



PLANT PASS SCHEME DOC #22

Kauri Schedule

V2.0 – 7 October 2022

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BIOSECURITY 2025

PLANT PASS SCHEME

Kauri Schedule

7 October 2022

Plant Pass Scheme

Scheme Manager – NZPPI

PO Box 3443, Wellington, 6140

P 04 918 3511, E office@plantpass.org.nz

Updates

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

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

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

Acknowledgements

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

Disclaimer

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

Revisions

V1.0 – February 2020

V1.1 – 10 June 2021

- Rebranding as Plant Pass
- Update references Kauri Protection Programme website and email
- Minor typos corrected

V2.0 – 7 October 2022

- Renamed as the “Kauri Schedule”
- Minor typos corrected
- Alignment with the National PA Pest Management Plan 2022
 - Obligation to report – Section 6
 - Obligation to undertake testing on suspicion of *Phytophthora agathidicida* – Section 6
 - Change required monitoring frequency from monthly to weekly – Section 5.3
 - Remove requirements pertaining to management of wild animals – was in Section 5.8
 - Remove requirements to not using recycled water – was in Section 5.8Note for clarity, the Plant Pass Core Standard addresses the use and treatment of recycled water, see Section 9.2.3 in that document.

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Kauri Schedule

measures to manage *Phytophthora agathidicida* in addition to the core standard, its checklist and the Phytophthora Specific Module

Phytophthora agathidicida Schedule

1. Purpose

This document is a Schedule under the Plant Pass Phytophthora Specific Module that pertains to plant producers who grow *Agathis australis* (kauri). It supplements the Core Standard of the Plant Pass Scheme (the Scheme) and describes specific measures to manage the risk of a nursery becoming infected by or spreading the pathogen *Phytophthora agathidicida* (kauri dieback).

2. Introduction

Kauri dieback is an incurable, fatal disease caused by the oomycete *Phytophthora agathidicida* (Pa) which affects NZ's iconic kauri (*Agathis australis*). Symptoms include root rot and associated rot in a collar around the base of the tree, bleeding resin, yellowing and chlorosis of the leaves followed by extensive defoliation, and finally, death.

The pathogen was first detected in NZ kauri in 1972; it continues to spread and is the subject of extensive disease management efforts by regional authorities and Tiakina Kauri - Kauri Protection Agency (www.kauriprotection.co.nz). The latter's National Pest Management Plan (PaNPMP, www.kauriprotection.co.nz/national-plan) includes rules/regulations to reduce the likelihood of inadvertent *Phytophthora agathidicida* spread.

Rule 3 of the PaNPMP pertains to those who grow kauri, and from 2 August 2022 all kauri plants/trees must be grown according to a kauri plant production plan if they are going to be moved off the property from which they were grown. Tiakina Kauri recognises certification to the Plant Pass Core Standard and this Kauri Schedule demonstrates compliance to the PaNPMP.

Plant producers play an important role in protecting kauri. Nurseries provide ideal conditions for *Phytophthora* development. If *Phytophthora agathidicida* is introduced to a nursery, it can rapidly spread through young kauri crops in the nursery, and in turn, to kauri forests, restoration areas, amenity plantings and home gardens as infected (and possibly asymptomatic) plants are shipped from nurseries.

Key opportunities for *Phytophthora* to enter a nursery and spread through its production cycle include:

- Contaminated propagules or imported infected (but possibly asymptomatic) plant materials and any associated substrates (soil and or potting media for example)
- Contaminated water, potting and growing media or pots.
- Poor sanitation practices and use of contaminated equipment through the production cycle.

3. Scope

Measures described in this *Phytophthora agathidicida* Schedule are designed to manage biosecurity risks for all plant producers who grow *Agathis australis* (kauri).

This Schedule supplements the Plant Pass Core Standard and the *Phytophthora* Specific Module and should be read in association with that standard and module. Certification to the *Phytophthora agathidicida* Schedule relies upon and can only be granted by Plant Pass where a plant producer meets the requirements for certification to the Core Standard.

While at the time of writing (October 2022) the Schedule only applies to producers who grow *Agathis australis* (kauri), if additional plant species are identified as hosting or vectoring *Phytophthora agathidicida*, the Schedule will be extended to growers of those plant species.

