Death disaster.
  http://phytosphere.com/BMPsnursery/Index.htm
- Kiwifruit Vine Health – Protocols applicable to kiwifruit nurseries that provide insight for all nurseries.
  https://www.kvh.org.nz/indnurseries

Manuals

- BioSecure HACCP 2017 – Australia's Nursery Production Biosecurity Manual. https://www.greenlifeindustry.com.au/Category?Action=View&Category_id=127
- Nursery Industry Accreditation Scheme, Australia (NIASA) - guidelines of 'best practice' in production nurseries http://nurseryproductionfms.com.au/niasa-accreditation
- FERA 2012 – UK Biosecurity Best Practice for Nurseries, Retailers and Landscapers. www.botanicgardens.eu/downloads/nurseriesbiosecuritysmall.pdf
- Safe Procurement and Production Manual - A Systems Approach for the Production of Healthy Nursery Stock – Oregon USA https://cdn.ymaws.com/www.oan.org/resource/resmgr/imported/pdf/SafeProduction.pdf

Suggestions for use

- Review and update this template for your situation and needs

Plant Pass Scheme Implementation Manager

Summary: This position involves managing our biosecurity risk and hazard management system (biosecurity programme). It includes designing and implementing effective biosecurity procedures, site-specific risk management protocols and procedures, and training of nursery personnel.

The Plant Pass Scheme Implementation Manager will also undertake overall administrative oversight and adaptation of the biosecurity programme to ensure nursery is compliant with the Plant Pass Scheme (Scheme) and addressing changing risks.

Duties and Responsibilities:

1. **Continuous improvement** - Implement, reassess and modify the biosecurity programme as necessary to ensure the requirements are continually satisfied.
2. **Biosecurity programme supervision** – work with nursery manager to ensure all biosecurity programme procedures are being followed and recorded.
3. **Operations review** - Review and update all biosecurity programme records on a quarterly basis and implement corrective actions where necessary (does not necessarily have to perform all the monitoring or corrective action, but rather ensure accountability with nursery managers and employees).
4. **Staff Training** - Educate employees and key personnel in all policies and procedures as they relate to the biosecurity programme. Training will be included in induction process for new employees and annually for all employees.
5. **Corrective Action** - Take corrective action when necessary in consultation with the nursery managers.
6. **Significant non-compliance** - Report significant lapses biosecurity programme performance (example, con-compliance against Plant Pass critical level elements) and corrective action plans to the Nursery Manager as soon as they become apparent.
7. ….

Suggestions for use

- Review and update this template for you own use – add, extract or modify
- Build this process into your broader staff induction processes

Staff Induction

Date			
Staff member		Signature	
Person undertaking induction		Signature	

[**Nursery Name**] is a member of the Plant Production Biosecurity Scheme and we work hard to keep pests and diseases out of our nursery, to stop them spreading through the nursery and to prevent them from being spread with the plants we ship to out customers.

Pests can be introduced or spread by, from or on:

- People – including staff and visitors
- Vehicles and equipment
- Plants and soil
- Packaging for materials we buy or plants we ship
- Neighbouring properties
- Weather – especially the wind
- …

We've procedures to help manage these risks

You can help keep pests out and stop them spreading by

1. Knowing what to look for

- **Report anything unusual to your supervisor**
- **Report Pests** – insects, caterpillars, mites, bugs, egg masses, ants, skinks, weeds, animals
- **Report pest signs and symptoms** – discoloured, chewed, eaten or wilting foliage, weed seed, stem wounds, weeping wounds
- ….

2. Adopting a high level of personal biosecurity hygiene

- **Arrive Clean, leave clean**
- Before you leave home, check clothing and footware for plant and soil materials
- If practical, leave work clothing and boots at work
- Wash your hands before you start work, before and after breaks
- Before you leave work, check clothing and footware for plant and soil materials and wash your hands
- ….

3. … what (if anything)

- ….

Suggestions for use

- Review and update this template for you own use – add, extract or modify
- Build this process into other induction processes
- It will be helpful to make this form more visual - e.g. include images of unwanted organisms, standard symbols for activities such as hand washing, or photos of your staff following your biosecurity procedures

Staff Training

[**Nursery Name**] is a member of the Plant Pass Scheme and we work hard to keep pests and diseases out of our nursery, to stop them spreading through the nursery and to prevent them from being spread with the plants we ship to out customers.

Pests can be introduced or spread by, from or on:

- People – including staff and visitors
- Vehicles and equipment
- Plants and soil
- Packaging for materials we buy or plants we ship
- Neighbouring properties
- Weather – especially the wind
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- Before you leave home, check clothing and footware for plant and soil materials
- If practical, leave work clothing and boots at work
- Wash your hands before you start work, before and after breaks
- Before you leave work, check clothing and footware for plant and soil materials and wash your hands
- ….

3. … **what** (if anything)

- ….

POSTER

Personal biosecurity hygiene

Arrive Clean – Leave Clean

- ☐ Before you leave home, check clothing and footware for plant and soil materials
- ☐ Wash your hands before you start work
- ☐ Wash your hands before and after breaks
- ☐ Before you leave work
    - o Check clothing and footware for plant and soil materials
    - o Wash your hands
- ☐ If practical, leave work clothing and boots at work
- ☐ As you move from one part of the nursery to another, check clothing and footware for plant and soil materials
- ☐ Don't bring gloves from home, don't take gloves home
- ☐ …

Keeping staff up to date

- Use this list during the year in reminder sessions
- Make a list of information you want/need to address during the year and when - schedule biosecurity meetings in your annual calendar
- Use your regular staff or Toolbox meetings to discuss these issues – examples
    - o Talk about seasonal pest issues at the start of the season
    - o Pick a random pest issue to discuss
    - o Run through a hygiene procedure
- Gather images of pest issues, signs and symptoms. Display them in the staff room, talk about them at staff meetings
- Have a process to communicate any changes to staff
- Keep notes of things discussed at these meetings
- …

Record keeping

Option 1 - Training Register

Record of who undertook what training and when – example

Date		Employee Name	Subject	Training undertaken	Trainee Signature	Trainer Signature

Option 2 - Work Procedure or Key Issue Information briefing

Or, if you've procedures or other documents staff are to be trained in, a training register can be included at the back of the document, and a printed copy signed. This also has the advantage of keeping track of whether staff are trained in the latest version - example

Procedure or Issue [ABC]

1. Procedure step or issue 1
2. Procedure step or issue 2
3. ….

… and on the last page

I have had this Procedure / Issue explained to me and understand it:

Name	Date	Signature

Record of staff toolbox meeting

Meeting details

Nursery name:	
Meeting held at:	Date:
Meeting conducted by:	Signed:

Persons attending

Issues covered

Action required

Action	Responsible	Timeframe

Suggestions for use

- Review and update this template for you own use – add, extract or modify

Toolbox meetings

Toolbox meetings are common in a workplace health and safety context. Use them to introduce biosecurity risk management concepts and actions.

