



NEW ZEALAND

PLANT PRODUCTION
BIOSECURITY SCHEME

PPBS DOC #05

PPBS Core Standard

PPBS Core Standard

February 2020

[Interim Address]

PPBS

PO Box 3443, Wellington, 6140

P 04 918 3511, E office@nzppi.co.nz

Updates

The Plant Production Biosecurity Scheme (PPBS) 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 in 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 PPBS experience and/or new science inform the need for change. Revisions published on the Scheme's website [to follow] 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 PPBS or by email to [in the interim office@nzppi.co.nz].

Acknowledgements

The PPBS 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 PPBS to extract from and draw heavily upon their work and the Kiwifruit Plant Certification Scheme.

Disclaimer

While the PPBS's objective is to allow certification of plant producers and confidence that the 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. PPBS accepts no liability for claims regarding the presence of pests in any plants produced by registered and/or certified producers. While the objective of the PPBS 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.

Contents

1.	Purpose	5
2.	Introduction	5
3.	Definitions and Abbreviations.....	6
4.	9
5.	The Core Standard	9
6.	Part A: Nursery Essentials	12
6.1.	Nursery Details	12
6.2.	Management Responsibilities	12
6.3.	Worker Training	12
6.4.	Signage	13
6.5.	Visitors.....	13
7.	Part B: Biosecurity Management Fundamentals	15
7.1.	A Systems Approach.....	15
7.2.	Hygiene	16
7.3.	Crop Monitoring.....	16
7.4.	Traceability.....	16
7.5.	Trusted Suppliers and Inwards Supplies.....	17
8.	Part C1: Hazard Management – All Plant Production	19
8.1.	Transplant	19
8.1.1.	Plant Stock for propagation &/or planting	19
8.1.2.	Growing Media	19
8.1.3.	Fertiliser	19
8.1.4.	Containers (pots, bags, trays ...)	20
8.1.5.	Propagation.....	20
8.1.6.	Potting and re-potting	20
8.2.	Growing	20
8.2.1.	Growing Areas – all types	20
8.2.2.	Nutrition Amendment – top dressing and/or fertigation	21
8.2.3.	Crop Protection – pest, pathogen and weed control.....	21
8.2.4.	Weed Management	21
8.3.	Dispatch.....	21
8.4.	Plant Distribution and Transport.....	22
9.	Part C2: Hazard Management – Container Production	23
9.1.	Transplant – Container Production	23
9.1.1.	Transport to and Placement in Container Growing Area.....	23
9.2.	Growing – Container Production.....	23
9.2.1.	Growing Areas – container production.....	23
9.2.2.	Plant Handling – container production	23
9.2.3.	Irrigation – container production	24
10.	Part C3: Hazard Management – Bare Root & Field Production	25
10.1.	Transplant – Bare Root & Field Production.....	25
10.1.1.	Transport to and planting in field.....	25
10.2.	Growing – Bare Root & Field Production	25
10.2.1.	Growing Areas – bare root and field production	25
10.2.2.	Plant Handling – bare root and field production	25
10.2.3.	Harvest from field	26
10.3.	Handling of Field Grown Plants Post Lifting	26
10.3.1.	Storage prior to processing.....	26
10.3.2.	Processing of field grown plants	26
10.3.3.	Storage of processed field grown plants.....	27

11. Document and Claims	28
12. Audit Requirements	28
12.1. Internal Audits.....	28
12.2. External Audits	28
12.3. Compliance Criteria	29
12.4. Non-compliance	29
13. Appendix 1: Record Requirements	30
14. Appendix 2: Specific Modules	30

Amendments

1.0 – 18/2/20 – 2020 Doc version created

1.1 - 9/3/20 – added Kauri Dieback (*P agathidicida*) Schedule to graphic on Section 5, page 10

1.2 – 10/9/20

- Amended Definitions – definition of a “pest”
- Added Section 8.2.4 – Weed Management
- Amended Section 7.3 – Crop Monitoring
- Amended Section 8.4 - Plant Distribution and Transport
- Updated pagination and table of contents

PPBS Core Standard

1. Purpose

The Plant Production Biosecurity Scheme (PPBS, the Scheme) provides a framework to help plant producers manage the risk their nursery becoming infested with or distributing a pest. It protects plant producers, their customers, other primary sectors, the environment and New Zealand's economy from the threat of endemic and exotic pests.

2. Introduction

Nursery stock is a well-recognised pathway for the long-distance dispersal of plant pests, both overseas and in New Zealand. This puts the plant production industry, its supply chains, the environment and New Zealand's primary sector at risk.

This Scheme is a comprehensive nursery biosecurity management system covering a wide array of management activities that relate to pests¹. It uses a systems approach and a set of actions that are independent of each other, that cumulatively provide a risk mitigation programme.

A certified producer can sell their plants with an assurance to its customers that they have been produced under a system of strong biosecurity risk management. The Scheme cannot guarantee freedom from pests. Plant producers following the programme can provide a high level of assurance that plants are produced in an environment which provides a high level of confidence that plants are practically free² of pests when they are sold.

Certified producers implement a systems-based approach to address pest risk management. They shall follow documented risk management systems and build a body of evidence to demonstrate their production has been undertaken under conditions of high biosecurity risk and hazard management. In doing so, they provide assurance that the plants they produce have been raised in conditions that minimise the introduction and inadvertent spread of pests.

Biosecurity risk can be managed in a nursery system by a layering of protection – increasing biosecurity awareness; improving hygiene of nursery premises, production facilities, growing media and other material; diagnostic tools and inspection to establish baseline data and detect new threats, and procedures for movement of material; crop monitoring, surveillance and risk mitigation.

Key steps include:

- ensuring propagation material is pest free
- using only certified production nursery inputs or those where you have a high level of confidence
- good hygiene during propagation, potting, growing, harvesting and dispatch
- hygiene and maintenance of tools, equipment and machinery, limiting the transfer of pests
- crop monitoring and surveillance supported by risk mitigation, corrective actions and strong documentation of plans and actions taken.
- reviewing the system regularly, identify, plan and undertake improvements on a continuous basis.