NOTE: The Biosecurity Act 1993 mandates actions which if they are instigated by MPI over-ride this module.

4. Managing Nursery Risk

Phytophthora risk management in nurseries is focused on an integrated approach to prevent *Phytophthora* from entering the nursery and its subsequent spread through the production cycle through to out planting. It is necessary to adopt an entire clean production system to achieve the goal of producing healthy plants, this includes a high standard of nursery hygiene: clean stock, clean soil, clean water. The Scheme and this Schedule forms the basis of measures to prevent the introduction of *Phytophthora* into nursery stock rather than attempting to suppress it after plants are already infected. If there is no *Phytophthora*, there will be no *phytophthora* diseases.

The Plant Pass Scheme provides a layered approach to *Phytophthora agathidicida* risk management:

1. The Scheme's **Core Standard** and **Guidance** acknowledges diversity among the nursery industry 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. It focuses on core biosecurity best practice encompassing management and staff 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.
2. The ***Phytophthora* Specific Module** identifies further measures that should be undertaken by plant producers who grow plants species which are susceptible to *Phytophthora* or distribute plants to markets or environments where *Phytophthora* is an identified risk – example, avoiding application of fungicides for the control of *Phytophthora* (eg phosphites) which can delay onset of symptoms in plants that are already infected.
3. This **Kauri Schedule** drills down further identifying measure specific to managing the threat of *Phytophthora agathidicida* to kauri – example, mandating cleaning and sanitation procedures for workers, vehicles, equipment and materials before leaving the nursery to visit kauri forests and before returning from forests to the nursery.

A hierarchy of risk management is established:

1. The Plant Pass Core Standard and Plant Pass Guidance establish broad measures and guidance.
2. The *Phytophthora* module guidance describes measures relevant to all *Phytophthora* species.
3. This *Phytophthora agathidicida* Schedule focus on additional measures to protect kauri.

All three help protect a plant producer growing kauri and the markets and environments they ship their plants to.

5. Nursery measures

The following tabulation identifies

1. The key *Phytophthora agathidicida* risk issues.
2. Mandated **Kauri Schedule measures** – that is, additional audited Standard requirements.
3. Cross reference to the Core Standard's generic requirements and mitigations described in Plant Pass Guidance materials.
4. Additional guidance to manage *Phytophthora agathidicida* risk.

5.1. Management and worker awareness

Risk issue	<i>Phytophthora agathidicida</i> can be spread or unnoticed by workers as they go about routine nursery activities.	
Kauri Schedule Measures	The plant producer shall be able to provide evidence of <ul style="list-style-type: none"> • Management awareness of <i>Phytophthora agathidicida</i> and how it is spread. • Training processes that include <i>Phytophthora agathidicida</i> awareness, issues and sign or symptoms, and how to respond to signs or symptoms or kauri plant decline. 	
Core Standard & Guidance	6.3	Worker training
Additional guidance	<ul style="list-style-type: none"> • Signs and symptoms <i>Phytophthora agathidicida</i> are noted at https://www.kauriprotection.co.nz/recognising-symptoms/ 	

5.2. Risk activity

Risk issue	Kauri production is often undertaken in association with kauri forest activities giving rise to the risk that <i>Phytophthora agathidicida</i> can be transferred between the nursery and forests and vice versa.	
Kauri Schedule Measures	The plant producer shall be able to provide evidence of <ul style="list-style-type: none"> • Cleaning and sanitation procedures for workers, vehicles, equipment and materials before leaving the nursery to visit kauri forests and before returning from forests to the nursery. 	
Core Standard & Guidance	7.2	Hygiene
Additional guidance	<ul style="list-style-type: none"> • The disinfectants Virkon® S, Janola®, and Sterigene have been tested and proven effective against <i>Phytophthora agathidicida</i>. • Use of dedicated clothing and footwear for forest work is recommended and should be changed before re-entering the nursery. 	

