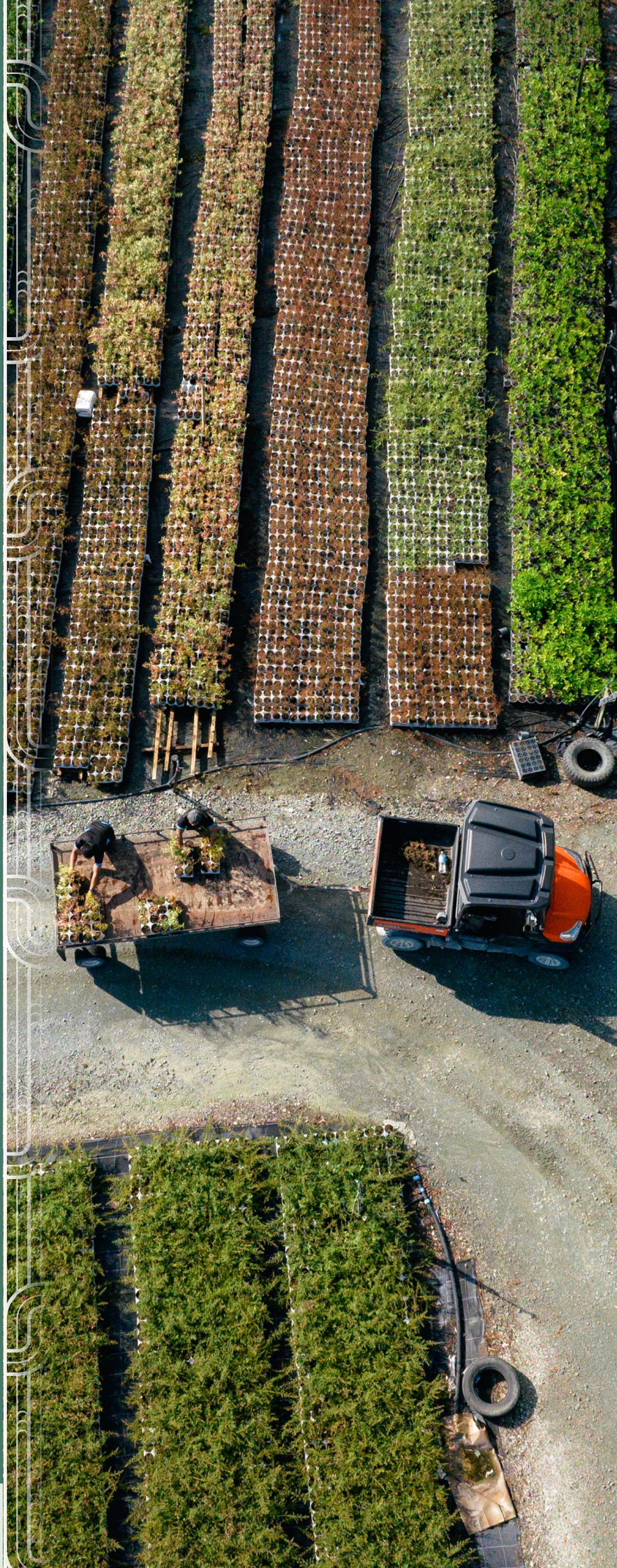




# Kauri Ora: Growing Kauri in Nurseries

Best practice guide for  
managing PA pathogen  
risk in nurseries



KA RAUHĪ TE TUPU O TE KAURI  
—  
GIVE KAURI SPACE TO GROW



Tiakina Kauri is an agency based within Biosecurity New Zealand that provides national direction for the achievement of the objectives of the National Plan for Kauri, through active partnership with mana whenua and collaboration with regional councils and the Department of Conservation.

For more information about protecting Kauri, visit [www.kauriprotection.co.nz](http://www.kauriprotection.co.nz)

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# Introduction

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This document provides nursery best practice guidelines to help nurseries manage the threat of their Kauri crops becoming infected with *Phytophthora agathidicida* (PA) and subsequently spreading it with plants to customers and through out-planting. Adoption of these guidelines will also help a nursery meet the requirements of the **National PA Pest Management Plan** (NPMP) for PA.

## About *Phytophthora agathidicida*

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*Phytophthora agathidicida* (PA) ) is a soil-borne pathogen which infects Kauri through their roots and restricts the trees' ability to transport water and nutrients between the roots and the leaves. This causes the fatal condition formerly known as kauri dieback disease, which eventually starves the Kauri.

There is no proven way to cure an infected Kauri, and there are limited treatment options.

PA contaminated soil and root material can easily be transferred between or within sites. The survival of Kauri depends on all of us taking action to stop PA from spreading, which means we must follow correct hygiene protocols when moving and working around Kauri.