- Pick a section from the PPBS Core Standard, PPBS Guidance and/or a Specific Module and highlight issues relevant to your nursery.
- Use information in the PPBS staff induction and training templates during the year in reminder sessions
- Make a list of information you want/need to address during the year and when - schedule biosecurity meetings in your annual calendar
- Use your regular staff or Toolbox meetings to discuss these issues – examples
    - Talk about seasonal pest issues at the start of the season
    - Pick a random pest issue to discuss
    - Run through a hygiene procedure
- Gather images of pest issues, signs and symptoms. Display them in the staff room, talk about them at staff meetings
- Have a process to communicate any changes to staff
- Keep notes of things discussed at these meetings
- …

Record keeping

Toolbox Meeting

Nursery name:	
Meeting held at:	Date:
Meeting conducted by:	Signed:

Persons attending

Issues covered

Action required

Action	Responsible	Timeframe

Signage

Visitor signage can

1. Highlight the importance of biosecurity risk issues and management within the nursery
2. Indicate that entry is restricted to permitted persons only
3. Show visitors where to park
4. Direct visitors to the office or provide contact details for a visitor to register presence

Some simple approaches can be effective and include some or all these elements.

VISITORS **Please Respect Nursery Biosecurity** Vehicles, equipment and people can carry pests and diseases **Follow signs to parking area** **Report to the office**	**VISITORS** **Please Respect Nursery Biosecurity** Vehicles, equipment and people can carry pests and diseases **Phone _____ to visit**
VISITORS **Please Respect Nursery Biosecurity** Vehicles, equipment and people can carry pests and diseases **Follow signs to parking area** **Phone _____ on arrival**	**BIOSECURITY AREA** **No unauthorised access** **Phone _____ before entering** Vehicles, equipment and people can carry pests and diseases
DO NOT ENTER Contact _____for access	**DO NOT ENTER NURSERY** Authorised access only Call _____

Signs are available for purchase from commercial providers – undertake a google search for "biosecurity signs".
You can design your own - undertake a google search for "biosecurity signs" and check out the "images" tab for ideas.

And this from Kiwifruit Vine Health	

Suggestions for use

- Review and update this template for you own use – add, extract or modify
- Use it with your sign-in book, as signage near you front door or gate or as a poster in your reception area.

Visitor Information

Please help us protect our nursery

[**Nursery Name**] is a member of the Plant Production Biosecurity Scheme and we work hard to keep pests and diseases out of our nursery, to stop them spreading through the nursery and to prevent them from being spread with the plants we ship to out customers.

Pests can be introduced to our nursery via:

- People
- Vehicles and equipment
- Plants and soil
- Neighbouring properties
- …

  Extra risk - These risks are increased if you have recently visited other nurseries, horticultural properties, been in parks and gardens or returned from overseas.

You can help us protect our nursery by:

- **Arriving clean, leaving clean**
- Parking in the designated area
- Checking your clothing and footware for plant and soil materials before entering
- Signing in when you arrive, signing our when you leave
- Telling us of you have undertaking any of the extra risk activities above
- Keeping out of our production areas unless authorised and if we require, accompanied by a staff member
- Keeping to path and roadways
- Following biosecurity and other access signage
- …

Guidance – refer Core Standard 6.5 and 7.2

- Having visitors, including contractors, sign-in on arrival is not mandatory under Plant Pass. But it's very helpful. That way you know who's visited if any followup is required.
- Contractors may have visited another nursery before yours.
- It's good to know where visitors and contractors go on your property if they access production areas – again, you can followup if there is a need.
- If visitors handle plants, treat them as you do workers … clean hands, clothing, footware, tools and equipment.
- Inspect vehicles that enter production areas rigorously. Wash and sanitise if there's any hint of soil or plant debris, especially if they have recent visited extra risk areas (above).

Sanitation Procedures

This paper collects information to assist plant producers ensure that production materials, tools, equipment and facilities are clean and do not contribute to the entry and spread of pathogens into and through the nursery.

Operator and Product Safety

- Chemicals and treatments discussed in this paper can pose safety hazards to workers and the environment.
- Product label and Material Safety Data Sheet (MSDS) information takes priority over the guidance provide here and elsewhere.
- Use the materials as directed on the product label and/or the MSDS.
- Ensure operators use appropriate personal protection equipment (PPE).
- Follow label and MSDS instructions when storing concentrated solutions, preparing working solutions and disposing of waste or spent solutions.
- If using a new product that may contact plants test it on a small scale first to check any toxic effect on plants.

1. Chemical options

- **Chlorine bleach (Sodium hypochlorite)** – available under a range of brand names including Janola®. The sodium hypochlorite in diluted solutions breaks down quickly; prepare these solutions fresh each day. Often used as a 0.5% active chlorine solution[1] (Phytosphere 2016). Bleach solutions are corrosive and are not advised for use on metal surfaces.
- **Quaternary ammonium compounds** (QACs) – also available under a range of brand names, search for quaternary ammonium compounds - several commercial "moss and mould" are QACs. Usage concentrations and exposure times will be described on the product label. They have the advantage a leaving a residual active film on undistributed surfaces.
- **Alcohol solutions** – example 70% methylated spirits and 30% water.

Factors to consider when using chemical agents include:

- Solution coverage and contact time with the item being sanitised is important. Either fully immerse or thoroughly coat the item with a film of the sanitising solution.
- Solution effectiveness declines with time. Prepare working solutions fresh daily unless the product label/MSDS indicates the solution is longer-lived.
- Solution effectiveness also declines in presence of soil, growing media and plant materials – brush and/or wash equipment prior to sanitising.
- Some sanitising solution options are corrosive, check the label/MSDS.
- Check compatibility with other chemicals used on the equipment, example detergents.