5.3. Crop Monitoring

Risk issue	Disease symptoms unnoticed in the nursery can lead to production losses and risk of further spread.	
Kauri Schedule Measures	The plant producer shall be able to provide evidence of <ul style="list-style-type: none"> • A weekly monitoring programme with documented procedures, with outcomes kept on record for a minimum of three years. • A documented response procedure in case of signs and symptoms of <i>Phytophthora agathidicida</i> being suspected, plant decline or a positive diagnostic test result. 	
Core Standard & Guidance	7.3	Crop monitoring
Additional guidance	<ul style="list-style-type: none"> • If you suspect <i>Phytophthora agathidicida</i> infection or kauri plants show any signs of disease or sickness refer to Section 6 below. • NOTE – <i>Phytophthora agathidicida</i> is an “unwanted organism” under the Biosecurity Act. Under section 53 of the Biosecurity Act it is an offence to sell or propagate plants that one suspects contain an unwanted organism. 	

5.4. Traceability		
Risk issue	In the event of <i>Phytophthora agathidicida</i> being detected in a nursery is it essential to understand where it may have come from, how it entered the nursery and where, if any, infected plants may have been distributed.	
Kauri Schedule Measures	<p>The plant producer shall be able to provide evidence of</p> <ul style="list-style-type: none"> • A strict batching process for kauri crops where plants from each seed sowing and/or potting activity are treated as a separate batch. • That larger batches of kauri are split into smaller sub-batches to limit risk of inadvertent contamination spreading more widely. 	
Core Standard & Guidance	7.4	Traceability
Additional guidance	<ul style="list-style-type: none"> • Strong traceability records identifying the origin of kauri plant material and how it progresses through the nursery and through to the customer or planting site will enable rapid location of potential infection sites should kauri dieback be detected at any stage of production. 	
5.5. Seed collection		
Risk issue	While seed is recognised as an unlikely pathogen carrier, seed collection activities present a risk and there is a risk of other contaminated materials being inadvertently brought back from the seed source to the nursery.	
Kauri Schedule Measures	<p>The plant producer shall be able to provide evidence of</p> <ul style="list-style-type: none"> • Policies and/or processes to ensure cones and seed collected are <ul style="list-style-type: none"> ○ Free from soil, invertebrates, water and other organic matter and ○ from areas where <i>Phytophthora agathidicida</i> has not been detected and ○ from healthy trees with good foliage cover and showing no signs or symptoms of <i>Phytophthora agathidicida</i>. 	
Core Standard & Guidance	8.1.1	Plant stock for propagation and/or planting
Additional guidance	<ul style="list-style-type: none"> • Cones containing seeds should be collected from at least 1m above the ground to be sure they have not had contact with contaminated soil or leaf litter. 	
5.6. Growing media		
Risk issue	Contamination from growing media that may have been sourced from <i>Phytophthora agathidicida</i> infected components and/or recycled in the nursery.	
Kauri Schedule Measures	<p>The plant producer shall be able to provide evidence of</p> <ul style="list-style-type: none"> • Sourcing growing media only from reputable commercial suppliers. • Policies to ensure growing media is free of soil or materials sourced from kauri forests • Policies to ensure growing media is not reused. • Processes to clean and <u>sanitise</u> between mixes bulk bin (where used) between mixes. 	
Core Standard & Guidance	8.1.2	Growing media

Additional guidance	<ul style="list-style-type: none"> • Ensure growing media is free draining with good water holding capacity. 	
5.7. Containers – pots, bags, trays ...		
Risk issue	<i>Phytophthora agathidicida</i> oospores are robust and long-lived. Soil and plant debris on recycled growing containers (pots, bags, trays ...) is a risk.	
Kauri Schedule Measures	The plant producer shall be able to provide evidence of <ul style="list-style-type: none"> • Thorough cleaning and <u>sanitation</u> of reused containers (if any). 	
Core Standard & Guidance	8.1.4	Containers (pots, bags, trays ...)
Additional guidance	<ul style="list-style-type: none"> • If possible, only use new containers, and store these to avoid contamination. 	
5.8. Growing		
Risk issue	Kauri nursery stock is at risk from other kauri plants, contamination sources and process during the growing cycle.	
Kauri Schedule Measures	The plant producer shall be able to provide evidence of <ul style="list-style-type: none"> • Processes to ensure all kauri plants are checked for signs and symptoms of <i>Phytophthora agathidicida</i> or decline prior to handling, movement or planting. • Tools and work surfaces used for kauri production and propagation are cleaned and sterilised before reuse. • Use of footbaths or disposable plastic shoes before entering kauri propagation areas. 	
Core Standard & Guidance	7.2 8.1.5 8.2 9.2 9.2.3	Hygiene Propagation Growing Growing – container production Irrigation – container production
Additional guidance	<ul style="list-style-type: none"> • Unhealthy plants and plants from batches where there is any rapid unexplained decline or death should not be moved, sold or planted – contact Tiakina Kauri – see below. 	
5.9. Pre-dispatch holding		
Risk issue	Plants that are asymptomatic at potting may contain <i>Phytophthora agathidicida</i> which could be spread with plants as they are shipped from the nursery.	
Kauri Schedule Measures	The plant producer shall be able to provide evidence of <ul style="list-style-type: none"> • A holding period of at least 3 months from potting prior to dispatch • Kauri plant batches being kept separate through the holding period and away from propagation areas and other plants 	
Additional guidance	<ul style="list-style-type: none"> • This observation period will help increase the likelihood of any asymptomatic infection developing before plants are dispatched to customers or for planting. 	