The PA pathogen can be spread by:

- vehicles and machinery;
- footwear, clothing or equipment that touches the soil;
- animals, including wild pigs and stock, that have walked through infected areas.

For more information, visit [www.kauriprotection.co.nz](http://www.kauriprotection.co.nz)



PA pathogen infection can cause bleeding gum



View of Kauri canopy with dead branches

# National Pest Management Plan

In August 2022, a National Plan was launched to help protect Kauri from the PA pathogen. The National Plan includes 10 rules that apply to anyone who grows Kauri, goes into Kauri forests, or lives or works around Kauri.

By following this guide and the rules of the National Plan, we can all help protect Kauri for generations to come.

For more information about the National Plan, visit [www.kauriprotection.co.nz/national-plan](http://www.kauriprotection.co.nz/national-plan)

**Rule 3** of the NPMP requires that any Kauri grown for movement or sale must be done so in accordance with a Kauri plant production plan. This production plan must contain the components stipulated within the rules (NPMP Section 17), which ensure growers of Kauri are managing the risk of PA spreading via growing and distributing Kauri plants – including the method of seed/cone collection, sourcing of growing media, handling of production batches and growing containers, and a pre-dispatch isolation period.

Other NPMP rules will be relevant to some nursery producers and operations – check the [Tiakina Kauri website](#) for more information.

Nurseries who are certified to the Plant Pass<sup>1</sup> Core Standard and the Plant Pass Kauri Schedule will automatically comply with **Rule 3**. This guidance will assist nurseries who are not part of Plant Pass to develop their production plan and meet the requirements of **Rule 3**.

## Kauri Hygiene Zone

The best way to protect Kauri and avoid introducing or spreading the PA pathogen through the movement of soil or dirt, is to avoid operations around Kauri and Kauri forests whenever possible.

To protect Kauri, it is important not to damage or disturb their roots. Kauri roots are shallow and fragile and extend outwards about 3x the radius of the canopy of the tree; this area is called the Kauri Hygiene Zone.

Figure 1: The Kauri Hygiene Zone for a single Kauri

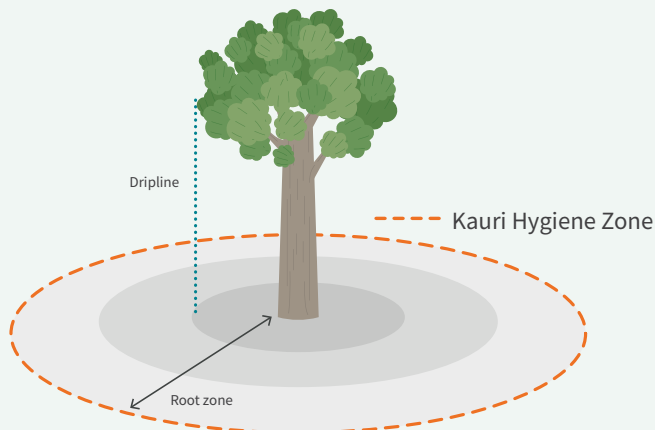
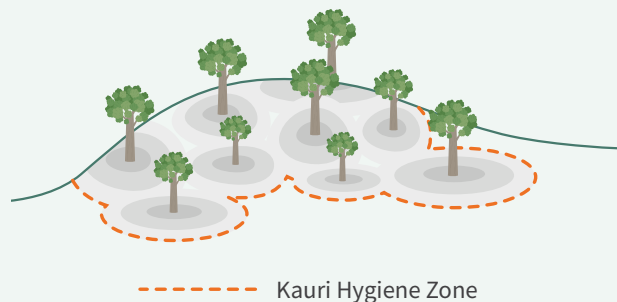


Figure 2: The Kauri Hygiene Zones for an interconnected stand of Kauri



1 Read more about Plant Pass at [www.plantpass.org.nz](http://www.plantpass.org.nz)

# Background

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PA is spread through the movement of contaminated soil, water and plant material and nursery operations carry a high-risk of this spread. Nursery conditions (high moisture and warm temperature) favour pathogen growth, and PA can be easily spread through the propagation, growing and distribution of infected seedlings and nursery stock. Internationally, nursery stock movement is known for rapid spread of other *Phytophthora* pathogens.

This guidance reflects New Zealand and international best practice and is designed to limit the likelihood of PA infection, and if it does occur, to increase the prospects of it being detected early, while there is a good chance to eradicate it, and before it is spread further.

## Key production plan elements

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The basic principles of these guidelines rely on good nursery and production hygiene. Clean production practices start with nursery staff as they carry out seed and cone collection, propagation and potting activities and materials, growing, pruning and handling plants and preparing plants for dispatch.