¹ Pest - Any species, strain or biotype of plant, animal or pathogenic agent that adversely impacts plants in commercial production or the natural environment

² See Definitions – Section 3 of this paper

3. Definitions and Abbreviations

Appropriate

An accepted action or outcome deemed fit for purpose by a regulator, standard setting body or industry.

Biosecurity

Measures taken to prevent the introduction and/or to minimize the risk of establishment and spread of a specific pest.

Batch

Plant material from a single source that is treated as one group for the purposes of production in the nursery.

Best Practice

A method or technique that has been generally accepted as superior to any alternatives because it produces results that are superior to those achieved by other means. It is accepted that best practice will evolve over time as our understanding develops and scientific endeavour informs new approaches.

Biosecurity Act 1993

An Act of Parliament that lists the laws relating to pests and diseases that are capable or potentially capable of causing unwanted harm to any natural and physical resources or human health.

Certified producer

A producer certified under this Scheme, its Core Standard and appropriate Specific Modules.

Clean (Cleanse)

To make free from unwanted material that may harbour pests. In the case of potted plants, removing dead leaves and other unwanted material from the surface of a pot.

Consignment

A quantity of goods that are received or shipped by the plant producer. Used in the context of nursery or production inputs and/or plants that are treated as a single group for handling and/or inspection purposes – example, for inspection of a group of plants and their packaging prior to dispatch.

Core Standard

This document, part of the Plant Production Biosecurity Scheme (PPBS), that outlines hazard management that applicable to all producers.

Crop

Plant material from a single or multiple batch(es) that are treated as single group once planted or potted.

Disinfest

Rid (a being or an object) of infesting vermin³ by treating or physically removing the target pest species.

Guidance

Advice or information provided to help a producer meet the requirements of the Core Standard or a Specific Module.

Growing Area

Any area in a nursery where plants are established to grow through for one production stage to another.

Hitch-hiker pest

A pest that is carried by plants, plant materials or packaging and does not infest those plants or plant products (Amended ex ISPM#5) and prescribed under some mechanism in the Biosecurity Act 1993 - for example National Pest Plant Accord, Regional Pest Management Plan (within region only).

Isolation area

An area with physical separation from nursery stock for isolation of incoming plants, plant and other materials for inspection and/or for isolating suspected contaminated plants prior to treatment or corrective action.

Key measures

Management processes that the Standard regards crucial to adequately address control biosecurity risk.

³ Vermin = unwanted animals of any sort

Module

see Specific Module

Mother stock plants

Plants from which propagation material is taken.

Nursery or Nursery site

A nursery is any property location where a plant producer undertakes the growing of plants. For clarity, if a plant producer operates on more than one site, any reference to the singular “nursery” in this Scheme, also applies to the plural “nurseries”.

Nursery Manual

A document that describes, or collates a body of evidence to show, how they meet the certification to Core Standard.

Nursery Stock

Any plant for planting, propagation or ornamentation including greenhouse, containerized, field grown and tissue culture plants.

Nursery Outputs

Nursery stock and any associated materials that leave the nursery with that nursery stock. Includes, but is not limited to, packaging and shipping materials (trolleys, crates, cartons pallets etc).

Nursery block

A distinct area that is physically separated from another to the extent it can be regarded as a discrete growing area.

Nursery Manager

The person responsible for the day-to-day management of the nursery site.

Pest

Any species, strain or biotype of plant, animal or pathogenic agent that adversely impacts plants in commercial production, or if spread with nursery stock, adversely impacts the built or natural environments.

Pest Plant

As defined in the Biosecurity Act, National Pest Plant Accord (NPPA), or Regional Pest Management Plans (RPMP).

Plant

Living plants and parts thereof, including seeds and germplasm.

Plant Producer / Producer

A plant producer is defined as any person, business or entity engaged in producing plants or parts of plants for sale, their own use or for movement outside of the nursery, or nurseries where the producer operates over more than one site.

Plant Production Biosecurity Scheme (PPBS) / Scheme

A framework to help plant producers improve biosecurity risk management.

Production site

A distinct area that is physically separated from another to the extent it can be regarded as a discrete area. (follows nursery block above).

Property

Defined in accordance with some government mandated record, definition or system – eg valuation number, Land Information Plan and Lot number.

Practically Free / Practical Freedom

A consignment, field, or place of production, without pests in numbers or quantities in excess of those that can be expected to result from, and be consistent with, good cultural and handling practices employed in the production and marketing of the commodity (ISPM 5, 2004).

Propagative material

Includes all seeds, cuttings, scion wood, plants and plant material used in the propagation process.

Risk assessment

An assessment of both the likelihood and severity of the consequences should hazard occur. This gives a guide as to the overall significance of a risk.

Sanitise

Make clean using a chemical to target pathogens. Disinfect using a disinfectant or other phytosanitary treatment; make free from the target pathogen (including virii, phytophthora, fungi and bacteria).

Scheme

See Plant Production Biosecurity Scheme.

Specific Module

A hazard management procedure designed to control the spread of a specific pest, a threat to a specific industry, plant species or distribution pathway which is integrated as part of the Scheme.

Staff

See Worker.

Standard

A set of agreed procedures or practice that provides requirements, specifications, guidelines or characteristics to consistently ensure that materials, products, processes and services are fit for their purpose.

In the context of the PPBS, generic use of the word “standard” refers to the Core Standard or individual Specific Modules or the aggregate of these.

Sterilise

Make (something) free from bacteria or other living microorganisms.

Systems approach

A set of actions that are independent of each other, that cumulatively provide a risk mitigation program and ensuring confidence in the nursery’s outputs.

Traceability

The ability to follow a nursery inputs, plants or a group of plants from one point in the supply chain to another.

Treat

An accepted [by industry best practice] procedure for the killing, inactivation or removal of pests [in the broadest sense], or for rendering pests infertile or for devitalization in the case of seeds.

Trusted Supplier

Suppliers of nursery inputs who have measures in place to prevent the inadvertent spread of pests from their premises which would lead to the introduction of pests into the nursery of the Producer.

