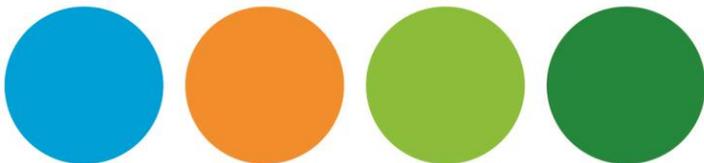




Core Standard

PLANT PRODUCTION BIOSECURITY SCHEME



DRAFT for PILOT P1.1 – 19 December 2018

Core Standard

Plant Production Biosecurity Scheme

[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; the Ministry for Primary Industry's funding of the design phase, 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 this standard'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 this standard and guidelines is to minimise the potential risk pest, no party can guarantee that adherence to these standards and guidelines will reduce such risk to zero.

Core Standard Contents

1. Purpose.....	5
2. Introduction.....	5
3. Definitions and Abbreviations	6
4. -	10
5. The Core Standard	10
6. Part A: Nursery Essentials.....	12
6.1 Nursery Details	12
6.2 Staff and Management Responsibilities.....	13
6.3 Staff Training.....	14
6.4 Signage.....	15
6.5 Visitors	16
7. Part B: Biosecurity Management Fundamentals.....	18
7.1 Biosecurity Best Practice	18
7.2 Hygiene	19
7.3 Crop Monitoring	22
7.4 Traceability	24
7.5 Trusted Suppliers	25
8. Part C: Hazard Management	27
8.1 Transplant.....	27
8.1.1 Plant Stock for planting	27
8.1.2 Growing Media	29
8.1.3 Fertiliser.....	31
8.1.4 Containers.....	33
8.1.5 Propagation	35
8.1.6 Potting and re-potting	37
8.1.7 Transport to and Placement in Container Growing Area	38
8.1.8 Transport to and Planting in Field	39
8.2 Growing	40
8.2.1 Growing Area.....	40
8.2.2 Irrigation	42
8.2.3 Nutrition Amendment – top dressing and/or fertigation	43
8.2.4 Crop Protection – pest, pathogen and weed control.....	44
8.2.5 Plant Growth and Training.....	45

8.2.6 Harvest from field.....	45
8.3 Dispatch.....	47
8.4 Plant Distribution and Transport.....	48
9. Document and Claims.....	50
10. Audit.....	50
10.1 Internal Audits.....	50
10.2 External Audits.....	51
10.3 Compliance Criteria.....	52
10.4 Non-compliance processes.....	53
11. Appendixes.....	54
11.1 Specific Modules.....	54
11.2 Record requirements.....	54
11.3 Templates for record keeping.....	55

Core Standard

1. Purpose

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

2. Introduction

Nursery stock is a well-recognised pathway for the long-distance dispersal of plant pests and pathogens, 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 pests and pathogens. 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 or pathogens. 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 free¹ of pests when they are sold.

The producer is required to implement a systems-based approach to address pest risk management. They must follow documented management system and/or build a body of evidence to demonstrate production has been undertaken under conditions of high biosecurity risk and hazard management. In doing so the producer provides assurance that plants they produce have been raised in conditions that minimise the introduction and 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 protocols for movement of material; crop monitoring, surveillance and risk mitigation.

Key steps include

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

¹ 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 (subject to review during pilot programme and best practice guidance development).

Biosecurity

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

Batch or crop

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.

Core Standard

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

Disinfest

Rid (a being or an object) of infesting vermin² 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.

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

² Vermin = unwanted animals of any sort

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.

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 Operator

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 the natural environment

Pest Plant

As per Biosecurity Act, NPPA, RPMS ...

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, DP 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.

Regulated pest

As per MPI unwanted organisms list, any other government list, NPPA list, Regional Council RPMS (within region only) – relevant sources would be listed in appendix or online)

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 protocol 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.

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.

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

Nursery inputs should be sourced from suppliers that the producer is confident can provide inputs that are free from pest contamination. These are recorded in the producer's trusted supplier register.

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.

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 staff 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 must implement to mitigate the risk that these hazards present.

Guidance is also provided for each step to assist the producer in identifying key risk management measures and records.

Part A:

Nursery Essentials

This section describes the nursery and general operating practices.

6. Part A: Nursery Essentials

6.1 Nursery Details

CORE STANDARD REQUIREMENTS

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

Key Measures: The Nursery manual shall describe

Contact details:

- Nursery name
- Scheme identity reference (if established)
- Physical address
- Mailing address if different from physical address
- Phone
- Email
- Person responsible for the nursery
- Person responsible for implementing this biosecurity Scheme
- Person responsible for undertaking internal audits for the nursery is implementation of the Scheme

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 sufficient for the reader to get an understanding of the operational process.

Productions sites

List all production sites (owned and leased) indicating their size, and location if different to the address above. The size of each production site should be indicated in either total square meters or hectares.

Nursery maps

For each production site prepare a map locating specific 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.

6.2 Staff and Management Responsibilities

CORE STANDARD REQUIREMENTS

The producer shall implement a systems-based approach to pest risk management. They 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 sufficient resources (physical, human and financial) to adequately meet the requirements of this Standard.

The nursery operator 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.

The nursery operator must ensure all staff that work on the nursery have access to this Core Standard and appropriate Specific Modules at all times.

The nursery operator may assign responsibility for the implementation of this Core Standard to senior staff member. That person(s) must 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 must ensure the Core Standard is being implemented properly. If possible, the internal auditor should not audit tasks they conduct themselves unless they are the sole employee.