The goal of a clean production system is to prevent the introduction of any *Phytophthora* into nursery stock rather than attempting to suppress it after plants are already infected. If there are no *Phytophthora* species present, there will be no disease caused by them<sup>2</sup>. By following the recommendations in this guide, you will manage for all species of soil-borne *Phytophthoras*, not just PA.

### 1. Building a production plan

A production plan describes the steps you will take when growing Kauri to limit the possibility of introducing PA into your nursery, spreading it through the nursery, and further spreading it when the trees leave the nursery.

**Rule 3** of the National PA Pest Management Plan from August 2022 requires that:

(1) A person who produces or propagates Kauri must not allow Kauri to be moved off their property unless they have, and operate in accordance with, a production plan that meets the requirements of the NPMP Clause 17(3).

Further, Clause 17(4) requires that:

Every person referred to in subclause (1) must provide the management agency (Tiakina Kauri) with a copy of that person's production plan, and information that records how the person has operated in accordance with that plan, within one week of the agency requesting the plan and information.

#### Useful steps in meeting this requirement include:

- 1) Giving a senior staff member the role of building, implementing and managing the production plan.
- 2) Having a record of key nursery facts: name, physical location, physical address, key staff (owner, managers, person responsible for the production plan), their contact numbers and emails.

<sup>2</sup> Phytophthora Research Nursery BMP

3) Having a map of the nursery showing key locations and workflows is recommended. For example, cone and seed cleaning areas, areas for incoming plants, stock plants, growing media storage, propagation, greenhouse and other growing areas. Include water sources and dispatch and shipping areas.

4) Building a production plan which describes key steps (procedures) you will take (see below) to meet the requirements of the NPMP and records where and when things were done and by whom.

## 2. Grow awareness of the pathogen and of signs and symptoms

It's essential that people who are involved in Kauri production know how PA affects Kauri, how it is spread and what to look for in infected nursery plants and trees.

Be mindful though, that some Kauri may only show symptoms of disease in the later stages of infection and some alternate plant hosts may be asymptomatic of disease.

Take a precautionary approach and treat all Kauri as though they are possibly infected and be rigorous in applying the procedures in this guide to lessen the chance of unintentional spread.

Clause 17(3)(a) of the NPMP requires a production plan to include practices and procedures to ensure that:

Any person at the plant production premises involved in the production or propagation of Kauri is informed about:

- (i) PA; and
- (ii) how PA spreads between plants; and
- (iii) how to identify the symptoms of PA in—
  - (A) Kauri; and
  - (B) if applicable, alternative PA host plant materials.

### Useful steps in meeting this requirement include:

- 1) Displaying information about PA in places where staff and others can see it.
- 2) Discussing PA, how it spreads, signs of infection and symptoms at staff meetings.
- 3) Putting information about PA in the staff induction pack. Staff are to be made aware of PA hygiene procedures and how to carry them out.

### Useful materials to help meet this requirement include:

#### Tiakina Kauri website

- [Propagation and planting of Kauri](#)
- [Kauri care guide](#)
- [How you can protect Kauri](#)
- [Disease identification](#)
- [All about the PA pathogen](#)
- [Frequently asked questions about Kauri](#)

#### Notes:

- 1) At time of writing this guidance, there are no known alternative PA host plants. Work however is underway to test other plant species for their ability to host PA. Check the Tiakina Kauri website for any changes.

### 3. Seed collection and sourcing young plants

PA is easily spread through contaminated plant materials, soil, water and mud, people, footwear and tools. It can be brought into your nursery from contaminated field operations, and spread from your nursery, if present, into Kauri forests.

PA can live in soil for a long time, even after a Kauri tree has died.

Implement routine procedures to avoid visiting known contaminated areas, and to lessen the chance of unknowingly bringing contaminated materials back into your nursery or taking them from your nursery into Kauri forests.

Clause 17(3)(b) of the NPMP requires a production plan to include practices and procedures to ensure that: Kauri cones and seeds collected are —

- (i) free from soil, invertebrates, water, and other organic matter; and
- (ii) from a place where PA has not been detected; and
- (iii) from a place where any Kauri trees are in good health and are not showing any symptoms of PA;