[1] **Preparation** – if chlorine bleach solution is 5.25% (eg Janola®), a working solution of 0.5% available chlorine is made by taking 1part of concentrated bleach and adding to 9 parts of water – eg 100ml bleach plus 900ml of water. See dilution rates for other bleach concentrations in Phytosphere 2016.

- For organic production, check suitability with the likes of BioGro prior to use - www.biogro.co.nz

2. Heat treatments

- Steam sterilisation
- Hot water
- Dry heat
- Solarisation

Effectiveness varies with method, contact time and temperature. Example:

Moist media/soil, 30 minutes at	Organisms killed
120°F (49°C)	Water moulds (oomycetes, including *Phytophthora* and *Pythium*), nematodes
145° F (63°C)	Most plant pathogenic fungi, bacteria, and viruses, worms, slugs, centipedes
160° F (71°C)	Plant pathogenic bacteria, soil insects
180° F (82°C)	Weed seeds
212° F (100°C)	Heat resistant plant viruses and weed seeds

(Phytosphere 2016)

Solarisation often uses greenhouses or storage under clear glass. Treatment times vary with temperatures achieves and require at least 4-6 weeks where daily target temperatures of at least 50°C are achieved (Phytosphere 2016).

3. Applications

A systematic approach to cleaning and sanitising materials, tools, equipment and vehicles applies layers of activity as risk or sensitivity of production steps increase. Adopt a stepwise approach.

Tools, equipment, work surfaces and vehicles

1) **Clean everything** – brush off soil, media and plant materials. Wash with water and soap/detergent if residual material remains after brushing.
2) **Wash all equipment and tools** – with water and soap/detergent. Use a QAC (2000ppm) if vehicles are likely to enter or be used in sensitive growing/production areas, eg propagation, growing media handling or preparation.
3) **Wash all vehicles and machinery that enter nursery production areas** - with water and soap/detergent, including underside. Establish a washdown area that drains away from growing areas. Use a QAC (2000ppm) if vehicles are likely to enter or be used in sensitive growing/production areas, eg propagation, growing media handling or preparation.
4) **Sanitise anything exposed to plant roots** – includes work and production surfaces. Chlorine and QACs have proved effective. Clean and wash water and soap/detergent first.
5) **Sanitise work surfaces that are exposed to plant wounds** - Chlorine, QACs and alcohol have proved effective. Clean and wash water and soap/detergent first. Rinse with water after treatment. For smaller areas, a spray bottle can be effective of using alcohol.

- Chlorine – 0.5% active chlorine for at least 1 minute – do not use on steel benches.
- QAC – 2000ppm for at least 1 minute.
- Alcohol – spray to wet and allow to dry before use.
- (ref Phytosphere 2016)

6) **Sanitise cutting and pruning tools** - Chlorine, QACs and alcohol have proved effective. Clean and wash first removing all debris and sap. Rinse with water after treatment. A spray bottle can be effective if using alcohol.

- Chlorine – 0.5% active chlorine for at least 1 minute – do not use on steel benches.
- QAC – 2000ppm for at least 1 minute.
- Alcohol – spray to wet and allow to dry before use.
- (ref Phytosphere 2016).

Worker hygiene

- Wash hands with a disinfectant soap – eg Sunlight, Savlon, Dettol, before and after work and breaks
- Use disposable gloves or wash with a disinfectant soap between nursery operations and if working in sensitive areas, between crops and batches.
- Change footware between sensitive areas or scrub with 2000ppm QAC
- Change outer clothing between sensitive areas and wash after each days use.
- (ref BioSecure HACCP 2017).

Plastic containers (pots, bags, trays) for reuse

- If reused, containers represent a high risk for pathogens being passed from one crop to another.
- Brush and rinse to remove all soil and organic matter.
- Container stacking should be loose enough to enable full sanitiser contact with all surfaces.
- For chemical and hot water options, some agitation may be required to break up bubbles on surfaces that would prevent sanitiser getting to all surfaces of the pot (SOD 2016, Phytosphere 2016).

Options

- Chemical sanitising solutions - fully immerse containers (SOD 2016, Phytosphere 2016).
  - Chlorine - 0.5% active chlorine for at least 5 minutes.
  - QAC – 2000ppm for at least 1 minute.
- Steam pasteurisation – aerated steam at 60°C for 30 minutes (BioSecure HACCP 2017).
- Hot water treatment – fully immerse containers at 70°C for at least 30 minutes. (SOD 2016, Phytosphere 2016).

Note that “washing and storage” is not effective against some pathogens – example phytophthora species, whose oospores are robust and long-lived.

4. References

… and information on procedures used elsewhere:

- BioSecure HACCP 2017 – Appendix A1.5 Cleaning and Disinfestation Procedures – purchase here https://www.greenlifeindustry.com.au/Category?Action=View&Category_id=127
- Greenlife Industry Australia Nursery Papers – search for “hygiene” here https://www.greenlifeindustry.com.au/Section?Action=View&Section_id=46
- Kiwifruit Vine Health — KPCS Best Practice Fact Sheet, Nursery Hygiene - https://www.kvh.org.nz/vdb/document/100462
- Phytosphere 2016 — Phytosanitary Procedures for BMPs for Producing Clean Nursery Stock - http://phytosphere.com/BMPsnursery/phytosanShell.htm
- SOD 2016 - Working Group for Phytophthoras in Native Habitats Guidelines to Minimize Phytophthora Pathogens in Restoration Nurseries https://www.suddenoakdeath.org/wp-content/uploads/2016/04/Restoration.Nsy_.Guidelines.final_.092216.pdf

Crop Monitoring Procedures

Systematic crop monitoring increases the likelihood of pests being detected early and the opportunity for intervention before crops are substantially impacted or become unsaleable. This paper provides guidance to assist plant producers develop and implementing a crop monitoring plan and procedures.