Key Measures: The Nursery manual shall record

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

GUIDANCE

Best Practice

- Develop and maintain procedures for
 - > Record keeping. Records shall be kept for seven years (or longer if practicable), and shall be legible, identified and retrievable.
 - > Control of infested plants or materials.
 - > How internal audits are undertaken.
 - > How documents are maintained, reviewed and controlled.
- Records may be stored as hard copies or electronically. Where “registers” are referred to these may take any form that supports review and recovery should the need arise. Examples include production worksheets, spray diaries, staff training records and a visitors’ book. Some maybe pre-formatted books (eg visitors), word documents (eg Trusted Suppliers), spreadsheets (eg production records) or a production management system or database.
- Undertake a periodic check on the management system to ensure that it is being applied effectively and correctly.
- Undertake a review of nursery operations, biosecurity risks and hazards in the effectiveness of hazard management on an annual basis. Modify the Nursery Manual and take corrective action as needed.

6.3 Staff Training

CORE STANDARD REQUIREMENTS

Staff should be able to demonstrate biosecurity awareness informed by adequate training, supporting information and documentation. Training must be provided to management and employees so that they understand their roles and responsibilities across the issues and processes that contribute to risk and hazard management. Competent staff are a key component in biosecurity risk and hazard management.

Key Measures: The Nursery manual shall record

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

GUIDANCE

Hazards

- Staff who are not aware of biosecurity best practice can inadvertently spread a pest from one production area or crop to another.
- Untrained staff can miss or misinterpret symptoms of pest contamination.
- Staff can be sources of contamination

Best practice

- Work with staff so they are aware of biosecurity hazards, what to look out for and how to react if they find something that raises concern.
- Establish a formal process to induct new staff on the biosecurity practices of the business.
- Staff should be aware of tracking their own movements within the nursery, hygiene of their own equipment and their roles in enforcing movement control of plant material, growing media, equipment, vehicles, visitors and contractors.
- Workplace induction and training includes verbal and written instructions on basic nursery hygiene and biosecurity best practice.
- Written instructions can be supplemented by pictorial training guides or prominent signs
- Training should be refreshed annually and may be undertaken in-house or through external providers.
- If training records are not available for some staff, record details of their experience.
- Staff applying crop protectants, remedial treatments and herbicides must be Growsafe registered or under the supervision of a Growsafe registered person when applying spray materials that require this registration.
- For permanent staff, competence in task and need for any retraining should be verified at least every 2 years.

Record keeping

Training Register.

6.4 Signage

CORE STANDARD REQUIREMENTS

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

Biosecurity information and requirements should be clearly communicated by means of well-designed signage on entering the nursery. Biosecurity signage should be placed at the main gate, external entrances, visitor parking areas and wash-down facilities.

Key Measures: The Nursery manual shall require signage that

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

GUIDANCE

Best Practice

- Signs should highlight the risks staff and visitors could have on the nursery biosecurity and refer to hygiene (and safety requirements) systems in place.
- Adequate signage will ensure that everybody who enters the production site, or moves from an area of lower risk measures to one of higher risk (example carpark into production area, carpark to propagation unit), will see appropriate signage at least once.

6.5 Visitors

CORE STANDARD REQUIREMENTS

People moving between different nurseries and other horticultural enterprises can unknowingly spread pests and pathogens and mitigation measures should be implemented to reduce this threat.

Vehicles can harbour and transfer pests and pathogens, especially if contaminated with growing media and plant material.

Key Measures: The Nursery manual shall describe

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.

GUIDANCE

Hazards

- All nursery visitors and their vehicles can be sources of contamination.
- Visitors who have recently been on other nurseries, horticultural production sites, or parks and gardens present additional risk.
- Visitors who have recently been overseas may be a source of exotic pest contamination

Best Practice

- All visitors (contractors, customers etc.) entering the nursery must be made aware that the nursery is operating the Scheme (see Signage).
- Work with in advance with contractors on accepted practices, this will help protect the nursery biosecurity and make the contractor more aware.
- All visitor vehicle access to production areas should be restricted to only those places where it is necessary for the visit.
- Prior to entering production areas vehicles should be inspected for possible contaminants. If concerns are raised vehicles should be cleaned and sanitised (especially tyres and truck decks) prior to access to sensitive production areas.
- All visitors moving into or around nursery production areas must sign the visitor's register (apart from visitors that only visit the nursery office, administration building, or owner's house, if it is on the nursery property).
- The register must also detail all movements of contractors on and off site, and the areas of the nursery they accessed.
- Visitors must adhere to access procedures and where possible be accompanied by a staff member while on site.
- Scheme documentation/brochures are considered acceptable to raise awareness to new employees or contractors. These can be tailored to the site.
- Great care should be taken with people who have recently been overseas, or overseas visitors, to ensure that shoes and clothes are clean before entering the operation.

Record Keeping

- Visitor Register

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

7.1 Biosecurity Best Practice

CORE STANDARD REQUIREMENTS

Producers must demonstrate that they have implemented a systematic approach to nursery management, production, hygiene and biosecurity risk management.

Key Measures: The Nursery manual should describe

1. Measures in place to prevent incursions from pests
2. Measures in place to prevent exposure to pests during the production cycle
3. How weed species in the nursery are controlled

GUIDANCE

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.

The Scheme was developed to assist growers to work within government requirements, while minimizing the incidents of regulatory actions through best management practices at the nursery.

Biosecurity best practice is fostered through

- Management commitment to biosecurity best practice and building a workplace culture where this is instilled throughout the nursery and among its staff.
- Measures to prevent the nursery becoming infested with a pest from contaminated production inputs.
- A high standard of nursery production hygiene to prevent pests spreading through the nursery.
- Comprehensive inspection and monitoring programmes and corrective action protocols during the growing cycle.
- Measures to prevent the nursery spreading pests through plant distribution and transportation.

Nursery environments have historically been shown to aid the propagation of pests and pathogens, including many species that of significant biosecurity concern.