#### Useful steps to help meet this requirement include:

- 1) A procedure to identify land tenure and if a permit is required from the landowner or land manager. This will be required for seed collection from Department of Conservation or council administered lands.
- 2) A procedure to check if PA has been detected where you collect cones, or other areas you intend to visit, and to ensure people steer clear of any PA positive areas. The Department of Conservation, Tiakina Kauri or councils may be able to assist, although this information may not always be available. Treat any collection site, soil and Kauri as possibly infected, and check for signs and symptoms of infection or ill health before collecting cones.
- 3) Thorough hygiene procedures when leaving the nursery to collect cones, between collection sites, and before entering the nursery when returning to ensure that PA is not spread outside of the nursery or brought back in.  
The procedures should ensure that staffs' clothing and vehicles are free of soil and plant debris, and that footwear and tools are cleaned and sanitised. Ideally use disposable gloves and footwear booties and have a set of clothing and footwear for field work and another for nursery work. Don't mix the two sets. Arrive clean, stay clean and leave clean around Kauri.
- 4) Directions to staff to park vehicles away from Kauri and their root zones when on collection trips unless on formed roads or parking areas. Parking away from Kauri and walking into their root zones is recommended. If this cannot be avoided, wash and sanitise tyres before entering root zone areas, between sites and when returning to the nursery.
- 5) A procedure describing what to look for when collecting cones so that collection is only from trees in good health with no signs of bleeding gum, yellowing or thinning foliage or canopy, or dead branches evident.
- 6) A procedure to ensure cones are collected from at least 1.5 metres above ground to make sure they have not been in contact with soil or leaf litter and are above the water-splash zone. Use raised tarps to collect cones or seed as it falls.
- 7) Clear directions to staff that cones must not be collected from the ground and why.

8) A procedure for cleaning and sorting collected material at the collection site and undertaking further nursery processing in a place away from propagation and growing areas before bringing it into your propagation area. Manage this area as you do the nursery; keep things clean, tidy and dispose of waste, Kauri material and soil to bulk waste, landfill or deep burial; do not compost or recycle.

9) Records of cone collections so that you know where they came from, when and who collected them. Records should be detailed enough to identify where any one batch of seed was collected from.

10) Third party supply of plant materials is a high-risk activity.

Cones, seeds or young plants cannot be accepted unless suppliers have adhered to the guidance listed above. Keep records of what, when and who supplied these, and if plants are sourced from others, isolate these in the nursery for a time before bringing them into production areas.

**Useful materials to help meet this requirement include:**

**Tiakina Kauri website:**

- [Kauri protection resources](#)
- [Disease identification](#)
- [The principles of hygiene](#)

[Clean planting materials](#) – Phytosphere BMP 2016, Chapter 2

[Sanitizing tools and surfaces](#) – Phytosphere Phytosanitary 2016, Section 2.3

## 4. Growing Media

PA is easily spread through growing media. Using commercial potting mixes from a reputable supplier is best. Avoid using potentially infected materials in growing media. Soil and forest floor litter can be infected and can infect new plants if used in growing media.

Avoid recycling used growing media as it may contain low levels of PA, even if the plants that were growing in it did not show symptoms. Growing media spilled on the ground may be contaminated.

Section 17(3) of the NPMP requires that:

Growing media used for Kauri production or propagation

- (i) does not originate from a Kauri forest; and
- (ii) has not been mixed with an unknown source of growing media; and
- (iii) is not reused for plant production or propagation.

### Useful production plan steps to meet this requirement include:

- 1) If you prepare your own growing media, have procedures to make sure materials are not sourced from Kauri forest areas, keep records of where the materials came from and when batches were made.
- 2) Provide clear directions to third party growing media suppliers (if used) that the growing media they supply must meet these rules.  
Keep records of when media was supplied and by whom.  
It is essential that the media is pathogen-free and free draining but still has a good moisture holding capacity.
- 3) Store growing media in a bin or on a raised pad with a concrete floor where rain and ground water cannot flow into the bin/pad and introduce potentially PA contaminated water into the media. Clean and sanitise the bin or pad between batches. The area below the growing media must drain freely and away from the bin or raised pad. Different batches of media should be stored separately to avoid cross contamination.
- 4) Provide clear directions to staff and others not to recycle used media or collect and use growing media that has spilled on the ground in propagation or potting areas.
- 5) A process to gather used and waste media from Kauri operations before disposing of it off-site and away from Kauri forest.

### Useful materials to help meet this requirement include::

**Sanitizing tools and surfaces** – Phytosphere Phytosanitary 2016, Section 2.3

## 5. Clean production

PA can live in soil and on tools and surfaces for a long time, even when things are dry, and can easily be spread from contaminated equipment and materials to infect new plants and growing media.

Equipment, tools and materials contaminated with soil can harbour PA. It is important to clean and sanitise on a regular basis and before reuse. Removing dirt before disinfecting is important.

PA produces two types of spores, which are zoospores and oospores. The zoospore is short-lived and can be killed with commonly used disinfectants. Oospores are robust and long-lived and are resistant to most disinfectants, so you cannot rely on sanitisers alone to destroy oospores once they have reached your facility.

Definitions:

- **Remove all dirt** – removal of soil and organic matter with pressurised water and brushes, using soap or detergent when material is difficult to remove.
- **Disinfect** – use of a disinfectant or other phytosanitary treatment to target PA;

The list of useful materials below includes materials and procedures that you can use. Take care to adhere to recommended solutions, concentrations, exposure times and temperatures.