1. Plan

- **Frequency** - Plan to undertake formal monitoring on a fortnightly basis. This may need to be shortened through periods of high risk (high pest likelihood, rapid growth, high humidity …) and in high risk areas (example greenhouses, near boundaries), and may be extended during lower risk periods and in lower risk areas.
    - In larger nurseries, a whole of nursery approach may be impractical. Divide the site up into smaller monitoring areas and plan to get through the entire nursery at least each month, undertaking monitoring of s portion of the smaller areas each week.
- **Preparation** - Gather information on pests of concern (these will vary by plant type and season) and on issues that have arisen in the past – review prior monitoring results in case of annual or seasonal threats.
- **Personnel** - Workers who undertake monitoring should be aware of what to look for, where and when it is likely to be found.
    - Establish the procedure as a standalone process rather than as part of other nursery activity.

2. Procedure

1. Begin inspections in highly sensitive and high-risk areas (example propagation) and move progressively to less sensitive lower risk areas.
2. Before inspecting individual plants, visually check the entire crop for unusual patterns in growth, foliage colour, vigour … Increase inspection vigilance of areas or individual plants that look unusual.
3. Walk through the growing area in a zigzag pattern varying the starting point through successive inspections.
4. From each group of plants[1], select 5 plants or trays of plants per 100m^2 of growing space. For blocks less than 100m^2, select 5 plants/trays.
5. Inspect leaves (top and underside), stems, buds, fruit, flowers looking for signs and symptoms of pests. For larger plants, look at material from top, middle and bottom.
6. Increase vigilance in high risk areas – near entrances to blocks/greenhouses, near pathways/tracks, exposed to prevailing winds, close to boundaries, waste storage, .

[1] A group of plants comprises plants of the same type (example hebes, prunus, grasses) growing in the same area at the same stage of production.

7. Where practicable, temporarily remove some plants from their pots and inspect the root ball looking for soil borne pests and/or unusual root growth condition or patterns.

3. If pests or signs and symptoms are detected

- Identify, or collect samples for later identification. If needed seek advice or submit a photo to the iNaturalist website (www.inaturalist.nz) where experts can assist in identification.
- Assess the portion of plants affected – do a rough count for % infected.
- Determine appropriate corrective action.
- Increase vigilance next time.

4. Corrective actions –

- Options will vary with your production system, the pest, the extent of infection and your customers' expectations and are likely to include all or some of the following.
    - Isolate crop and observe
    - Treat, spray
    - Remove and monitor
    - Remove and dump to bulk waste or deep burial, and preferably bagged before disposal
    - Accept if below "acceptable" threshold

5. A new pest?

If you suspect that you have detected a new plant pest, disease or weed, photograph the plant/pest, stop the inspection and quarantine the area.
Call the MPI's exotic pest and disease hotline on 0800 80 99 66.

6. Record keeping – record

- Date and time of inspection
- Who undertook the inspection
- Which production blocks were inspected
- The absence or presence of pests
- Which pests were detected where.
- Corrective action undertaken
- Any issues that were referred to a third party for identification and the outcomes of the referral.
- Records may be kept electronically, in a diary or on a recording sheet.
- Where useful the Plant Pass has a form template that you can adopt or adapt for record keeping.

7. Property survey

- While inspecting crops, look for issues near outside of the growing areas, near boundaries and on neighbouring properties. Follow up if issues are identified that may impact production crops.

8. Informal monitoring

- Workers who handle plants (example plant maintenance, order collation and dispatch) are in an ideal position to supplement formal monitoring. Work to increase their awareness of what to look for (which may be as simple as anything unusual) and what to do if they suspect anything.

9. References

- BioSecure HACCP 2017 – Appendix A1.8 – Pest, disease and weed crop monitoring procedures – purchase here https://www.greenlifeindustry.com.au/Category?Action=View&Category_id=127
- Greenlife Industry Australia Nursery Papers – July 2015 Nursery Production Pest Monitoring, Inspection and Surveillance Methodology https://www.greenlifeindustry.com.au/Story?Action=View&Story_id=2254
- Kiwifruit Vine Health – KPCS Best Practice Fact Sheet, Monitoring, sampling and testing - https://www.kvh.org.nz/vdb/document/100461
- Phytosphere 2016 –BMPs for Producing Clean Nursery Stock - Inspection and testing http://phytosphere.com/BMPsnursery/BMP6_6insptest.htm

Pest identification and **diagnostics**

Found something you can't identify or looking for information to take to a team toolbox meeting. Here's material and information that will help.

Contents

1. Identification - Web collections of pest information 1
2. Identification - iNaturalist 2
3. Diagnostics - Direct testing of roots with immunoassay test strips 2
4. Diagnostics - Laboratory Services 3

1. Identification - Web collections of pest information

Our undesirable (and unwanted) pests parallel those of many other horticultural industries. The links that follow lead to images, posters and/or information about a wide range of pests.

- **MPI - Priority pests and diseases of biosecurity concern to plant and aquatic health**
  https://www.biosecurity.govt.nz/protection-and-response/finding-and-reporting-pests-and-diseases/priority-pests-plant-aquatic
- **Kiwifruit's Most Unwanted**
  https://www.kvh.org.nz/vdb/document/104848
  You can get this in poster form – contact KVH, info@kvh.org.nz
- **Avocado pests**
  https://industry.nzavocado.co.nz/about-us/biosecurity/established-avocado-pest-fact-sheets/exotic-pest-fact-sheets
- **Grapes**
  http://www.vitpractice.co.nz/Disease_gallery.html
- **Brown Marmorated Stink Bug**
  https://www.mpi.govt.nz/protection-and-response/responding/alerts/brown-marmorated-stink-bug
- **Fruit flies**
  https://www.biosecurity.govt.nz/protection-and-response/responding/alerts/fruit-flies
- **Australia's Top 40 Unwanted pests**
  http://www.agriculture.gov.au/pests-diseases-weeds/plant
- **Common Pests of Nursery Crops – USA**
  https://pnwhandbooks.org/insect/hort/nursery/common
- **Pest Facts Sheets – Australia**
  https://www.greenlifeindustry.com.au/Category?Action=View&Category_id=682
- **KiwiCare - Top 20 Worst Garden Pests**
  https://www.kiwicare.co.nz/advice/garden/top-20-garden-pests

2. Identification - iNaturalist

- iNaturalist (www.inaturalist.nz) is a community-based website where experts can assist in identification of pests. Thousands have submitted photos of things they've found in nature. Sometimes they've provided identification, sometimes the community has responded to an unknown and provided an identification. This is a good place to start!