Containerized seedling production provides increased opportunities for improved media sterilisation and hygiene; however, wide-scale nursery surveys throughout Europe suggest many containerised nurseries have similar contamination rates to field-produced plants.

Nursery practices contributing to high population densities for instance of *Phytophthora* species include:

- Overly dense plantings;
- The proximity of various plant species enabling cross-infections;
- Reuse of green waste, mulch, compost or plastic containers without sterilization;
- Use of unfiltered surface water or recirculation of irrigation water without filtering or sterilization;
- Storing containerised nursery stock on poorly drained surfaces or even on the ground; and
- Collection of dead plants and plant debris near the production area that can harbour and/or facilitates pests and pathogens.

7.2 Hygiene

CORE STANDARD REQUIREMENTS

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 operator and are instrumental in reducing the likelihood of biosecurity threats entering the nursery and spreading within the nursery.

Key Measures: The Nursery manual shall describe

1. How access to nursery production areas is controlled
2. How staff and visitors are informed of nursery hygiene measures
3. How equipment and vehicles are cleaned
4. How plant and other biological waste is disposed of
5. How work areas are kept clean
6. 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 nursery operates on more than one site)

GUIDANCE

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. The Scheme was developed to assist growers to work within government requirements, while minimizing the incidents of regulatory actions through best management practices at the nursery.

Hazards

- Plant materials, people, equipment and vehicles are all potential sources of pests being introduced or spread around the nursery.

Best Practice

Generic

- Develop job hazard analyses and protocols that outline biosecurity hygiene measures

Nursery Site

- Construct nursery facilities to prevent the ingress of runoff water.
- Introduce systems to manage extraneous plant material and other risk material.
- Prevent the exposure of pots, plants, tools and irrigation hoses to contaminated soil by metalling or paving all walkways and surfaces and suppressing dust.
- Remove all weeds and pest plants within the nursery site, including where practicable along boundary fences to avoid weed seed contamination and alternate pest host sources. If weed seeds from neighbouring properties pose a problem, work with neighbours to try to eliminate the hazard.

Nursery Access

- Access to production and propagation areas should be restricted to those people directly involved in the production process. Access to production areas by visitors and other staff should be discouraged and managed appropriately.
- Signage identifying biosecurity risks and restricted areas should be displayed at all entrances to production areas. Signs should include contact details of the nursery operator for visitors to request access.
- Where practical, access should be limited to one point of entry to reduce the presence of unauthorised personnel.
- Only essential vehicles, machinery and equipment should be allowed in the production areas. Other non-essential equipment should be routed around or outside production areas.
- Nursery operators should ensure visiting contractors and other personnel are aware of the potential biosecurity risks in production areas, and only enter these areas when necessary.
- Staff and/or visitors who have recently been at other nurseries, horticultural production sites parks and gardens or overseas present additional risk. Check their clothing and vehicles for possible contamination particularly weeds seeds.

Nursery personnel

- All staff involved in nursery production have a responsibility for maintaining a high standard of biosecurity practice.
- This includes:
 - > Managing their own personal biosecurity before and between batches, and on arrival at and prior to leaving work.
 - > Ensuring footwear and clothing is clean especially when coming from possible areas of infection such as collecting plant material offsite.
 - > Footbaths should be provided for people to clean and disinfect footwear prior to entering a sensitive growing (example, greenhouses) or propagation areas.
 - > Staff should be trained in and fully aware of all biosecurity hygiene requirements before working with plant material.

Equipment cleaning

- Vehicles and tools are a common vector of biosecurity threats. Vehicles and tools dedicated to a particular site or task that can be easily cleaned and sanitised will reduce the risk of spreading pests and pathogens between sites.
- Tools and equipment used for propagation, maintenance and training should be cleaned and sanitised between batches, and at regular intervals when working on a large batch of plants.
- Vehicles and wheeled equipment should remain if possible on concrete or metaled pathways avoiding contact with soil. Where vehicles and/or equipment are directly exposed to soil they should be cleaned and washed down before entering other growing areas.
- New and second-hand equipment and machinery should be isolated on arrival, inspected and if necessary cleaned and disinfested before moving them into the nursery.

Plant and waste materials

- Trimmings and prunings may present a biosecurity risk and must be removed from plant production areas on a daily and not left lying around on site as a potential source of infection. It can be disposed of via in bulk waste, composting or deep burial.
- Spilt growing media also presents a biosecurity risk and should be swept and disposed.

- If used potting mix is recycled measures need to be put into place to manage contamination risk.

Work areas

- Production areas should be cleaned and prepared prior to placing a new container grown batch or planting a new field batch.
- Unsaleable or rejected plants should be removed and disposed of in an approved manner.
- Propagation work surfaces should have all plant material removed and disposed of, then cleaned and sanitised between batches and at the end of the day
- Container production growing areas should have all extraneous plant material removed and disposed of and beds or benches cleaned and sanitised between crops.

Multiple Sites

- Nurseries with multiple sites should consider ways of reducing the transfer of all but essential items (including plants, staff and equipment) between sites.
- Undertake a risk analysis of vehicles and equipment that are transferred between sites and implement measures as appropriate.

Useful references

- BioSecure – Section A1.5, A1.6

Record keeping

- Checklists provide a both a record and a reminder to sound nursery hygiene practices.
 - > Daily propagation and production hygiene checklist (and supervisor signoff)
 - > Production records

7.3 Crop Monitoring

CORE STANDARD REQUIREMENTS

Early pest detection may enable nursery management to take appropriate action, isolating or destroying infested plants and protecting remaining stock through good hygiene practices.

Crop monitoring is essential, so a producer knows which pests, pathogens and weeds are present, whether the populations are significant and if corrective actions need to be taken. A monitoring plan must be established for the nursery and monitoring routinely undertaken.