Clause 17(3)(d) of the NPMP requires that:

Containers, tools, and surfaces used for Kauri production or propagation are cleaned and sterilised before reuse.

### Useful production plan steps in meeting this requirement include:

- 1) Never grow Kauri directly on the ground. Ideally grow on raised, metal mesh on benches. If this is not possible, grow on free draining gravel (5-10cm deep) which is sloped so that irrigation or rainwater runs away from the growing area.
  - 2) Ideally use new containers.  
If containers must be reused, assume that all used containers are contaminated. Clean and sanitise in an area outside the nursery production space, before use or storage.  
Store all containers in a clean, dry place above the ground and away from places where ground water can splash.
  - 3) Building hygiene kits for in-field use and hygiene stations in the nursery. Install sanitation footbaths at points where people move from low to high-risk areas. For example, from outdoor growing areas into propagation areas. Restrict entry of people to propagating areas. Personnel footwear will need to be cleaned of any soil and contaminants before entering the propagation area.
  - 4) Setting up separate tools/kits for different activities and not mixing these between activities so that all materials are kept separate.
  - 5) Cleaning tools with soap and water, drying and then disinfecting. Do this between batches of plants and growing media, and prior to beginning work and at the end of the day when they are used.
  - 6) Sweeping, washing and sanitising propagation and potting benches between batches and at the end and start of each day when in use. Any of the following disinfectants are suitable: Sterigene (2% solution), bleach (5% solution) or methylated spirits (70%, note: check the 'denatured alcohol content' – some meths are already diluted to 70%).
  - 7) Remove post-crop debris by sweeping hard surfaces or raking gravel growing areas, and dispose of through bulk waste, landfill or deep burial.
  - 8) Cleaning and sanitising growing benches or hard surface (concrete or bitumen) growing areas between crops. Sanitise gravel growing beds after raking.
  - 9) Having procedures for keeping vehicles, ATVs and quads out of propagation areas. Vehicles and equipment will need to be cleaned of any soil and contaminants before entering the propagation area. The water from the wash-down should be diverted away from the site.
- PA can be spread by water and may be present in water, for example, from surface water supplies, streams or dams. It could also be present in nursery runoff.
- 10) Use municipal reticulated water that doesn't usually require treatment.
  - 11) Treat water from streams or dams before use. The use of a 5 micron filter is advised as an alternative.
  - 12) Avoiding recycling water; it may contain PA from established crops. If you must reuse water, set up a treatment step to kill any PA.

### Useful materials to help meet this requirement include:

#### Tiakina Kauri website:

- [The principles of hygiene](#)
- [Heat treatment to kill PA](#)

[Clean container](#) – Phytosphere BMP 2016, Chapter 3

[Benches and growing area](#) – Phytosphere BMP 2016, Chapter 6.3

[Tools, surfaces and the nursery environment](#) – Phytosphere BMP 2016, Chapter 6.4

[Chemical sanitizing agent](#) – Phytosphere Phytosanitary 2016, Section 1

[Heat treatment](#) – Phytosphere Phytosanitary 2016, Section 1

[Sanitizing recycled containers](#) – Phytosphere Phytosanitary 2016, Section 2.2

[Sanitizing tools and surfaces](#) – Phytosphere Phytosanitary 2016, Section 2.3

## 6. Batch processing and traceability

If PA is detected in your nursery, in an area you've visited or in plants you've supplied to others or planted out, you need to rapidly limit the opportunity for further spread, and work out where it might have come from, or been moved to.

Batch processing and segregation helps; an infection may be contained to just the one batch. Good records of seed source, what batches seed has been used in, and where finished plants have gone will help identify the source of a problem and/or where it might have spread to, commonly referred to as 'trace-forward and trace-back'. In essence, you should know where plant materials have come from, how they have moved through the nursery, and where they've gone.

Clause 17(3)(e) of the NPMP requires that:

Seed-sowing and potting is undertaken in batches.

### Useful production plan steps in meeting this requirement include:

- 1) Keeping good records of where seed or young plants have come from. If you've collected the seed, you should know from where and when. If you've purchased seed or plants, you should know from whom and when.
- 2) Keeping each sowing and potting batch separate from others. Label or keep records to show when sowing and potting was done, where starter material come from, and where it was placed in the nursery.
- 3) Growing in small batches and keeping each separate as well as keeping records of how batches move around the nursery.
- 4) Keeping records of who plants have been sold to from each batch, or if you are doing planting, where they have been planted.

### Useful materials to help meet this requirement include::

[Plant batch](#) – Phytosphere BMP 2016, Section 7.6

## 7. Crop monitoring and symptoms.

Early detection of a PA infection gives the best chance of preventing further spread, understanding where it came from and cleaning up to eradicate the infection and PA.