3. Diagnostics - Direct testing of roots with immunoassay test strips

- Useful for quick diagnostics in the nursery, and for an early indication of presence/absence of *Phytophthora* and can help a plant producer determine if they have an issue that warrants lab submission.
- They are intended for use with plant material (not soil) and cross-reactivity with Pythium is possible.
- If the immunoassay strips are consistently positive, consider sending the used strips (with plant material also) for species-specific diagnostics in a laboratory. Do this within 1-2 days of test so that the detected pathogen does not degrade.

More Information

Agdia Immunoassay strips

- Info: orders.agdia.com/agdia-immunostrip-for-phyt-isk-92601
- User guide: d163axztg8am2h.cloudfront.net/static/doc/e2/61/b5ef70805734d56ceb7a18ce3ded.pdf
- NZ agent - www.ngaio.co.nz/product/immunostrip
- Agdia have Immunoassay strips for wide selection of plant pathogens orders.agdia.com/pathogen-tests/immunostrip-tests

Pocket Diagnostics

- Info: pocketdiagnostic.com/onlineshop/pocketdiagnostic/phytophthora-single-2/
- User guide: 38r2m93jq0me13tr972aqsan-wpengine.netdna-ssl.com/wp-content/uploads/2014/08/PD-IFU-v2.01.pdf
- Phytophthora Usage Data sheet: 38r2m93jq0me13tr972aqsan-wpengine.netdna-ssl.com/wp-content/uploads/2017/08/Phytophthora-spp-datasheet-v3.00.pdf
- Australian Agent - arborcarbon.com.au/products.html - select plant disease diagnosis

About the technology

- https://www.envirologix.com/news/how-immunoassays-work/
- https://en.wikipedia.org/wiki/Lateral_flow_test

A discussion on limitations

- http://phytosphere.com/BMPsnursery/test3_1direct.htm

4. Diagnostics - Laboratory Services

Plant Health and Environment Laboratory – PHEL
• Entomology (insects, mites, spiders).
• Mycology (fungi).
• Bacteriology.
• Virology (viruses, viroids, phytoplasmas, liberibacters).
• Botany (terrestrial and aquatic, GMO).
• Nematology (contracted via Landcare Research).
Key diagnostic methods include:
• Mophological identification
  o Microscopy
  o TEM
• Molecular
  o Real-time PCR
  o Conventional PCR (including nested)
  o High through-put sequencing (HTS)
  o DNA barcoding
  o Sequencing (direct and cloning)
  o Phylogenetic analysis
• Serological
  o ELISA
  o Lateral flow device
• Bioassays
  o Herbaceous indexing
  o Graft indexing
  o Grow-out tests
  o Pathogenicity testing
• Seed wash test
• Seed plate testing
• Selective plating
• Soil baiting
	A: 231 Morrin Rd, St Johns, Auckland 1072
	P: 0800 008 333
	W: mpi.govt.nz/protection-and-response/laboratories/plant-health-and-environment-laboratory
	Includes test range, price list and sample submission information

Plant Diagnostics Limited Diagnosis of plant disease Issues on plants, soil and water for plant producers. • Testing for fungal, bacterial and some viral pathogens in plant material. • Testing for selected diseases (including Phytophthora) in soil/potting mix. • Testing for fungi/bacteria in re-circulating water. • Testing for pathogens in irrigation water. • Testing for nematodes in plant and soil/potting mix. • Special research projects, consultancy and surveys to help solve plant health problems. Client reports provide an interpretation, a pictorial record, management advice when required. Visit the Plant Diagnostics website for further detail of the full range of services. Pricing is by application following discussion of requirements. Contacts: • Mark Braithwaite 027 9479450 • Lewis Braithwaite 027 7126307	A: 185 Kirk Road, Templeton, Christchurch 7678 P: 03 377 9026 E: enquiries@plantdiagnosticslimited.co.nz W: plantdiagnosticslimited.co.nz Includes test range and sample submission information

Scion's Forest Health Reference Laboratory Identification and diagnosis of pest and pathogens of woody plants, including forestry species, natives, and amenity trees.	A: Forest Health Reference Laboratory, Scion, 49 Sala Street, Whakarewarewa, Rotorua 3046 *P:* 07 343 5513 (or Scion Reception 07 343 5899) E: fhdiagnostics@scionresearch.com W: scionresearch.com/forest-health-diagnostics
Hill Laboratories Analytical services across a wide range of agricultural, environmental and food substrates and tests.	A: Private Bag 3205, Hamilton 3240 P: 0508 44 555 22 E: mail@hill-labs.co.nz W: hill-laboratories.com/analytical-testing Includes test range, price list and sample submission information
Linnaeus Diagnostic testing and research and development activities in the areas of plant and soil health, and water, air and food quality.	A: 4 Banks Street, Gisborne 4010 P: 0800 25 46 62 E: shanna@linnaeus.co.nz W: linnaeus.co.nz Includes services and test range information
AsureQuality Services in plant pathology (disease), entomology (insects, mites …) and nematology to diagnose plant and seed diseases, and invertebrate pests. Services include pathogen testing of irrigation water – contact the Plant Health Lab, Lincoln.	W: asurequality.com/our-industries/horticulture/pest Includes test range, price list information and order forms **Entomology and nematology** A: PestLab, AsureQuality, 131 Boundary Road, Blockhouse Bay, Auckland P: 0508 00 11 22 E: pestlab@asurequality.com **Pathology** A: Plant Health Lab, AsureQuality, South Drive, Lincoln University, Canterbury P: 0508 00 11 22 E: pathology@asurequality.com
AgResearch Biocontrol & Biosecurity team Arthropods and insects.	C: Dr Sofia Orre-Gordon P: 07 838 5802 E: Sofia.Orre-Gordon@agresearch.co.nz
Bio-Protection Research Centre Expertise across entomology (insects), microbiology (disease) and weeds.	A: PO Box 85084, Lincoln University, Lincoln 7647 P: 03 423 0932 E: bioprotection@lincoln.ac.nz W: bioprotection.org.nz