Wash

Clean with water and, possibly but not necessarily, soap or detergent. With reference to dirt - remove or be removed by cleaning with water and possibly a detergent.

Work Area

Any area in a nursery where plants are manipulated or handled through the production process.

Worker

All the people engaged by the plant producer – includes paid employees, workers and volunteers. For clarity, this definition does not include third party contractors; they are regarded as visitors.

4.

The section is intentionally blank at this stage

5. The Core Standard

The Scheme is designed to manage the diversity among plant producers, their nurseries, species grown and their markets. This Core Standard focuses on core biosecurity best practice encompassing management and worker responsibly, nursery hygiene, crop monitoring and traceability common across plant production. It includes examples biosecurity hazards and management measures for nursery inputs, through the production cycle and in nursery stock dispatch and transportation.

The **Core Standard** is organised to prompt a producer to identify **biosecurity hazards** that apply to key tasks and production steps in their nursery. They may select from several potential identified hazards for each production step and identify and record others where applicable.

The Core Standard is divided into three parts:

- **Part A – Nursery Essentials**
This section describes the nursery and general operating practices.
- **Part B – Biosecurity Fundamentals**
This section identifies key components of a biosecurity risk management system
- **Part C – Hazard Management**
This section identifies specific hazards and measures nurseries shall implement to mitigate the risk that these hazards present.

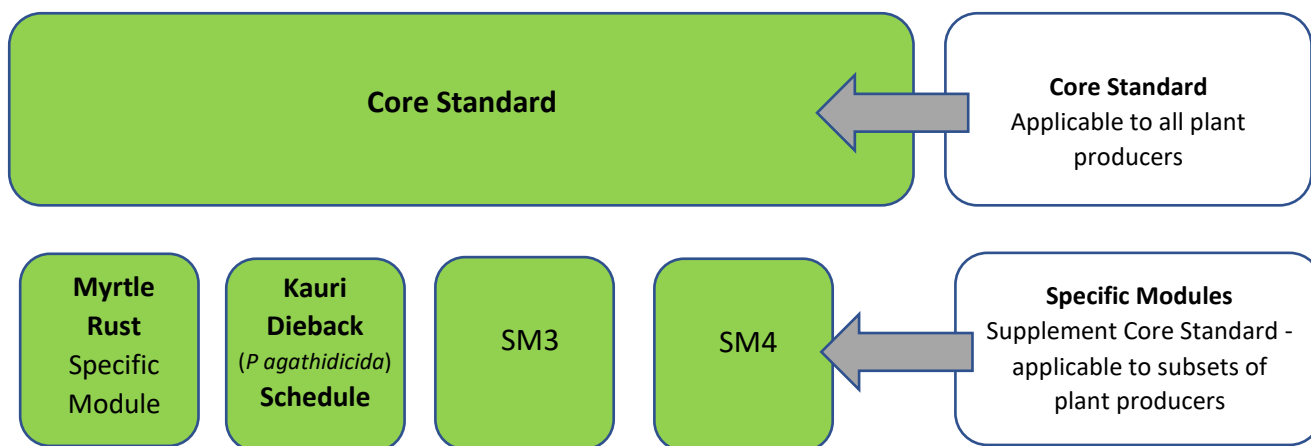
This part is split into three sections:

1. **All Plant Production** - issues that relate to all plant producers and their nursery(s)
2. **Container Production** – issues that relate only where production steps include the use of containers (pots, bags, trays ...).
3. **Bare Root and Field Production** – issues that relate only where production steps include growing plants in the field, that is, part of the production cycle includes plants being grown directly in soil.

Design Principles

The plant production industry is extremely diverse. It comprises a few thousand producers across a wide range of markets, customers and distribution networks, enterprise size, ownership and commercial models and plant species. Producer's awareness of and expertise in biosecurity hazard and risk management varies.

The Scheme's design acknowledges this diversity and can be used by all plant producers, from the smallest to largest nursery, by commercial and community nurseries irrespective of what they grow or who they supply. The **Core Standard** focuses on core biosecurity best practice encompassing management and worker responsibly, nursery hygiene, crop monitoring and traceability. It includes examples of biosecurity hazards and management measures for nursery inputs, through the production cycle and in nursery dispatch and transportation.



Where necessary and desired, **Specific Modules** (SM) manage concerns about a specific pest, plant species, industry or distribution pathway that are additional to those in the Core Standard and where the greater number of plant producers are not subject to the specific concern. These may be incorporated as a module within the Scheme, by reference to other biosecurity schemes or through mutual recognition. Examples may include myrtle rust, kauri dieback, kiwifruit nursery stock and plants supplied for restoration of offshore islands.

Specific Modules may include both additional Standard requirements (that is, mandatory for certification to the Specific Module) and guidance to assist plant producers improve management of the risk that is the subject of the Specific Module.

Part A:

Nursery Essentials

This section describes the nursery and general operating practices.

6. Part A: Nursery Essentials

This section describes the nursery and general operating practices.

6.1. Nursery Details

Information is required to identify the producer, the nursery sites they operate and build a picture of the nature of the nursery and its production system.

Key Measures: The plant producer shall be able to provide evidence of:

1. Nursery contact and location details.
2. An overview of their production system
3. A list of production sites and water sources
4. Nursery maps showing location of key production and risk areas.

Information to assist producers meet this requirement is provided in the PPBS Guidance document.

6.2. Management Responsibilities

The producer shall maintain a management system appropriate to the scale and nature of their operations that demonstrates that plant production has been undertaken under conditions of high biosecurity risk and hazard management. The producer shall have enough resources (physical, human and financial) to adequately meet the requirements of this Standard.

The **Nursery Manager** is responsible for implementing all aspects of the Scheme. This involves the planning, implementation and maintenance of Scheme procedures and the documentation of these in the Nursery Manual or elsewhere.

The Nursery Manager may assign responsibility for the implementation of this Core Standard to senior worker (example, **PPBS Implementation Manager**). That person shall be aware of the necessities of good nursery practice, nursery hygiene and of the biosecurity risk management procedures required by this Core Standard.