Crop monitoring should be planned and systematic, but there should also be room for “casual” observation and staff reporting concerns to management during routine plant handling procedures.

Further, clause 15 of the NPMP records

### **Plan rule 1: obligation to report**

(1) An occupier of land who recognises that a Kauri on the land is exhibiting any symptoms of PA must, as soon as is reasonably practicable, report the symptoms and the location of the Kauri to the management agency, an inspector, or an authorised person.

(2) Subclause (1) does not apply to an occupier who knows that the management agency is aware that the tree is or may be exhibiting symptoms.

Note – a negative test result is not proof of the absence of PA. If a negative test result is returned, but the Kauri continue to show signs and symptoms of infection, continue to isolate the plant batch and test again in a month. If symptoms have abated, and the retest is negative, it is reasonable to regard the plants as free of PA. If the plants continue to show symptoms, even if the retest is negative, treat them as infected and undertake appropriate safe disposal and clean-up of potentially contaminated areas.

### **Useful production plan steps in meeting this requirement include:**

- 1) Implementing a formal monitoring plan that describes how, when and who should inspect Kauri production batches. Make sure it explains who to report any suspicious signs and symptoms to.
- 2) Keep Kauri plant batch lots separate. Keep all Kauri away from propagation areas and other plants during this time.
- 3) Keeping records – date, areas inspected, staff and outcomes – if PA was suspected and who it was reported to.
- 4) Making sure all staff know what to look for and who to report to if they find something suspicious. At the very least, ask staff to report “anything unusual”.
- 5) Not using fungicides to manage PA. Some fungicides simply mask the symptoms, and do not kill PA, which may then “bloom” once fungicide treatments are stopped.
- 6) Having a plan on what to do if signs or symptoms are suspected; clear instructions to isolate the area, remove contaminated plants and soil/media and dispose, procedures to collect and send samples to the laboratory (see below), and report your findings to the Tiakina Kauri management agency.

### **Useful materials to help meet this requirement include:**

#### **Tiakina Kauri website:**

- **Disease identification**
- **Report a sick-looking kauri**
- **Landfill disposal of contaminated material**

## 8. Pre-dispatch isolation

It can take some time for an infected Kauri to show signs and symptoms. To lessen the risk of asymptomatic, infected Kauri being shipped from your nursery, an isolation period after final potting will give time for symptoms to develop if there is an infection. Batches undergoing isolation should be kept separate from others to lessen the chance of batch-to-batch transfer of PA.

Clause 17(3) of the NPMP requires that:

- (g) Kauri remain on the premises for no less than 3 months after final potting; and
- (h) While Kauri remain on the premises in accordance with paragraph (g),
- (i) They are not mixed with other batches of plants; and
- (ii) Are kept away from other propagation areas.

### Useful production plan steps in meeting this requirement include:

- 1) Having an area away from the main production and propagation areas and other Kauri where finishing batches of Kauri can be kept, noting that batches in this area should also be kept separate from each other.
- 2) Noting that crop monitoring procedures should also inspect this area on a weekly basis and that testing and reporting requirements on signs and symptoms also include these batches.
- 3) Dispatch procedures that include a final inspection, new cartons and cleaned and sanitised shipping crates or trolleys.
- 4) If you are transporting plants to planting sites, apply the same procedures as for cone and seed collection above – leave clean, arrive clean and return clean, and treat any plants and materials coming back to the nursery as potentially contaminated.

### Useful materials to help meet this requirement include:

**Delivering plants** – Phytosphere BMP 2016, Chapter 8

**Tiakina Kauri website:**

- **Propagation and planting of Kauri** – section 6.4 “planting out”

## 9. Record keeping

Records serve several purposes:

1. They help identify trends and patterns, informing future actions like more intensive crop monitoring when a disease threat is high.
2. In the case of an infection in the nursery, they help you understand where to look for the source and where else may have unknowingly been contaminated and if nearby plants have been infected.

Clause 17(3)(j) of the NPMP requires that:

Records for paragraphs (f) to (i) [crop monitoring, pre-dispatch segregation and holding period and any testing] are kept for a minimum of 3 years and can be provided on request.

Useful production plan steps in meeting this requirement include:

- 1) Record keeping for regulated activity under clause 17(3)(j).
- 2) Record keeping for other key steps including traceability.