Plant and Food Research
PFR has over 650+ science staff spread across 14 sites in New Zealand. PFR undertakes plant pest and disease diagnostics in the following areas:
• Diagnostic assay and protocol development for exotic and established pests and diseases. Examples include:
  o Psa pathovar and strain identification
  o Grapevine Leaf Roll Virus 3 strains
  o *Candidatus* Liberibacter solanacearum
  o *Ceratocystis*
  o *Sphaceloma perseae*
  o *Guignardia citricarpa*
• PFR uses a number of different approaches and techniques including:
  o qPCR
  o ddPCR
  o LAMP
  o Developing presence/absence assays or quantification assays
  o Assays based on whole genome comparisons or more targeted ITS-based assays
• Typically, our key involvement is in the development phase of the assays, but we also run a more limited number of diagnostic services on behalf of industry/clients for targeted pests and diseases (example, grapevine viruses, phytophthora) to help rule in or rule out the presence of a target organism.
• PFR also undertake plant cultivar susceptibility testing against target organisms of interest.
	A: 120 Mt Albert Research Centre, Sandringham, Auckland
	P: +64 21 226 8163
	E: robin.macdiarmid@plantandfood.co.nz
	W: plantandfood.co.nz/page/our-research/bioprotection/products-systems/diagnostics-detection and plantandfood.co.nz/page/our-research/bioprotection/products-systems/plant-virus-testing

Manaaki Whenua – Landcare Research Identification (morphological and molecular) of plants, fungi, micro-organisms, and invertebrates.	E: Plants. Plantinfo@landcareresearch.co.nz E: Fungi. PDD@landcareresearch.co.nz E: Microorganisms. ICMP@landcareresearch.co.nz E: Invertebrates. NZAC@landcareresearch.co.nz W: landcareresearch.co.nz/resources/laboratories/biological-diagnostics Includes test range, price list and sample submission information

Traceability Procedures

Recording the source of plant materials and how they progress through the nursery and through to the customer or planting site allows rapid location of potential infection sources, impacted crops and nursery areas or distribution sites if a pest is detected at any stage of production or at the source of distribution site.

The Plant Pass Scheme requires a producer to be able to trace all input materials one step back (where they came from), and in the case of plant materials their progression through the nursery and who/where they were distributed to (one step forward).

1. Plant Sources

Source records will vary with how a producer sources plant material:

- Seed & cutting collection – where did the seed/cuttings come from, who collected them and when.
- Plant materials sourced from another nursery – who that nursery was, when were they supplied (the supplying nursery should have similar records so that they can go back to their plant source).

2. Plant Dispatch

Dispatch records should identify where or who the plants were shipped to. It will vary with the nature of the business:

- Plants supplied to another party will identify who that party was (eg Smiths Garden Centre, ABD Landscaping Services, XPY Project, Kens Plant Brokers), the immediate shipping address and date of supply. If this third party distributes them further, tracing further will rely on their records.
- If you are planting them directly in the field – you'll record an address or location and a planting date.
- An exception in the Plant Pass requirements is that where that where a producer sells plants directly to the public, names and addresses of purchasers are not required to be recorded

3. Progression of plants through the nursery production process and growing areas

Records of how plants progress through the nursery help identify where pest may have entered the nursery or a crop, what other crops or nursery areas might be infected and help target any corrective actions.

4. Production Batching

Wherever practicable handle plants in production batches to help track of things.

- Batch nursery production to at least species level from the start of the production process (and to cultivar level where applicable). This allows a biosecurity issue to be traced back to source and forward to identify what and where else the issue might impact.
- The Plant Pass Scheme defines a "batch" as "Plant material from a single source that is processed as one group for the purposes of production in the nursery". Examples include:
  - Collecting cuttings from stock plants on a given time and date.

  - Potting a group of seedlings in a single operation.
- Start "batching" at seed, cutting or other material collection steps, or upon the receipt of plant material from another nursery.
- Keep batches of plants together. For example, if you are propagating a single cultivar or seed line over a several days, treat each harvest of cuttings (or at the very least, each day's work) as an individual batch. When the potted, treat them separate batches. When the plants are dispatched keep records of each batch.
- Each production batch should be identifiable through each production step.
  - Give it a unique ID.
  - Example S375 for seed collection #375, hebespeciosa191020 for Hebe speciosa cuttings collected on 20-Oct-2019 etc.
  - Retain this identification through all nursery production steps. Most nursery production software systems can do this, spreadsheets can be used and a manual system with notebooks or record sheets can be developed
  - If a batch is split, give each sub-batch a new batch ID. Example:
    - Seed is collected and identified as S375 (for seed collection number 375).
    - Three sowings are made from this batch of seed. The resulting batches are identified as S375a, S375b and S375u.
    - S375a and S375b are each potted on in one potting step – the ID's S375a and S375b go with those batches and when they are sold or planted, those IDs are recorded with the invoice or other dispatch documents.
    - Seedlings from batch S375c are potted on two dates – batches that arise are identified as S375c1 and S375c2. These new IDs go with these crops through the production and dispatch cycle.
    - Using a system like this enables all plants from the one seed collection to be traced forward/back even though it has been split into four separate batches.
- **If the above is not practicable**, maintain records to give you the greatest chance of being able to identify where a crop/batch/species was/is grown in the nursery. If needed, this would identify where to look for sources or impacts of problems.

5. Dispatch Records

Dispatch record should identify the batch that each of the plant species came from. This information does not have to be on the customers invoice or dispatch document, but should at least be retained within a nursery database, spreadsheet or notebook.

If this is simply not possible, records could be maintained noting when a batch was sold – example April/May 2019. If trace back/forward was needed, this would help pinpoint sources and destinations.

6. Record keeping

Records can be kept in any fashion that enables easy recovery - electronically, in a diary or on a recording sheet.

Propagule Collection

Moving plants and plant materials into or through the nursery represents a major pest risk pathway.

When collecting propagation materials (propagules: seed, cuttings, divisions …) there are two main risks areas that apply whether you are collecting material from your own property or from off-site:

1. That you introduce a pest (insect, disease, weed (seed), hitchhikes (ants, skinks etc) …) into the collection area.
2. That you bring a pest back from the collection area.

Vectors include include vehicles, soil, personal gear, tools and the plant material.

1. Key principles

- Leave the nursery clean, arrive at the collection site clean (or from the collection site perspective, arrive clean, leave clean).
- The health status of the plants from which you are collecting seed in critical; achieve the highest level on confidence possible that propagation material is free of pests and diseases.
- Know and clearly identify the location where material was collected for traceability purposes.