Key Measures: The Nursery manual shall describe

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.

GUIDANCE

Hazards

- Pest populations develop and spread without nursery management being aware of them

Best Practice

- Make a list of pests, pathogens and weeds of concern to your crops – descriptions, symptoms, photos and posters help staff become familiar with what to look out for.
- Encourage all staff to keep an eye out for and report any occurrence of pest symptoms whether they are of known treats on not. As staff handle plants on a frequent basis through the growing cycle and at dispatch they are in a strong position to report any pest symptoms.
- Use the nursery map to divide the nursery into areas where pest threats and risks are likely to be similar.
- Establish a formal monitoring plan with areas of the nursery inspected on a regular basis.
- The formal monitoring plan should identify the frequency of monitoring, how monitoring is conducted on what to look for.
- Formal monitoring should be undertaken by trained people and follow a routine procedure walking the perimeter of a crop or growing area and several transects through the block and its rows of plants.
- All plants and mother stock plants (if on the nursery site) should be monitored at intervals determined by the growing cycle of the given plant and its pest species.
- Mother stock plants not on the nursery site should be monitored inspected immediately prior to any propagation material being taken and where possible monitored through-out the year.
- Undertake corrective action if pests are detected, isolating plants where possible.
- If pests are detected but cannot be identified or if signs and/or symptoms are present and are unaccounted for take samples and send for diagnostic analysis for identification and then undertake appropriate corrective action
- Maintain records of pest detections noting details that help inform future monitoring – headings include, the pest, host plants, pest density, date reported, location in the nursery, prevailing winds, weather etc. Photos and posters will help staff awareness.

Useful references

- BioSecure – Section A1.8

Record keeping

- Crop monitoring records inclusive of
 - > Monitoring records to inform future monitoring
 - > Any pests identified and corrective action
 - > Samples that have been sent for diagnostics, the results and subsequent corrective action.

7.4 Traceability

CORE STANDARD REQUIREMENTS

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.

To facilitate this, plants should be batched 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.

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 Nursery manual shall describe

1. How batches of plants are established and identified.
2. The system of traceability from supplier through the nursery system to the customer, including:
 - > The source of nursery inputs and propagative or young plant material.
 - > How inputs and plant materials are traced through the production process.
 - > How sales and/or shipments can be traced.

GUIDANCE

Best Practice

- Good traceability records will enable quick access in the case of a pest incursion either in the nursery, at one of the nurseries suppliers and/or at one of their customers.
- Each production batch should be identifiable through each production step.
- 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 harvestable sold keep records of each batch.

Record keeping

- Nursery records should facilitate rapid recovery of data to show
 - > The source of all nursery inputs.
 - > Where propagative or young plant material came from for any given batch.
 - > How that batch progressed through the nursery production system.
 - > Who plants from that batch were sold/shipped to.

7.5 Trusted Suppliers

CORE STANDARD REQUIREMENTS

Anything that is sourced off site may present biosecurity risk. The material, its packaging or transport may be contaminated. A nursery is placing considerable trust in the supplier and should have some system in place to validate that trust.

Plant materials and other biological materials (example, growing media) should only be sourced from Scheme certified producers. In the absence of Certified Producers, the nursery shall source materials only from suppliers who are able to demonstrate they have measures in place to prevent the spread of pests. This will be in the form of a commitment to biosecurity quality assurance of a similar nature to this Standard, that is, they manage biosecurity risk through a system of measures, inspections and corrective action, so that you, the customer can have confidence you are not introducing pests (insects, pathogens, and hitchhiker pests) into your nursery.

Key Measures: The Nursery manual shall describe

1. How Trusted Suppliers are assessed and established so that the producer has confidence pests are unlikely to be introduced on materials sourced offsite.

GUIDANCE

Record keeping

- Trusted supplier register

Part C:

Hazard Management

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

8. Part C: Hazard Management

8.1 Transplant

8.1.1 Plant Stock for planting

CORE STANDARD REQUIREMENTS

The nursery operator must take steps to ensure that propagation stock and incoming plant material is practically free from known pests and pathogens. Early detection of pest organisms prior to introduction of new stock is essential to prevent spread and infestation of nursery stock. Nurseries must keep supplier details for traceability purposes and have systems in place to verify plant stock for planting is practically free from pests.

Key Measures: The Nursery manual shall describe

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.

GUIDANCE

HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Source young plants from offsite.		Plants, transport, containers and/or packaging are contaminated with pests <ul style="list-style-type: none"> • Pathogens • Insects or hitch-hiker pests • Weeds 	<p>Source plants only from trusted suppliers.</p> <p>Inspect and/or test plants sourced offsite upon receipt.</p> <p>Isolate imported material until inspections are complete.</p> <p>Nominate an isolation period and treatments.</p> <p>Consider preventative application of crop protection product</p>	<p>Identify pest signs and/or symptoms and treat appropriately.</p> <p>Undertake diagnostic testing where symptoms are unable to be identified and treat appropriately.</p> <p>Reject, or isolate and treat contaminated plant material or packaging.</p>
Source propagation material from mother stock plants from on- or offsite.		Mother stock plants and/or transport / packaging are contaminated with pests <ul style="list-style-type: none"> • Pathogens • Insects or hitch-hiker pests • Weeds 	<p>Source propagation material from mother plants and locations free of pests.</p> <p>Maintain mother plants in a high state of health and if possible, position growing areas away from potential pest reservoirs.</p>	<p>Identify pest signs and/or symptoms and treat appropriately.</p> <p>Undertake diagnostic testing where symptoms are unable to be identified and treat appropriately.</p>

			<p>Inspect mother stock plants where practicable on a regular basis and always immediately prior to harvesting propagation material.</p> <p>Keep packaging and transport materials free of pests, soil and non-target plant material.</p>	<p>Treat or remove infested mother stock</p> <p>Reject, or isolate and treat contaminated plant material or packaging</p>
--	--	--	---	---

APP = tick this column if the step, action or hazard applies to your nursery.