Useful production plan steps in meeting this requirement include:

**Record keeping** – Phytosphere BMP 2016, Chapter 7

## 10. Transitional requirements

The PA NPMP came into effect on 2 August 2022 and the requirement for a production plan pertains to Kauri batches initiated after that date:

Clause 17(5): Subclause (1) [the requirement for a production plan] does not apply in respect of Kauri planted or growing before 2 August 2022

However, batches initiated prior to 2 August 2022 are subject to end-of-process testing prior to being moved out of the nursery:

Clause 17(6): A person must not allow Kauri planted or growing before 2 August 2022 to be moved unless they have practices and procedures in place to ensure that end-of-process PA testing is conducted as set out in subclause (3)(i) [end of process PA testing].

**Simply put – Kauri growing in your nursery prior to 2 August 2022 must be tested before shipping.**

## 11. End-of-process testing

If you have sick plants and you're testing for PA, healthy plants should also be tested as part of the process. Kauri healthy in appearance may still harbour the pathogen on their roots. Testing must legally be carried out on sick plants. The following procedures include how to take samples, prepare and send them to the lab, and provide reference to a list of approved labs.

Clause 17(3) of the NPMP requires that:

- (f) There is documented weekly monitoring and inspection of Kauri for PA symptoms; and
- (i) End-of-process PA testing is conducted for any batch of Kauri showing signs of any disease or sickness by a laboratory that is independent of the plant production premises

Note – Kauri often only show symptoms in the later stage of infection. From a best practice perspective Kauri that are healthy in appearance will also require testing. Any plants that are unwell should not be used.

### Useful production plan steps in meeting this requirement include

#### Sampling procedures – container grown Kauri

1. These procedures apply only to Kauri growing in containers (trays, pots and bags for example). If you have concerns about a Kauri planted in the ground, contact Tiakina Kauri or your regional council.
2. Recent chemical or fertiliser treatments (up to three months prior to sampling) can interfere with test procedures. Tell the lab if you've treated the plants in the last three months, and when they were treated and what you have used.
3. Take samples early in the week on the same day they are collected or early next day, so they get to the lab before the weekend. Avoid sampling and shipping to the lab on Thursday and Friday.
4. Plants that you take samples from should be well-watered.
5. If collecting from a seedling tray:
  - a. Collect sub-samples from areas where symptoms are evident, digging down through the root zone. Include plant roots in the sample.
  - b. Combine these into a single lab sample.
6. If collecting from potted or bagged Kauri:
  - a. Collect approximately 25ml (about a rounded tablespoon) of potting mix and roots from the root zone of each plant at a location about midway between the top and bottom of the container.
  - b. Include plant roots in the sample.
  - c. You may need to use a knife to cut the bag or through the root zone to the best sampling location.
  - d. Samples from up to seven "sick" Kauri plants (plant soil samples), regardless of container size, can be combined into a single lab sample.
7. If sampling shortly after pricking out or potting, be sure to sample from the root zone area; the test method requires roots to be present in the lab sample.
8. Tools and hands need to be sanitised between each plant sample – spray to wetness with a solution of 70% methylated spirits and 30% water.
9. Place the lab sample in a clear snap-lock plastic bag and label it with your nursery name, a code to help you identify the sample later and the date the sample was collected.
10. Keep records of where you've taken the plant soil samples from and when they were collected. Keep these plants or area they came from isolated until test results are available.
11. Keep lab samples cool. Storage between 10-22°C is ideal. Keep them out of the sun but do not put in the fridge.
12. Email the lab with the courier tracking number and ask them to confirm receipt.

List of laboratories approved by Tiakina Kauri to perform morphological testing for *Phytophthora agathidicida*

#### **Plant & Food Research**

Attention: Ian Horner

Crosses Rd

Havelock North 4130

Email: [ian.horner@plantandfood.co.nz](mailto:ian.horner@plantandfood.co.nz), Phone 021 226 8170

#### **Scion Research**

Attention: Kauri soils

Titokorangi Drive (Formerly Long Mile Road), Rotorua

Email: [kaurisoils@scionresearch.com](mailto:kaurisoils@scionresearch.com), Phone 07 343 5618

#### **Instructions:**

- Keep samples cool, out of the sun and always below 25°C – ideally between 10-22°C.

Do not refrigerate or freeze.

- Send samples by overnight courier and avoid shipping on a Thursday or Friday.
- Contact lab by email preferably a few days ahead of shipment and on the day of shipment. Include sample labels, details of sender, contact and testing required.

#### **Additional notes**

1. Samples collected following the procedures above will contain fine roots from Kauri plants. Please tell the lab if you have cultural concerns and need the samples handled in any particular way.
2. If the lab test is positive for PA, the lab will advise Tiakina Kauri who will then contact you about what to do next. Continue to isolate and do not move or handle the plants or plant batch until you have heard from them.
3. If the lab test is negative for PA, but the Kauri plants continue to show signs and symptoms of infection then follow the guidance in Section 7 above.