5.10. *Phytophthora agathidicida* testing

Testing of kauri plants during the production cycle and/or prior to dispatch increases the likelihood of avoiding distribution of infected kauri into forest, restoration, rural and urban areas. While not yet included it is possible that future editions of this Schedule may require diagnostic testing prior to distributing kauri from nurseries. Work is needed to establish effective and cost-efficient tests and this Schedule will be updated when these are available and a requirement for diagnostic testing prior to distributing kauri from nurseries is established.

Currently the only requirement for diagnostic testing arises from a suspected *Phytophthora agathidicida* infection following unexplained kauri plant decline or suspicion of signs and symptoms of *Phytophthora agathidicida* (PaNPMP Rule 3 clause 3)i), 2 August 2022). Refer to section 6 below.

6. Upon a suspected *Phytophthora agathidicida* infection

Producers with any concerns about the health of their plants or if plants are showing dieback-like signs or symptoms, Rule 1 of the PaNPMP requires that Tiakina Kauri must be advised – email kauriprotection@mpi.govt.nz.

Further:

- If you suspect *Phytophthora agathidicida* infection or kauri plants show any signs of disease or sickness, you must test them for the *Phytophthora agathidicida* before the plants are moved out of the nursery (PaNPMP Rule 3).
- Signs or symptoms of *Phytophthora agathidicida* infection include unhealthy kauri plants where there is any rapid unexplained decline or death.
- Contain the plant batch and do not sell or distribute plants from the batch.
- Contact a diagnostic laboratory (list at www.plantpass.org.nz/biosecurity/resources). They will advise on sampling and sample submission.

NOTE – *Phytophthora agathidicida* is an “unwanted organism” under the Biosecurity Act. Under section 53 of the Biosecurity Act it is an offence to sell or propagate plants that one suspects contain an unwanted organism.

7. Tiakina Kauri

Established within Biosecurity New Zealand, Tiakina Kauri | Kauri Protection Agency, invests in key kauri protection activities in partnership with mana whenua and collaborating agencies - the Department of Conservation (DOC) and regional councils across kauri lands (where kauri naturally grow - from Waikato to Te Tai Tokerau-Northland).

Website: <https://www.kauriprotection.co.nz/>

Rule 3: <https://www.kauriprotection.co.nz/national-plan/growing-kauri/> and <https://www.legislation.govt.nz/regulation/public/2022/0208/latest/LMS711677.html>

Email: kauriprotection@mpi.govt.nz

8. Audit Checklist

The *Phytophthora agathidicida* Schedule checklist is part of the Plant Pass Hazard Management Checklists document – refer Section 22

9. Glossary

The Plant Pass Core Standard provides definitions for a wide range of Scheme terminology. In addition, the following aid the use of this schedule:

Kauri Dieback (KDB)

An incurable, fatal disease caused by the oomycete *Phytophthora agathidicida* which affects the New Zealand's iconic Kauri (*Agathis australis*).

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See *Phytophthora agathidicida*

***Phytophthora agathidicida* (Pa)**

A soil-borne oomycete which affects the *Agathis australis* (kauri) and causes KDB

Oospore

A robust and long-lived fertilized female egg cell with a thick and persistent cell wall that that can endure in the soil for a considerable time