An **Internal Auditor** role shall also be established. This role is responsible for conducting internal audits to ensure the Core Standard is being implemented properly.

Key Measures: The plant producer shall be able to provide evidence of:

1. Who is responsible for the implementing the Core Standard.
2. Who is responsible for and how internal audits are conducted.

Information to assist producers meet this requirement is provided in the PPBS Guidance document.

6.3. Worker Training

Pest and biosecurity awareness amongst management and workers is essential so they understand their roles and responsibilities across the issues and processes that contribute to pest risk and hazard management.

Key Measures: The plant producer shall be able to provide evidence of:

1. Worker induction processes
2. Worker training processes
3. The location of training records

Information to assist producers meet this requirement is provided in the PPBS Guidance document.

6.4. Signage

Signs inform visitors that access control and biosecurity is important, and that they share a responsibility in maintaining it.

Key Measures: The plant producer shall be able to provide evidence of signage that:

1. Highlights the importance of biosecurity risk issues and management within the nursery
2. Indicates that entry is restricted to permitted persons only
3. Shows visitors where to park
4. Directs visitors to the office or provides contact details for a visitor to register presence.

Information to assist producers meet this requirement is provided in the PPBS Guidance document.

6.5. Visitors

People moving between different nurseries and other horticultural enterprises can unknowingly spread pests and mitigation measures should be implemented to reduce this threat. Vehicles can harbour and transfer pests, especially if contaminated with growing media and plant material.

Key Measures: The plant producer shall be able to provide evidence of:

1. How visitors are made aware of biosecurity requirements
2. How the risks visitors and their vehicles present to production areas are mitigated
3. Where the visitor register is located and how it is maintained.

Information to assist producers meet this requirement is provided in the PPBS Guidance document.

Part B:

Biosecurity Management

Fundamentals

This section identifies specific hazards and measures nurseries must implement to mitigate the risk that these hazards present

7. Part B: Biosecurity Management Fundamentals

This section identifies specific hazards and measures nurseries must implement to mitigate the risk that these hazards present.

7.1. A Systems Approach

Producers shall demonstrate that they have implemented a systematic approach to nursery management, production, hygiene and biosecurity risk management. A systems approach is a set of actions that are independent of each other, that cumulatively provide a risk mitigation program and ensuring confidence in the nursery's outputs.

Key Measures: The plant producer shall be able to provide evidence of:

1. Measures in place to prevent introduction of pests into the nursery.
2. Measures in place to prevent the spread of pests during the production cycle.
3. Measures in place to prevent pests being spread through plant stock dispatch.
4. Measures in place to undertake routine review of the nursery's risk management systems.

Plant Producers **who are certified to the standard shall:**

- Have documented procedures for risk management processes
- Have records to demonstrate the outcomes of risk management procedures.
 - **Traceability records** shall be kept for at least seven years from date of dispatch and be readily retrievable.
 - Other records shall be kept for at least three years and be readily retrievable
 - Records may be stored as hard copies or electronically. They may take any form that supports review and recovery should the need arise. Examples include production worksheets, spray diaries, worker training records and a visitors' book. They may be pre-formatted books (eg visitors), word documents (eg Trusted Suppliers), spreadsheets (eg production records) or a production management system or database.
 - Refer Appendix 1 for more on Records Requirements.
- Undertake an annual self-assessment against the Core Standard checklist, and any relevant Specific Modules, identifying con-conformances and undertaking corrective actions (if any).
- Undertake an annual risk assessment of nursery operations, biosecurity risks and hazards and the effectiveness of hazard management on an annual basis, creating new or updating procedures, and taking corrective actions as needed.

Information to assist producers meet this requirement is provided in the PPBS Guidance document.

Alternative Solutions

The Core Standard is designed to manage risk across a wide range of nursery types, production processes and variation, plants, pests and pathways. There will be occasions where the Standard's requirements are difficult or inappropriate for some specific risk issue for a producer. In these areas, the producer is encouraged to undertake a risk assessment and develop a solution to adequately manage the risk issue. They should then work with the PPBS and/or the auditor to have their solution assessed as an appropriate alternative to the Standard's requirement and PPBS guidance.

7.2. Hygiene

Any substrate (plant material or inanimate object) has the potential to be a carrier of biosecurity threats onto a nursery, particularly when plant and other biological materials are being sourced from offsite. Good hygiene practices are a critical component of biosecurity best practice for a nursery and are instrumental in reducing the likelihood of biosecurity threats entering the nursery and spreading within the nursery.

Key Measures: The plant producer shall be able to provide evidence of:

1. How nursery site issues are managed
2. How access to nursery production areas is controlled
3. How workers and visitors are informed of nursery hygiene measures
4. How tools, equipment and vehicles are cleaned
5. How plant and other biological waste is disposed of
6. How work areas are kept clean
7. How movement of people, equipment and vehicles between multiple sites are managed to control the risk of pests being transported from one site to another (if more the plant producer operates on more than one site).

Information to assist producers meet this requirement is provided in the PPBS Guidance document.

7.3. Crop Monitoring

Early pest detection may enable a producer to take action, treating, isolating or destroying infested plants and protecting remaining stock. Crop monitoring is essential, so a producer knows which pests are present, whether the populations are significant and if corrective actions need to be taken.

A crop monitoring plan shall be established for the nursery and monitoring routinely undertaken.

The monitoring plan shall also include procedures to avoid pest plants as defined by the National Pest Plant Accord (NPPA) and relevant Regional Pest Management Plans (RPMP) being inadvertently produced.

Key Measures: The plant producer shall be able to provide evidence of:

1. How monitoring for the presence of pests is conducted in the nursery.
2. The procedure to follow when a pest is detected.
3. The procedure to follow when a pest and/or, signs and/or symptoms of a pest are detected but is not able to be identified.
4. A process to avoid production of pest plants.

Information to assist producers meet this requirement is provided in the PPBS Guidance document.

7.4. Traceability

A certified producer shall be able to trace plants it has produced, through its production system back to the source of production inputs, the plant/seed supplier or mother stock plant location, and forward to the customer.