2. Arrive clean – leave clean

Make up a simple checklist of the following that apply to your collection procedures.

Getting ready

To avoid introducing pests into the collection area, as you are getting ready check the following if they apply to how you are collecting material:

- Vehicles are clean and free of soil and plant debris - sweep vehicle trays, car boots and footwells. Vehicles could be sanitised before leaving if going into sensitive, or high-risk areas.
- Clothing and footware are clean – wear overalls and sanitise footware if going into sensitive, or high-risk areas.
- Tools have been sanitised.
- Collection bags/containers are clean.
- You have cleansing gear – hand wash, alcohol spray bottle (for tools), brush/shovel for vehicle.

Repeat the above when changing collection locations – that is, moving to a new collection site.

After collection

To avoid bringing pest back from the collection area:

- **Before leaving collection site** - clean things while onsite; ensure:
  - Any vehicles and tools are clean (free of soil, plant debris).
    - Cutting tools could be sanitised in alcohol.
    - Vehicles could be sprayed before leaving if retuning from high-risk areas.
    - Trays, car-boots and footwells in vehicles are high risk areas.
  - Clothing and boots are clean.
  - Collection bags/containers are clean – free of extraneous plant material.

- Upon returning to nursery – keep risk out of production areas.
  - Spray underside of vehicle if retuning from high-risk areas and not already done.
  - Sanitise footware, wash overalls.
  - Unpack gear and clean in an area isolated from main production.
  - Unpack, clean and prepare seed in an area isolated from main production.
  - Unpack and inspect other propagules in an area isolated from main production.
  - If they are to be reused, ensure collection bags/containers are clean – free of seed and other extraneous plant material.

3. Collect only in pest-free areas, from healthy, pest-free plants

Inspect general area and surrounding plants

- Look for unusual patterns in growth, foliage colour, vigour.
  - Weeds/seeds
  - Symptoms of stress or disease
  - Pests, egg masses ….

Inspect the plants you are collecting propagules from

- Check leaves (top and underside), stems, buds, fruit, flowers looking for signs and symptoms of pests.
  - Stress or disease.
  - Chewed leaves, lessons, leaf pitting, egg masses ….

Increase inspection rigour in high risk areas or for high risk species – examples, urban areas, near roads/pathways/tracks, exposed to prevailing winds or collecting say, myrtaceous species.

4. While collecting

- Sanitise tools between plants and species (especially for sensitive species or in high risk areas). 70% methylated spirits solution in a wash bottle works is an easy option.
- Wash hands regularly with soap and water or hand gel/foam, or wear disposable gloves
- Sanitise gloves, hands, tools if they contact soil.
- Avoid collecting material from branches near ground that may be subject to water splash, or near potting media in stock plants grown in containers.
- Avoid collecting seed from the ground
  - If fallen seed is essential, knock onto clean tarps placed on the ground or collect using seed traps. Isolate collected fallen seed and treat before use.

Sometimes propagation material is collected on an unplanned or “casual basis”, for example, while walking on the weekend. Take care to record where it was collected and undertake the appropriate “returning to nursery” procedures above when bringing the material back into the nursery.

5. Stock plant management

- Ensure stock plants are well fed, watered and free from pests and disease.
- Ideally, grow stock plants in containers in clean areas with generous spacing.
- Ideally, irrigate stock plants by trickle.
- Train plants so that cutting material is higher up.
- Remove, bag and bin diseased stock plants.

6. Traceability

Keep records of where plants materials are collected from. They should be sufficiently detailed so that the collection site can be re-located if necessary. This could include a GPS record, the name of the nursery stock bed, reference to a street number, filed block location, natural site. The more sensitive the species or higher the risk, the more specific the record likely needs to be – example kauri seed collection would lend itself to a GPS record.

7. Records

For each variety collected record:

- A unique identifier that can be used to track the material through the production system
- Genus, species and cultivar …
- The date and time
- The location of the source material
- The type of material – eg seed, seedling, cutting …
- Personnel
- Records may be kept electronically, in a diary or on a recording sheet.

8. References

- Phytosphere 2016 – BMPs for Producing Clean Nursery Stock – Clean planting materials http://phytosphere.com/BMPsnursery/BMP2clnplt.htm
- Greenlife Industry Australia Nursery Papers – December 2004. Hygiene in plant propagation https://www.greenlifeindustry.com.au/Attachment?Action=Download&Attachment_id=1593
- QEII National Trust biosecurity & field hygiene guidelines https://qeiinationaltrust.org.nz/wp-content/uploads/2018/06/BiosecurityProtocols.pdf
- NSW Environment Conservation Management Notes - Seed collecting https://www.environment.nsw.gov.au/research-and-publications/publications-search/seed-collecting-conservation-management-notes
- Australian Department of the Environment - Arrive Clean, Leave Clean https://www.environment.gov.au/system/files/resources/773abcad-39a8-469f-8d97-23e359576db6/files/arrive-clean-leave-clean.pdf

Boundary Management Guidance

Sometimes issues that impact a nursery originate offsite or along the property boundary. Seeds from weeds along boundaries and in upwind neighbouring properties can readily infest your nursery crops, and provide habitat for other pests – thrips, aphids, fungal diseases and viruses that can be spread by visiting insects. They can harbour skinks and ants in locations where these are a problem too. Runoff from surrounding properties can spread water-borne pathogens and weed seeds.

Take a systematic approach to boundary management assessing risks, removing them or putting measures in place to lessen their impact on your property and crops.

1. Weeds

- Assess weed risk along your boundary and in neighbouring properties.
- Actively monitor boundaries and remove/treat weeds early in their growth cycle, and certainly before the set flower or seed.
- Work with neighbours to manage weed threats that impact your nursery and crops. If this is not possible, increase surveillance of crops downwind of neighbours so that weeds can be detected and removed early.
- Consider increasing buffer zones inside the boundary or erecting a physical barrier (example windbreak) if wind-borne seeds are a problem.
- Look too for plants subject to the National Pest Plant Accord and your Regional Council's pest management plan, example, moth plants (*Araujia hortorum*). Report sightings of such pest plants to the Regional Council.

2. Runoff

- Shape land along and inside boundaries to ensure any runoff from neighbours is deflected away from growing areas.
- Work with neighbours to lessen the likelihood of wastewater and runoff ingress.