Hazards

- Good traceability records will enable quick access in the case of a pest incursion either in the nursery, at one of the nurseries suppliers and/or at one of their customers.
- Each production batch should be identifiable through each production step.
- 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 harvestable sold keep records of each batch.

Record keeping

- Trusted supplier register
- Materials inspection and corrective action record
- Production records

8.1.2 Growing Media

CORE STANDARD REQUIREMENTS

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 spread of pests. The Nursery shall record supplier information and details of any pest or pathogen assurance programme.

Key Measures: The Nursery manual shall describe

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.

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Source growing media or component materials.		Media, component materials, packaging and/or transport contaminated with pests <ul style="list-style-type: none"> • Pathogens • Insect or hitch-hiker pests Weeds	Source media and materials from trusted suppliers. Inspect materials upon receipt. If component materials are sources from the “wild” undertake a risk assessment to identify the risk of a pest (unwanted insect, pathogen or hitch hiker) being introduced into the nursery.	Where possible, reject contaminated materials before they are unloaded. Treat or dispose of contaminated materials already on-site.
Prepare growing media.		Contamination during mixing <ul style="list-style-type: none"> • Mixing equipment Mixing surfaces	Clean and sanitise equipment on a regular basis. Keep mixing surfaces free of pests, plant material and static water.	
Store growing media or component materials.		Contamination during storage <ul style="list-style-type: none"> • Pathogens • Insect or hitch-hiker pests Weeds	Construct storage areas to prevent from ingress of runoff water, plant material and other risk material. Keep storage areas free from pests.	Treat or dispose of contaminated media or components.

Soilless growing media or component materials are recycled.		Pathogens and/or weed seeds are carried over from prior crops into new production.	Media and/or component materials are sterilised prior to reuse.	
---	--	--	---	--

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Trusted supplier register
- Materials inspection and corrective action record
- Production records

8.1.3 Fertiliser

CORE STANDARD REQUIREMENTS

Manufactured fertilisers are unlikely to present a threat to the biosecurity of a nursery other than hitch hikers being introduced inadvertently on packing. The Nursery shall record supplier information and details of any pest or pathogen assurance programme 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 Nursery manual shall describe

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 incursions.
4. Measures to manage contamination risk if organic manures are used.

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Source fertiliser		Fertiliser, packaging and/or transport contaminated with pests <ul style="list-style-type: none"> • Pathogens • Insect or hitch-hiker pests • Weeds 	Source fertiliser from trusted suppliers. Use reliable transporters who regularly clean their vehicles. Inspect materials upon receipt.	Where possible, reject contaminated materials before they are unloaded. Treat or dispose of contaminated materials already on-site
Source organic manures		Manure, packaging and/or transport contaminated with pests <ul style="list-style-type: none"> • Pathogens • Insect or hitch-hiker pests • Weeds 	Undertake a risk analysis. Source materials from trusted suppliers. Inspect materials upon receipt.	Where possible, reject contaminated materials before they are unloaded. Treat or dispose of contaminated materials already on-site.
Store fertiliser or manures		Contamination during storage <ul style="list-style-type: none"> • Pathogens • Insect or hitch-hiker pests • Weeds 	Construct storage areas to prevent from ingress of runoff water, plant material and other risk material. Keep storage areas free from pests,	Treat or dispose of contaminated organic fertiliser and manures.

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Trusted supplier register
- Materials inspection and corrective action record

8.1.4 Containers

CORE STANDARD REQUIREMENTS

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 recycled, measures must be in place to ensure pests are not carried forward to new crops.

Key Measures: The Nursery manual shall describe

1. Record 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 recycled.

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Source containers.		Containers, packaging and/or transport contaminated with pests <ul style="list-style-type: none"> • Insect or hitch-hiker pests • Weeds 	Source containers from trusted suppliers. Use reliable transporters who regularly clean their vehicles. Inspect materials upon receipt.	Where possible, reject contaminated materials before they are unloaded. Treat or dispose of contaminated materials already on-site
Store containers.		Contamination during storage <ul style="list-style-type: none"> • Insect or hitch-hiker pests • Weeds 	Construct storage areas to prevent from ingress of runoff water. Maintain storage area free of weeds, accumulations of plant and other risk materials. Keep storage areas free from pests. Inspect for contamination prior to use.	Treat contaminated containers.
Recycle containers for reuse on site.		Contamination from prior crops or storage prior to reuse <ul style="list-style-type: none"> • Pathogens • Insect or hitch-hiker pests • Weeds 	Sanitise and disinfest prior to reuse. Inspect for contamination prior to use.	Treat contaminated containers.

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Materials inspection and corrective action record
- Recycled container treatment records

8.1.5 Propagation

CORE STANDARD REQUIREMENTS

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 staff 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 Nursery manual shall describe

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

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Prepare propagules		Contaminated incoming propagules Contamination from staff, propagation environment & tools	Inspect materials upon receipt. Maintain facility and staff hygiene measures - Refer section Error! Reference source not found. Clean-up waste – media, soil and green waste.	Where possible, reject contaminated materials before they are taken unloaded. Isolate and treat contaminated materials Sanitise contaminated environment & tools.
Plant propagules		Contamination of incoming stock Contamination from staff, environment & tools Containers are contaminated with pests	Maintain facility and staff hygiene measures - Refer section Error! Reference source not found. Clean-up waste – media, soil and green waste. Inspect containers before use.	Sanitise contaminated environment, tools and containers.
Grow propagules		Contamination from staff, environment & tools	Maintain hygiene measures in the growing areas. Monitor growing areas on a regular basis.	Identify pest, its signs and/or symptoms and treat appropriately. Undertake diagnostic testing where signs and/or symptoms are unable to be identified and treat appropriately. Reject, or isolate and treat contaminated plant material. Sanitise contaminated growing areas.