Records shall be kept for seven years from the date of dispatch, and shall be legible, identified and retrievable. They may be stored as hard copies or electronically.

Key Measures: The plant producer shall be able to provide evidence of:

1. How batches of plants are established and identified.
2. The system of traceability from supplier through the nursery system to the customer, including:
3. The source of all nursery production inputs.
4. How plant batches are tracked through the production process.
5. How sales and/or shipments can be traced.

Information to assist producers meet this requirement is provided in the PPBS Guidance document.

7.5. Trusted Suppliers and Inwards Supplies

Anything that is sourced off site may present biosecurity risk. The material, its packaging or transport may be contaminated. A producer is placing considerable trust in the supplier and should have some system in place to validate that trust. A producer shall source materials only from suppliers who are able to demonstrate they have measures in place to prevent the spread of pests. Upon receipt, inspection of inwards supplies is an important part of keeping pests out of a nursery.

Key Measures: The plant producer shall be able to provide evidence of:

1. How Trusted Suppliers are assessed and established so that the producer has confidence pests are unlikely to be introduced on nursery production supplies sourced offsite.
2. How nursery inputs are inspected on arrival.

Information to assist producers meet this requirement is provided in the PPBS Guidance document.

Part C:

Hazard Management

This section identifies specific hazards and measures nurseries must implement to mitigate risk that arise through the production process

It is split into three sections

- **Section C1 – #8: All Plant Production** – issues that relate to all plant producers and their nursery(s)
- **Section C2 – #9: Container Production** – issues that relate only where production steps include the use of containers (pots, bags, trays ...).
- **Section C3 – #10: Bare Root and Field Production** – issues that relate only where production steps include growing plants in the field, that is, part of the production cycle includes plants being grown directly in soil.

8. Part C1: Hazard Management – All Plant Production

These issues in this section relate to all plant producers and their nursery(s) irrespective of the methods they use to grow their plants.

This section is supplemented by:

- **Part C2 – #9: Container Production** – where production steps include the use of containers (pots, bags, trays ...).
- **Part C3 - #10: Bare Root and Field Production** – where production steps include growing plants in the field; that is, part of the production cycle includes plants being grown directly in soil.

8.1. Transplant

Information to assist producers meet these requirements is provided in the PPBS Guidance document.

8.1.1. Plant Stock for propagation &/or planting

The Nursery Manager shall take steps to ensure that propagation stock and incoming plant material, including seed, is practically free from known pests.

Producers shall keep source and supplier details for traceability purposes and have systems in place to verify plant stock for propagation and/or planting is practically free from pests.

Key Measures: The plant producer shall be able to provide evidence of:

1. Records to identify the origin any plant material brought onto site.
2. Records to identify the location of any mother stock plants.
3. Measures to inspect plant material brought onto site and/or mother stock plants to ensure contaminated plant materials are detected early and corrective action undertaken.

8.1.2. Growing Media

Growing media or its component materials have the potential to introduce pests to the nursery. Producers should obtain growing media from trusted suppliers that have measures in place to prevent the introduction and spread of pests. The Plant Producer shall record supplier information and details of any pest assurance programme.

Key Measures: The plant producer shall be able to provide evidence of:

1. Records to identify where growing media and/or its components come from.
2. Measures undertaken to ensure growing media, and/or its components, are practically free of pests.
3. Measures to ensure growing media and/or its components are prepared and stored to avoid pest contamination.
4. Measures to manage pest contamination risk if soilless growing media or components are recycled.

8.1.3. Fertiliser

Manufactured fertilisers are unlikely to present a biosecurity threat other than through hitch hiker pests being introduced inadvertently on packaging. The Plant Producer shall record supplier information and inspect materials and packaging on arrival.

If organic manures are used, a risk analysis shall be undertaken, and any necessary measures put in place to manage the risk from the use of organic fertilisers.

Key Measures: The plant producer shall be able to provide evidence of:

1. Records to identify where fertilisers come from.
2. Measures undertaken to ensure fertilisers are practically free of pests.
3. Measures to ensure fertilisers are prepared and stored to avoid pest contamination.
4. Measures to manage contamination risk if organic manures are used.

8.1.4. Containers (pots, bags, trays ...)

New containers and their packaging have the potential to introduce pests into the nursery, with the most likely hazard being hitchhiker pests on packaging or in transport. Producers should obtain containers from trusted suppliers and use reliable transporters who maintain clean vehicles.

If containers are reused, measures shall be in place to ensure pests are not carried forward to new crops.

Key Measures: The plant producer shall be able to provide evidence of:

1. Records to identify where containers come from.
2. Measures undertaken to ensure containers are practically free of pests.
3. Measures to ensure containers are stored to avoid pest contamination.
4. Measures to manage contamination risk if containers are reused.

8.1.5. Propagation

In propagation, plants are at one of their most vulnerable stages to contamination from pathogens and infestation by insects. Hazards include air borne and water transmitted pests, tools, machinery and work surfaces, and contamination from worker who work or visit the propagation unit. Good quality propagation material, appropriate management, excellent hygiene and good record keeping are essential for successful propagation.

Key Measures: The plant producer shall be able to provide evidence of:

1. Measures undertaken to ensure in place to avoid contamination during the propagation process.

8.1.6. Potting and re-potting

When plants are being potted (and until they are established) they are susceptible to competition from weeds, attack from pathogens and infestation by insects. Hazards include air borne and water transmitted pests, tools, machinery and work surfaces, and contamination from workers who work in or visit the potting facility. Sound nursery hygiene practices are critical to growing and protecting young plant stock.

Key Measures: The plant producer shall be able to provide evidence of:

1. Measures undertaken to ensure in place to avoid contamination during the potting process.

8.2. Growing

Information to assist producers meet these requirements is provided in the PPBS Guidance document.

8.2.1. Growing Areas – all types

Plants in growing areas (greenhouses, container standing out beds, in the field etc) are exposed to a wide range of biosecurity hazards. Sources include nursery activity, facility management and condition, neighbouring areas and environmental issues – weather! Many are mitigated through sound nursery hygiene and good facility design and construction. Regular and thorough crop monitoring will detect emerging issues early and provide the best opportunity to take corrective action.