## References

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Phytosphere BMP 2016. Phytosphere Research – Best Management Practices (BMPs) for Producing Clean Nursery Stock – <http://phytosphere.com/BMPsnursery/index.htm>

Phytosphere Phytosanitary 2016. Phytosphere Research – Phytosanitary Procedures for BMPs for Producing Clean Nursery Stock – <http://phytosphere.com/BMPsnursery/phytosanShell.htm>



# Appendix 1 – Plant Production Plan

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A plant production plan is required to provide detail on how the spread of PA will be prevented within and external to a premises. The following are required components of a plant production plan.

## Production Premises

Details
Business name:
Site/property address:
Owner(s):
Contact details (phone and email):

## Rule 3 Exclusions

Subclause (1) does not apply in respect of Kauri planted or growing before 2 August 2022. However, a person must not allow a Kauri planted or growing before 2 August 2022 to be moved unless they have practices and procedures in place to ensure that end-of-process PA testing is conducted as set out in subclause (3)(i) below.

## Summary of Premises

The table below is a summary of what is required in a plant production plan under rule 3. Questions that are relevant to your premises are answered with a yes or a no. Questions not relevant are answered with not applicable. Those answered yes or no require detail under the PA Management section below.

Production Plan Summary Checklist – Plan Rule (3) Section (3) (a) to (j)	Y/N/NA
(a) Have staff been made aware of PA, how it spreads and how to identify symptoms in Kauri or, if applicable, alternate PA host plant material?	
(b) Are Kauri cones and seeds collected on the premises?	
(c) Is growing media used for Kauri production or propagation?	
(d) Are containers, tools, and surfaces used for Kauri production or propagation cleaned and sterilised before reuse?	
(e) Are seed sowing and potting undertaken in batches?	
(f) Is there a documented weekly monitoring and inspection of Kauri for PA symptoms?	
(g) Do Kauri remain on the premises for no less than 3 months after final potting?	
(h) While Kauri are on the premises, in accordance with above, are they are not mixed with other batches of plants and are kept away from other propagation areas?	
(a) Is end-of-process PA testing conducted for any batch of Kauri showing signs of any disease or sickness by a laboratory that is independent of the plant production? premises?	
(a) Are records for paragraphs (f) to (i) kept for a minimum of 3 years and can be provided on request under clause 16?	

## PA Management

The table below provides detailed responses to each section of subclause (3) for the management of PA through the activities carried out on the premises. Staff involved in this work on site have been listed along with an initial to say they understand PA and the requirements.

PA Management for Rule 3	
(a) Have staff been made aware of PA, how it spreads and how to identify symptoms in Kauri or, if applicable, alternate PA host plant material? If so, write their name below and ask them to initial to say they have understood.	
[Full name]	Initial
(b) Are Kauri cones and seeds collected on the premises:	
(i) Free from soil, invertebrates, water and other organic matter? Provide detail below.	
(ii) From a place where PA has not been detected?	
(iii) From a place where any Kauri trees are in good health and are not showing any symptoms of PA?	
(c) Growing media used for Kauri production or propagation:	
(i) Does not originate from a Kauri forest;	
(ii) Has not been mixed with an unknown source of growing media	
(iii) Is not reused for plant production or propagation	
(d) containers, tools, and surfaces used for Kauri production or propagation are cleaned and sterilised before reuse?	
If yes, provide detail	

(e) Seed-sowing and potting is undertaken in batches?

If yes, provide detail

(f) There is documented weekly monitoring and inspection of Kauri for PA symptoms?

If yes, provide detail

(g) Kauri remains on the premises for no less than 3 months after final potting?

If yes, provide detail

(h) While Kauri remain on the premises in accordance with paragraph (g), they

(i) are not mixed with other batches of plants; and

(i) are kept away from other propagation areas

(i) End-of-process PA testing is conducted for any batch of Kauri showing signs of any disease or sickness by a laboratory that is independent of the plant production premises

If yes provide detail, including sample results

(j) Records for paragraphs (f) to (i) are kept for a minimum of 3 years and can be provided on request under clause 16.

Provide proof of records

## Supporting Evidence (Optional)

The operator of the premises can provide photographic evidence of the PA mitigation processes described above as added proof of the requirements under Rule 3 of the PA NPMP.





This guide was updated in 2025 by Tiakina Kauri with the help and advice of:

- Gavin Clapperton (Kauriology) – Chair of review group
- Ashley Davenport (Te Roroa)
- Stuart Leighton (Auckland Council)
- Mihi McMahan (Te Kawerau ā Maki)
- Tracy Mezger (Department of Conservation)
- Shannon Hunter (Auckland Council)
- Nari Williams (Plant and Food Research)

The original version of this guide was prepared by John Little from NZPPI.

For more information about protecting Kauri, visit [www.kauriprotection.co.nz](http://www.kauriprotection.co.nz)