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Materials inspection and corrective action record
- Facility hygiene checklists
- Propagation production records
- Monitoring and corrective action record

8.1.6 Potting and re-potting

CORE STANDARD REQUIREMENTS

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 staff who work in or visit the potting facility.

Sound nursery hygiene practices are critical to growing and protecting young plant stock (see Refer section **Error! Reference source not found.**).

Key Measures: The Nursery manual shall describe

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

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Prepare plant stock		Contaminated incoming plant stock. Contamination from staff, potting environment, machinery & tools.	Inspect materials upon receipt. Maintain facility and staff hygiene measures - Refer section Error! Reference source not found. Clean-up waste – media, soil and green waste.	Where possible, reject contaminated materials before they are taken unloaded. Isolate and treat contaminated materials Sanitise contaminated environment & tools.
Potting		Contamination from staff, environment & tools. Containers are contaminated with pests.	Maintain facility and staff hygiene measures - Refer section Error! Reference source not found... Regularly clean and disinfect potting environment, machinery and tools. Clean-up waste – media, soil and green waste. Inspect containers before use.	Sanitise contaminated environment, tools and containers.

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Materials inspection and corrective action record
- Facility hygiene checklists
- Potting production records
- Monitoring and corrective action record

8.1.7 Transport to and Placement in Container Growing Area

CORE STANDARD REQUIREMENTS

As newly potted container stock is transported to the growing area it is at risk of contamination from equipment and staff. 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 (see section **Error! Reference source not found.**)

Key Measures: The Nursery manual shall describe

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

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Transport to growing area.		Contamination of plants from staff and transport equipment. Contamination of plant stock near to roadways by water splash from standing water.	Maintain staff hygiene measures - Refer section Error! Reference source not found. Clean and sanitise transport equipment on a regular basis. Construct paths and roadways to eliminate standing water.	Treat contaminated plants. Sanitise contaminated equipment.
Placement containers in in growing area.		Contamination of plants from staff. Contamination from prior crops.	Maintain facility and staff hygiene measures - Refer section Error! Reference source not found. Clean and disinfest container growing area prior to placement of new crops.	Sanitise contaminated environment, tools and containers.

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Facility hygiene checklists
- In-between crops clean up records
- Production records

8.1.8 Transport to and Planting in Field

CORE STANDARD REQUIREMENTS

As newly prepared stock is transported and planted in the field it is at risk of contamination from equipment and staff. 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 (see Section **Error! Reference source not found..**)

Key Measures: The Nursery manual shall describe

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

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Transport to growing area		Contamination of plants from staff and transportation. Contamination of plant stock near to roadways by water splash from standing water. Lost plants	Adopt strong staff hygiene measures - Refer section Error! Reference source not found.. Covered in transport if going off site while transporting plants to avoid both stress and possible contamination. Clean and sanitise transport equipment on a regular basis. Construct paths and roadways to eliminate standing water. Maintain record keeping of plants that leave the nursery shed and plants that are planted in the field.	Treat contaminated plants. Sanitise contaminated equipment.
Planting stock in field.		Contamination of plants from staff. Contamination from prior crops.	Adopt strong facility and staff hygiene measures - Refer section Error! Reference source not found.. Clean and <u>disinfect</u> growing area prior to planting new crops.	Sanitise contaminated environment, tools and containers.

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Production records
- Facility hygiene checklists
- Monitoring and corrective action record

8.2 Growing

8.2.1 Growing Area

CORE STANDARD REQUIREMENTS

Plants in growing areas (greenhouses, container standing out beds, in the field etc) are exposed to a wide range of biosecurity hazards. Hazard 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 Nursery manual shall describe

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

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Plant growth while in container and inground growing areas.		<p>Contamination from growing facilities, equipment and surrounds.</p> <p>Staff introduction pests from elsewhere on site.</p> <p>Contamination build up through the growing cycle</p> <p>Pathogen spread through poorly designed and drained growing areas.</p> <p>Soil borne pathogens build in field production areas up over time.</p> <p>Weeds in growing area or nearby harbour insect, hitch-hiker or pathogen pests.</p>	<p>Construct greenhouses, growing areas and benches from materials that isolate plants from potential contamination.</p> <p>Construct growing areas so that water drains freely and does not accumulate on the surface.</p> <p>Ensure growing and adjacent areas are free of pests.</p> <p>Adopt strong facility and staff hygiene measures - Refer section Error! Reference source not found...</p> <p>Keep growing and nearby areas and equipment clean, weed free and clear of waste materials.</p> <p>Undertake routine pest monitoring and crop inspections – see Section 7.3.</p>	<p>Identify pests, their signs and/or symptoms and treat appropriately.</p> <p>Undertake diagnostic testing where signs and/or symptoms are unable to be identified and treat appropriately.</p> <p>Reject, or isolate and treat affected plants.</p> <p>Treat facilities where plants are grown appropriately.</p>
Plant growth in inground growing areas		<p>As per above and ...</p> <p>Build-up of bacteria</p>	<p>As per above and ...</p> <p>Rest or rotate field production areas on an appropriately scheduled basis.</p> <p>Fallow period with cover crop</p>	

		Contamination through visitors	<p>Clear signage and fencing to prohibit visitors.</p> <p>Limit access to only foot access – authorised vehicles only.</p> <p>Washdown site provided for any vehicles that enter site</p> <p>Foot baths/brushes provided for visitors.</p>	
--	--	--------------------------------	--	--

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Production records
- Monitoring and corrective action record

8.2.2 Irrigation

CORE STANDARD REQUIREMENTS

Irrigation water is sourced from a wide range of sources, some of which are more susceptible to contamination than others.