Key Measures: The plant producer shall be able to provide evidence of:

1. Measures to ensure the potential for pest contamination is managed while plants are growing in greenhouses, container standing out beds and/or in the field.

8.2.2. Nutrition Amendment – top dressing and/or fertigation

Contamination risks from nutrition amendment in the growing area arise from workers who may introduce pests from other parts of the nursery or from offsite. and possibly from contaminated fertilisers, manures or fertigation systems/solutions. Measures to manage these risks include sound nursery hygiene and processes described above for fertiliser sourcing and storage and irrigation.

Key Measures: The plant producer shall be able to provide evidence of:

1. Measures to manage the risk of pests being spread while undertaking nutrition amendment

8.2.3. Crop Protection – pest, pathogen and weed control

An appropriate **crop protection plan** comprises sound management practices through the growing cycle utilising cultural practices, crop monitoring and a combination of preventive and remedial measures. The plan shall identify key pest threats, monitoring and subsequent corrective actions.

Key Measures: The plant producer shall be able to provide evidence of:

1. The nursery's crop protection plan including
 - o Key pest threats and corrective action
 - o Agrichemicals, if any, selected for corrective action
 - o If appropriate, details of a routine agrichemical programme
2. Where agrichemical diary records are stored.

8.2.4. Weed Management

The nursery's **crop protection plan** shall address weed management comprising sound management practices through the growing cycle utilising cultural practices, crop monitoring and a combination of preventive and remedial measures. If a weed species is used as a cover crop, include measures to prevent weeds or seeds being distributed at shipping.

Key Measures: The plant producer shall be able to provide evidence of:

1. The nursery's crop protection plan addressing measures for management weeds in crops, through the nursery site and along its boundaries.
2. Measures for weeds that are likely to be distributed with nursery stock to ensure that
 - o Plants are free of visible weeds at point of dispatch.
 - o The nursery is free of flowering and seeding weeds.
 - o Any weeds present are few, not widely dispersed, and are in a pre-flower-stem-elongation juvenile state and there is clear evidence of procedures to detect/remove/treat weeds before they flower.

8.3. Dispatch

Information to assist producers meet these requirements is provided in the PPBS Guidance document.

Plant dispatch processes are the last step in ensuring that the risk of a producer spreading pests to their customers is minimised. Hygienic handling, careful inspection (and corrective action if necessary) and clean shipping containers, packaging and materials are key steps to safeguard clean plants, a producer's reputation and their customer's interests.

Key Measures: The plant producer shall be able to provide evidence of:

1. The process and person(s) authorised to undertake and clear plant consignments for dispatch.
2. Measures to avoid contamination during the dispatch process.
3. Records that detail final inspection and signoff at an appropriate point prior to order picking and/or dispatch.
4. Date of dispatch and any pre-dispatch treatment, and traceability information (including reference to invoice which should detail species shipped).

8.4. Plant Distribution and Transport

Information to assist producers meet these requirements is provided in the PPBS Guidance document.

Plant distribution and transportation provides a key control point in the management of pest spread. Pests may be spread on the plants themselves, packaging or on the vehicles undertaking transport. Plant Producers shall provide transport operators (including their own drivers and contractors) assurance that the plants and their packaging have been inspected and signed off prior to shipping.

Risk management measures through plant transport shall include procedures to track and trace co-shipped consignments and maintain truck and deck cleanliness and hygiene and dispose of waste appropriately. Where a plant producer contracts plant transport to an independent transport operator, the producer shall seek and hold on record an assurance of compliance from the operator.

Key Measures: The plant producer shall be able to provide evidence of:

1. The process to manage contamination risk during transport.

9. Part C2: Hazard Management – Container Production

Part C2 relates to plant producers who undertake all or part of their production using containers (pots, bags, trays ...)

- It follows from **Part C1 – #8: All Plant Production** which applies to all plant producers and their nursery(s) irrespective of the methods they use to grow their plants.

9.1. Transplant – Container Production

Information to assist producers meet these requirements is provided in the PPBS Guidance document.

9.1.1. Transport to and Placement in Container Growing Area

As newly potted container stock is transported to the growing area it is at risk of contamination from equipment and workers. The presence of standing water on roadways, possibly harbouring pathogens, also presents a hazard to nearby stock from water splash.

Growing areas should be cleaned and sanitising before place new plants on ground previous occupied by other plants; contamination risks also arise from debris and waste from prior crops.

Key Measures: The plant producer shall be able to provide evidence of:

1. Measures undertaken to ensure container grown plants are not contaminated during transportation to and placement in the growing area.

9.2. Growing – Container Production

Information to assist producers meet these requirements is provided in the PPBS Guidance document.

9.2.1. Growing Areas – container production

Plants in growing areas (greenhouses, container standing out beds, in the field etc) are exposed to a wide range of biosecurity hazards. Sources include nursery activity, facility management and condition, neighbouring areas and environmental issues – weather! Many are mitigated through sound nursery hygiene and good facility design and construction.

Regular and thorough crop monitoring will detect emerging issues early and provide the best opportunity to take corrective action.

Key Measures: The plant producer shall be able to provide evidence of:

1. Key measures to ensure plants are not contaminated while growing in greenhouses and/or container standing out beds.

9.2.2. Plant Handling – container production

Contamination risks when handling plants (moving, spacing, staking, pruning, shaping and other activities to manage growing plants) can arise from workers who may introduce inadvertently pests from other parts of the nursery (or from offsite) and from contaminated equipment and tools.

Key Measures: The plant producer shall be able to provide evidence of:

1. Measures to avoid contamination during the plant growth maintenance process.

9.2.3. Irrigation – container production

Irrigation water is sourced from a wide range of sources, some of which are more susceptible to contamination than others and will require testing and treatment where appropriate.