3. Being a good neighbour

- While issues from neighbouring properties may impact your nursery, so too can issues in your nursery impact neighbours.
- Actively monitor your boundary for issues that may impact neighbours … Undertake corrective action promptly … this will benefit both you and your neighbours alike.
- Keep your side of the boundary clean, tidy and free of weeds and other pests.
- Capture wastewater or runoff and direct to your own management area rather than allow it to leave your property and perhaps create problem downstream. Consider natural filtration systems, constructed wetlands, reed beds and the like to clean water before it leaves your property.

Suggestions for use

- Review and update this template to build your nursery details
- It'll likely fit on one page (plus map(s)) – add, extract or modify as necessary

Nursery details

Nursery Name: _____

Scheme ID # *to follow* _____

Physical Address: _____

_____

_____

Mailing address: _____ if different from above

_____

_____

Phone: _____

Email Address: _____

Nursery operator _____

Person responsible for the nursery:

Person responsible for implementing this biosecurity Scheme: _____

Person responsible Internal audits: _____

Number of people Working in nursery: **Permanent:** _____ Casual (peak period): _____

Production system

What is the production system that is used by your nursery (example containerised, undercover, field grown, combination or other)? The description of the production system should be enough for the reader to get an understanding of the operational process.

_____

_____

_____

_____

_____

Example: *ABC Nursery grows potted trees and shrubs for supply to landscapers throughout the Hawkes Bay. We operate out of two sites, one in Waipukurau (main propagation, production and growing site) and another in Taradale (mostly used to hold stock pending its use in nearby landscape works). We've a permanent staff of 5 and occasionally employ casual labour through peak periods.*

Specific Risk Crops, pests of pathways

- ☐ Myrtaceae species grown
- ☐ Phytophthora risk a specific concern
- ☐ Kauri (Agathis australis) gown

Productions sites

List all production sites (owned and leased). The area of each production site should be indicated in either square meters or hectares.

Location	Area
57 East Street, Waipukurau	*2.45 ha*
237 North Road, Taradale	*2,520m2*

Nursery map(s)

For each production site prepare a map locating key areas (if they exist) of the nursery such as:

- *Mother plants*
- *Isolation areas*
- *Areas for incoming plants*
- *Growing media preparation and/or storage areas*
- *Potting facilities*
- *Propagation area*
- *Production area (greenhouses, outdoor growing areas)*
- *Dispatch and shipping areas*

The map must show the numbers, letters or names that are used at the nursery to designate blocks, fields, rows or buildings. This information will be used in the inventory system to track plant movement at the nursery.

The maps can be an informal sketch, formal plans or notated aerial photographs. Key issue – does it clearly show the location of the areas noted above (if you have them in your nursery).

Staff Training Record

Nursery Name _____

Date	Employee Name	Subject	Training undertaken	Trainee Signature	Trainer Signature

Staff Training Record

Toolbox Meeting Record

Meeting details

Nursery name:	
Meeting held at:	Date:
Meeting conducted by:	Signed:

Persons attending

Issues covered

Action required

Action	Responsible	Timeframe

Visitor Record

Nursery Name _____

Pests can be introduced to our nursery via:	**You can help us protect our nursery by:**
• People • Vehicles and equipment • Plants and soil • Neighbouring properties **Extra risk** - These risks are increased if you have recently visited other nurseries, horticultural properties, been in parks and gardens or returned from overseas.	• **Arriving clean, leaving clean** • Parking in the designated area • Checking your clothing and footware for plant and soil materials before entering • Signing in when you arrive, signing our when you leave • Telling us of you have undertaking any of the extra risk activities above • Keeping out of our production areas unless authorised and if we require, accompanied by a staff member • Keeping to paths and roadways • Following biosecurity and other access signage

Date	Time arrived	Name	Organisation	Visiting	Areas of nursery visited	Time left

PPBS Checklist Self-Assessment and Corrective Action Record

Nursery Name _____

Date	Checklist Reference	Pass	Fail	Issue	Corrective action	Priority	Person Assigned	Date Due

PPBS Checklist Self-Assessment and Corrective Action Record

Suggestions for use

- Customise this template for areas in your own nursery – add, extract or modify
- Use it as a poster and/or checklist

Production Hygiene Checklist for _____ area

At the start of the day

Measure	Done	Signed off
Check clothing and footware for plant debris and soil		
Wash hands		
Spay cutting tools with 70% methylated spirits		
Spay and wipe propagation bench with 70% methylated spirits		
…		
…		

Between batches / work areas / production activities

Measure	Done	Signed off
Wash hands		
Spay cutting tools with 70% methylated spirits		
Sweep, spay and wipe propagation bench with 70% methylated spirits		
Sweep trailer		
Check clothing and footware for plant debris and soil as you move from one area to another		
…		
…		

At the end of the day

Measure	Done	Signed off
Wash cutting tools to remove any dirt and plant sap, spay with 70% methylated spirits		
Sweep, spay and wipe propagation bench with 70% methylated spirits		
Sweep potting shed floor		
Sweep and wash trailer and barrows		
Wash hands		
Check clothing and footware for plant debris and soil		
…		
…		

Crop Monitoring Record

Nursery Name _____

Date	Time	Inspection person	Nursery block	Crop type	Detections If none – record NIL			Corrective action	Date Followup completed
					Insects	Diseases	Weeds		

Inwards Goods Inspection Record

Nursery Name _____

Date	Supplier Name	Invoice # or other ID	Goods supplied	Inspection outcome		Corrective action (if rejected)	Inspector Signature
				Accepted	Rejected		

Trusted Supplier List

Nursery Name _____

Date	Supplier Name	Address	Phone / email	Contact	Goods supplied	Approved Signature

Plant Source Record

Nursery Name _____

Collection ID	Date	Plant variety	Material Type	Collection person	Source

Note – Collection person = who took cuttings, collected seed or inspected materials from another supplier. Source = who cutting/seed we collected, or name of other supplier

Growing Media Receipt and Inspection Record

Nursery Name _____

Date	Supplier Name	Invoice # or other ID	Media Type	Supplier quality check / test records received	Inspection outcome		Corrective action (if rejected)	Inspector Signature
					Accepted	Rejected		