- Water from surface features (rivers, ponds, dams) and shallow bores presents a hazard and where risks are identified and confirmed appropriate disinfection measures should be introduced.
- Water from town supply, deep wells and clean roof catchments present a lesser hazard and are not likely to require treatment.
- Water stored in a way that exposes it to the risk of contamination (example in dam and uncovered tanks).
- Recycled water presents a high contamination hazard and will almost certainly require treatment prior to reuse.

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

Key Measures: The Nursery manual shall describe

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

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Irrigation		<p>Plants are contaminated from water-borne pathogens.</p> <p>Growing areas are poorly drained enabling pathogen build-up in standing water.</p> <p>Recycled water is contaminated.</p>	<p>Check water quality regularly and treat as appropriate.</p> <p>Construct growing areas so that water drains freely and does not accumulate on the surface.</p> <p>Run-off from growing and adjacent areas should be directed away from growing areas, and if recycled treated appropriately.</p>	<p>Treat water.</p> <p>Rectify issues arising from poor irrigation design and/or run-off management.</p>

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Water test records
- Water treatment records – where water sources require treatment or where water is recycled.

8.2.3 Nutrition Amendment – top dressing and/or fertigation

CORE STANDARD REQUIREMENTS

Contamination risks from nutrition amendment in the growing area arise from staff 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 Nursery manual shall describe

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

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Nutrition amendment		<p>Plants are contaminated by staff or equipment while applying fertiliser.</p> <p>Fertiliser and manure are contaminated.</p> <p>Water used in fertigation solutions is contaminated.</p>	<p>Adopt strong facility and staff hygiene measures - Refer section Error! Reference source not found..</p> <p>Refer Fertilisers – section 8.1.3.</p> <p>Check water quality regularly and treat as appropriate.</p>	<p>Treat water.</p> <p>Rectify issues arising from poor irrigation design.</p>

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Production records

8.2.4 Crop Protection – pest, pathogen and weed control

CORE STANDARD REQUIREMENTS

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 will identify key pest threats, monitoring and subsequent corrective action, and/or a routine agrichemical programme. If agrichemicals are applied, the plan will have been developed to ensure the use of effective and appropriate agrichemicals, off-label use evaluation, and include product rotation to minimise the risk of resistance build-up.

Records are to be kept of all agrichemical applications and weather conditions at time of application. Agrichemical practices must be in accordance with associated agrichemical regulations such as the Agrichemical Code of Practice (NZS 8409 2004), Growsafe, Approved Handler and regional council regulations as appropriate.

Key Measures: The Nursery manual shall describe

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

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Pest, pathogen, insect and weed management		Plants are destroyed by, or lose value through the presence of pests	Develop and crop protection programme including: <ul style="list-style-type: none"> • Key pest issues/concerns • Monitoring and corrective action procedures • Agrichemical selection parameters. • Maintain vigilance. Maintain agrichemical application equipment to a high standard Train staff in appropriate use of equipment and agrichemicals.	Identify pest symptoms and treat appropriately. Undertake diagnostic testing where pests, signs and/or symptoms are unable to be identified and treat appropriately. Service and calibrate equipment as appropriate

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Production records
- Monitoring and corrective action records
- Agrichemical application diary

8.2.5 Plant Growth and Training

CORE STANDARD REQUIREMENTS

Contamination risks during pruning and other activities to manage growing plants can arise from staff who may introduce inadvertently pests from other parts of the nursery (or from offsite), from contaminated equipment and tools and pest build up in any pruning or other waste left in the growing areas.

Key Measures: The Nursery manual shall describe

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

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Plant shape and growth management and maintenance.		Plants are contaminated by staff or equipment while undertaking plant maintenance. Pests build up in prunings and other waste left in growing area.	Adopt strong facility and staff hygiene measures - Refer section Error! Reference source not found.. Remove waste materials.	Treat affected plants as appropriate.
Plant shape and growth management and maintenance in inground crops		Contamination of wounds generated through pruning and training.	Preventative sprays or wound dressings in the case of large cuts applied after wounds made. Clean tools after a set time (completion of a block or bay, plant, row, lot, determined by nursery).	
		Contamination from machinery	Machinery wash down and cleaning protocols – between blocks. Machinery wash down site contained at one location. Sanitise machinery that has been on another nursery, horticultural property or park or garden.	

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Plant maintenance records
- Corrective action register

8.2.6 Harvest from field

CORE STANDARD REQUIREMENTS

Contamination risks during harvest can arise from staff who may introduce pests from other parts of the nursery (or from offsite), through handling and from contaminated equipment, tools and storage facilities.

Key Measures: The Nursery manual shall describe

1. Measures to avoid contamination during the harvest process

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Harvest inground plants and prepare for dispatch or moving to another nursery location		Transmission of pathogens through handling	<p>Adopt strong facility and staff hygiene measures - Refer section Error! Reference source not found.</p> <p>Harvest plants into bins lined with clean or sanitised bags.</p> <p>Transport to processing shed as soon as possible after harvest</p> <p>Hygiene controls for wash down areas</p> <p>Handle only one bin of product at a time – effectively placing everything in quarantine.</p> <p>Store processed plants in a different place to recently harvested plants.</p> <p>Washed down plants to go into bin lined with new clean bag.</p>	Treat contaminated plants as appropriate.
		Pathogens in cool storage	<p>Plants dipped into chemical fungicide prior to cool storage.</p> <p>Dipping mixture is changed regularly (defined through testing of chemical mix to make sure it is still active and no build-up of bacteria).</p>	

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Production records
- Corrective action register

8.3 Dispatch

CORE STANDARD REQUIREMENTS

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 and materials are key steps to safeguard plant health, a producer's reputation and their customers interests.