- Water from town supply, deep wells, bores and clean roof catchments presents a low hazard and does not require testing or treatment, unless there known issues and/or concerns are raised.
- Water from surface features (rivers, ponds, dams) presents a hazard. Annual testing for pathogens is warranted and where risks are identified and confirmed, appropriate treatment measures should be introduced.
- Water stored in a way that exposes it to the risk of contamination (for example, in dams, ponds and uncovered tanks) should be tested for pathogens annually and treated if required.
- Recycled water presents a high contamination hazard and will need to be treated prior to reuse and should be tested for pathogens at least annually

Plant Producers should undertake a risk analysis and undertake testing and treatment as appropriate.

Key Measures: The plant producer shall be able to provide evidence of:

1. Sources of water used in the nursery
2. Measures as appropriate to manage the risk of pests being introduced and spread through irrigation
3. Measures to ensure that water run-off does not re-enter growing areas

10. Part C3: Hazard Management – Bare Root & Field Production

Part C3 relates to plant producers who undertake production steps that include growing plants in the field, that is, part of the production cycle includes plants being grown directly in soil.

- It follows from **Part C1 – #8: All Plant Production** which applies to all plant producers and their nursery(s) irrespective of the methods they use to grow their plants.

10.1. Transplant – Bare Root & Field Production

Information to assist producers meet these requirements is provided in the PPBS Guidance document.

10.1.1. Transport to and planting in field

As newly prepared stock is transported and planted in the field it is at risk of contamination from equipment and worker. The presence of standing water on roadways, possibly harbouring pathogens, also presents a hazard to nearby stock from water splash. Sound nursery hygiene practices are critical to growing and protecting young plant stock.

Key Measures: The plant producer shall be able to provide evidence of:

1. Measures undertaken to ensure plants are not contaminated during transportation to and planting in field.

10.2. Growing – Bare Root & Field Production

Information to assist producers meet these requirements is provided in the PPBS Guidance document.

10.2.1. Growing Areas – bare root and field production

Plants in growing areas are exposed to a wide range of biosecurity hazards. Sources include nursery activity, facility management and condition, neighbouring areas and environmental issues – weather! Many are mitigated through sound nursery hygiene and good facility design and construction.

Regular and thorough crop monitoring will detect emerging issues early and provide the best opportunity to take corrective action.

Key Measures: The plant producer shall be able to provide evidence of:

1. Key measures to ensure plants are not contaminated while growing in the field.

10.2.2. Plant Handling – bare root and field production

Contamination risks when handling plants (moving, spacing, staking, pruning, shaping and other activities to manage growing plants) can arise from workers who may introduce inadvertently pests from other parts of the nursery (or from offsite) and from contaminated equipment and tools. Pruning's and organic waste also presents a hazard and need to be managed as appropriate with season and crops.

Key Measures: The plant producer shall be able to provide evidence of:

1. Measures to avoid contamination during the plant growth maintenance process

10.2.3. Harvest from field

Contamination risks during harvest can arise from workers who may introduce pests from other parts of the nursery (or from offsite), through handling and from contaminated equipment and tools. Contamination risks may also arise during transport from field to storage or for further processing.

Key Measures: The plant producer shall be able to provide evidence of:

1. Measures to avoid contamination during the harvest process.
2. Measures to avoid contamination during the transport from field either to storage or further processing.

10.3. Handling of Field Grown Plants Post Lifting

Information to assist producers meet these requirements is provided in the PPBS Guidance document.

Plant processes from harvest prior to final dispatch are vital in ensuring that the risk of a producer spreading pests within their site, and to their customers is minimised. Hygienic handling to avoid cross contamination risk between unprocessed and processed plants, careful inspection (and corrective action if necessary) and clean shipping packaging/containers and materials are key steps to safeguard plant health, the producer's reputation and the interests of the customer.

Key Measures: The plant producer shall be able to provide evidence of:

1. The process and person(s) authorised to control processing, storage facilities and transport.
2. Measures to avoid contamination during processing, storage facilities and transport.
3. Records of inspection for processing, storage facilities and transport equipment.
4. Records of inspection for plants, including any treatments or corrective actions taken

10.3.1. Storage prior to processing

Contamination risks during Storage Prior to Processing can arise from staff who may introduce pests from other parts of the store (or from offsite), through handling, from contaminated equipment, tools and storage facilities, and from adjacent external environs.

Key Measures: The plant producer shall be able to provide evidence of:

1. Measures to avoid contamination during storage prior to processing
2. Measures to avoid contamination during transport from storage to processing

10.3.2. Processing of field grown plants

The aim of plant processing is to remove contamination, resulting in a cleaner product going to the client. Processing is to be done in suitable facilities, using trained staff, clean equipment, inputs and materials, in order to achieve this aim.

Once processing has been completed, it is vital that steps are in place to prevent the risk of recontamination of plants prior to receipt by the client. Potential steps to lessen the risk of recontamination of plants would be to use clean packaging off the processing line, and to keep processed plants physically separated from plants waiting to be processed.

Key Measures: The plant producer shall be able to provide evidence of:

1. The process requirements and person(s) responsible for processing.
2. Measures to avoid contamination during processing.

10.3.3. Storage of processed field grown plants

Correct storage of processed field grown plants prior to dispatch is essential to control and maintain the hygiene levels achieved during processing.

Key Measures: The plant producer shall be able to provide evidence of:

1. The process and person(s) authorised to undertake the correct storage of Processed Field Grown Plants.
2. Measures to avoid contamination during storage of processed field grown plants.
3. Records required for inspection during storage of processed field grown plants.

11. Document and Claims

Producers certified to the Core Standard are to identify themselves as such through the inclusion of a statement on their documentation – product lists, packing slips, invoices, marketing materials etc.

Acceptable wording includes “[Producer name] is certified to the Plant Production Biosecurity Scheme Core Standard”. A logo will be made available for optional use on documentation.

Where producers are managing a biosecurity threat identified by a Specific Module should follow the identification requirements specified in that module to identify that the plants have been managed to reduce risk from the given threat. These may include Scheme identification on plant labels or other means physically attached to individual plants, lots or batches.

Key Measures: The plant producer shall be able to provide evidence of:

1. How participation in the Scheme is used in documents and identified.

12. Audit Requirements

Scheme certification/accreditation includes a requirement for an external audit by a Scheme Approved Certification Body (unless otherwise agreed with the Scheme under an “equivalence” arrangement). Details relating to audit requirements are set out in within the Core Standard and modules.

The PPBS will maintain integrity of the Scheme and the audit process to ensure audits deliver the outcomes expected and are consistent between nurseries.

12.1. Internal Audits

The plant producer shall undertake internal audits (at least one per year) to ensure that the procedures documented in the Nursery Manual are being followed, or that the collected body of evidence demonstrate how risk is managed and improving the likelihood of a successful external audit.

Key Measures: The plant producer shall be able to provide evidence of:

1. How internal audits are conducted, results are reviewed, corrective actions plan and implemented

12.2. External Audits

External audits are done by the Certification Body and undertaken to certify that the plant producer complies with the Core Standard. The cost of all audits, their associated corrective actions, and any subsequent repeat audit will be borne by the audited party. Audits will typically be on an annual basis, although the PPBS reserves the right to audit at any time, especially if significant non-conformance is suspected.

Performance based auditing

Audit frequency will be on a performance basis. After achieving certification audit frequency will be undertaken annually for at least the two consecutive years for the producer to establish their performance history.

Subject to the producer’s audit performance history, audit frequency may then be increased for poor performers or reduced for high performers. Producers that receive a clean bill of health over the preceding two years (100% pass with no critical, major or minor non-conformances) may be rewarded for their high standard of practice and move to a reduced audit frequency of up to 24 months.

Producers that have critical non-conformances (i.e. three or more critical or ten or more Major non-conformances) identified in their external audit may move to an increased audit frequency of 6 months.

12.3. Compliance Criteria

A producer may still pass an external audit with a small number of non-conformances provided auditor deems these do not create significant biosecurity risk.

To guide auditors and producers on the measures most important in mitigating biosecurity risk, each compliance criterion has been assigned either a Critical, Major, Minor or Recommended audit level. These are described further in the table below and audit compliance criteria are defined in the Core Standard Hazard Management Checklist.

Compliance criteria that are labelled as Critical are extremely important in mitigating biosecurity risk and nurseries that completely lack all the required measures for these criteria will receive a Critical non-conformance. Plant producers that do have some but not all the required measures for these criteria may receive a Minor, Major or Critical non-conformance depending on the nature of the failure and the risk it presents.

Critical	<p>A Critical non-conformance is a serious failure that is likely to cause biosecurity risk and seriously undermines the producer's biosecurity assurance.</p> <p>Corrective actions for a Critical non-conformance shall be completed within 30 days and will require sign off by the Certification Body. A follow up site visit by the auditor may be required (at the applicant's expense).</p> <p>Critical failures will result in an increase of audit frequency and in some cases, may result in suspension or cancellation of a producer's ability to claim certification.</p>
Major	<p>A Major non-conformance may cause a biosecurity risk and jeopardize the producer's biosecurity assurance.</p> <p>Corrective actions for a Major non-conformance shall be completed within 30 days and will require sign off by the Certification Body to ensure effectiveness of the corrective action. A critical non-conformance can result if a producer has serious failure in any of the Critical compliance criteria, or serious failures in 10% or more applicable Major level criteria.</p>
Minor	<p>A Minor non-conformance does not put the producer's biosecurity assurance in immediate jeopardy, but if left unattended could lead to more serious non-conformance(s).</p> <p>There are no minimum requirements for Minors, however all Minor criteria will be audited.</p>

12.4. Non-compliance

Non-conformances identified during an audit will be documented by the Certification Body.

Producers shall identify root causes of problems and implement suitable corrective and preventive actions. The effectiveness of corrective actions will be verified by the Certification Body either with a follow up audit or by the applicant submitting evidence of corrective action and/or outstanding documents.

If corrective action has not been completed within the specified time the producer will be suspended from obtaining or claiming Scheme certification until the corrective action has been completed. Any nurseries which have on-going major non-conformances that are not corrected will have their certification status withdrawn.

Critical non-conformances will result in an increase of audit frequency and in some cases, may result in suspension or cancellation of a producer's ability to claim Scheme certification.

13. Appendix 1: Record Requirements

An integral part of good nursery biosecurity practice, and a significant component of any management or auditing system, is the maintenance of detailed nursery records. These systems facilitate good hygiene, pest monitoring and traceability. A good record and document control system provides the facility to maintain records for:

1. Materials, production and dispatch traceability – from suppliers through production to customer.
2. Internal and external audit findings.
3. Crop monitoring details and findings.
4. Training registers.

Traceability Records

Traceability records shall be kept for at least seven years from date of dispatch and be readily retrievable. They should be enough to enable tracing the entire chain of custody of plant materials, growing media and any other “organic” materials and include records of suppliers, buyers and others that can trace the entire chain of custody of nursery plant stock outputs.

Other records

Where an activity is undertaken, records maintained by the Producer for at least three years from the date of the activity should include:

- Worker Training Register
- Visitor Register stating visitor and contractors’ movements
- Trusted Supplier Register
- Plant mother stock register
- Supplies Receipt Register
- Supplies inspection and corrective action record
- Annual Crop Protection Plan and if used, agrichemical application records
- Crop Monitoring records
- Dispatch inspection and treatment records
- Internal audit records
- Dispatch signoff register
- Vehicle hygiene and corrective action log
- Propagation and production checklists
- Production records identifying batches, work on them and their movement through the production system
- Plant maintenance records
- Recycled container treatment records
- Growing area sanitation records
- Water test records

Note: where there is equivalence with another scheme, or a customer requirement that states a longer period, then that period should apply

Templates are provided in the PPBS Guidance documents to assist producers with record keeping.

14. Appendix 2: Specific Modules

- **Myrtle Rust** – for producers who grow plants from the *Myrtaceae* family.
- **Kauri Dieback Schedule** – for producers who grow *Agathis australis* (Kauri) and other identified alternate hosts of the pathogen *Phytophthora agathidicida* (kauri dieback)⁴.

⁴ Alternate hosts – at date of writing (9 October 2019) no alternate hosts have been identified.