Key Measures: The Nursery manual shall describe

1. The process and person(s) authorised to undertake and clear plants for dispatch.
2. Measures to avoid contamination during the dispatch process.
3. Dispatch records that detail final inspection and signoff, date of dispatch and any pre-dispatch treatment, and traceability information (including reference to invoice which should detail species shipped).

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Order picking		Contamination of plants through handling, tools and equipment	Adopt strong facility and staff hygiene measures - Refer section Error! Reference source not found...	Report detection of affected plants. Treat or reject as appropriate.
Transport to dispatch area		Contamination of plants during transport.	Clean and sanitise tools, vehicles, trailers, carts etc as appropriate	Disinfest contaminated equipment
Detailing		Contamination of plants through handling, tools and equipment. Build-up of pests in plant waste and other materials.	Adopt strong facility and staff hygiene measures - Refer section 7.2. Check, clean, disinfest.	Report detection of contaminated plants. Treat or reject as appropriate.
Packing		Packaging, trolleys, pallets, cartons and other materials are contaminated	Check, clean, disinfest.	Treat or reject contaminated materials

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Monitoring and corrective action records
- Dispatch and traceability records

8.4 Plant Distribution and Transport

CORE STANDARD REQUIREMENTS

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.

Nurseries shall provide transport operators (including their own drivers) assurance that the plants and their packaging have been inspected and signed off prior to shipping.

Transport operators should not accept shipments unless they receive appropriate shipping signoff from the nursery operator. Further, they shall ensure that their trucks are kept clean and that plant debris are not left to build-up on the truck deck.

Key Measures: The Nursery manual shall describe

1. The process for the completion of the nursery dispatch clearance.

Transport operators shall have a Standard Operating Procedure describing measures to manage plant debris is on trunk decks.

GUIDANCE

POTENTIAL HAZARDS

Step /Action	APP	Hazard	Common Control Measures	Corrective Actions
Plant and other organic debris build-up on trunk decks and shelving.		Contamination of plants from pests in the debris.	Sweep the deck clear as the opportunity arises while travelling, or when empty, or at least weekly. Inspect plants and report the presence of any pests, symptoms and/or signs.	If the pest or symptoms and/or are detected, clean was sanitise truck deck, shelving, walls and equipment as appropriate.
Plants from other nurseries		Contamination from co-shipped product.	Only carry product from trusted nurseries and where the appropriate Nursery Dispatch Declaration has been provided Inspect plants and report any symptoms	If the pest or symptoms and/or signs are detected, clean was sanitise truck deck, shelves, walls and equipment as appropriate.
Vehicle contamination		Contamination from pests on the vehicle	Clean vehicles on a regular basis paying attention to built-up soil and plant materials.	
Contamination introduced by the driver			Drivers maintain hygiene measures, for example when arriving on site or before and	

			<p>after handing plants drivers should:</p> <ul style="list-style-type: none"> • Inspect clothing and footwear for contamination • Wash hands and gloves. 	
Couriers		Contamination from other freight stacked on top of open cartons.		

APP = tick this column if the step, action or hazard applies to your nursery.

Record keeping

- Dispatch clearance register
- Vehicle hygiene and corrective action log

9. Document and Claims

CORE STANDARD REQUIREMENTS

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 Nursery manual shall describe

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

10. Audit

CORE STANDARD 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.

10.1 Internal Audits

The plant producer must 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 Nursery manual shall describe

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

10.2 External Audits

External audits are done by the Certification Body and undertaken to certify that the operator 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. Nurseries that have critical non-conformances (i.e. [TBC] critical or [TBC] or more Major non-conformances) identified in their external audit may move to an increased audit frequency of 6 months.

10.3 Compliance Criteria

A nursery 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 (ie. hygiene) will receive a Critical non-conformance. Nurseries 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

A Critical non-conformance is a serious failure that is likely to cause biosecurity risk and seriously undermines the nursery's biosecurity assurance.

Corrective actions for a Critical non-conformance must 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).

Critical failures will result in an increase of audit frequency and in some cases, may result in suspension or cancellation of a nursery's ability to sell certified plants.

Producers are unable to claim Scheme certification until corrective actions for Critical non-conformances are addressed and signed off by the external auditor.

Major

A Major non-conformance may cause a biosecurity risk and jeopardize the nursery's biosecurity assurance.

Corrective actions for a Major non-conformance must be completed within 30 days and will require sign off by the Certification Body to ensure effectiveness of the corrective action. A follow up site visit by the auditor may be required (at the applicant's expense).

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.

Minor

A Minor non-conformance does not put the nursery's biosecurity assurance in immediate jeopardy, but if left unattended could lead to more serious non-conformance(s).

There are no minimum requirements for Minors, however all Minor assessment points will be audited.

10.4 Non-compliance processes

Non-conformances identified during an audit must 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 must 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.

11. Appendixes

11.1 Specific Modules

- **Myrtle Rust** – for all producers who grow Myrtaceae

11.2 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.

Records should be maintained for 7 or more years from the date of dispatch.

Records that should be maintained by the Nursery include:

- Staff Training Register
- Visitor Register stating visitor and contractors' movements
- Trusted Supplier Register
- Plant mother stock register
- Materials Receipt Register
- Materials inspection and corrective action record
- Plant Traceability records, including suppliers, buyers and records that can trace the entire chain of custody
- 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

11.3 Templates for record keeping

- Templates will be provided to assist producers with record keeping.

