



Treating root collar rot in chestnut trees

FACTSHEET

***Phytophthora* is a group of destructive soil-borne pathogens that affect chestnut trees in Australia.**



This tree shows symptoms of root rot caused by *Phytophthora cinnamomi*.
(Image: State of Victoria, Australia)

1. Introduction

Phytophthora is a water mould more closely related to algae than fungi.

It thrives in wet, poorly drained soils, spreading through water movement, infected plant material, and soil disturbances.

Once established, it causes root decay, canopy dieback, and tree death, leading to severe orchard losses.

One of the most serious diseases affecting chestnuts is root collar rot, primarily caused by *Phytophthora cinnamomi*.

This pathogen infects the root collar and lower trunk, leading to bark cankers, girdling, wilting, and tree decline.

Infected trees often develop dark, water-soaked lesions near the base, a key symptom of infection.

2. Management

a) Exclusion / orchard hygiene

Preventing *Phytophthora* introduction is the best approach. The pathogen spreads via contaminated water, soil, and infected plant tissue but is not airborne.

Regular soil testing using baiting techniques (e.g., New Zealand blue lupins) helps detect infections early.

b) Disease-free nursery trees

Chestnut trees should be propagated under best-practice guidelines (e.g., NIASA accreditation). Ensuring pathogen-free nursery stock prevents disease spread.

A self-regulated industry accreditation for chestnut nurseries could further enhance disease control.

c) Cultural control

Good soil drainage, aeration, and irrigation management are essential to reduce saturation and *Phytophthora* infection risk.

Adding gypsum can help suppress the pathogen by improving soil structure.

d) Biological control

Increasing organic matter through mulches, compost, and manure promotes beneficial soil microbes, which naturally suppress *Phytophthora*.

e) Resistant rootstocks

Where available, resistant or tolerant rootstocks play a key role in managing *P. cinnamomi*. However, resistance may be limited under high disease pressure.

f) Chemical control

Chemical treatments, such as phosphonates and fungicides, are used to suppress disease.

These are detailed on the next page.

3. Metalaxyl

Metalaxyl is a systemic fungicide that targets *Phytophthora cinnamomi* in the soil by inhibiting pathogen growth and preventing root infections. It must be used strictly according to label recommendations. Proper application enhances disease control and protects chestnut tree root systems.

Application Guidelines

- Apply at the start of summer as a soil drench using a boomer sprayer or equivalent.
- Apply within a 1m radius around the base of the tree trunk.
- Use sufficient water to ensure even soil coverage for maximum absorption.
- DO NOT apply using backpack spray equipment.
- DO NOT exceed 4.7 L/ha per application (maximum two applications per year).
- Maintain a minimum interval of three months between applications.
- Ensure soil is free of weeds and spread a heavy mulch layer before application to retain moisture.
- Metalaxyl has a half-life of 1–8 weeks in soil, degrading faster in organic-rich soils.

Avoid excessive irrigation after application to prevent leaching and ensure the chemical remains active in the root zone.

4. Phosphonates

(Permit No. PER15259)

Phosphonates, including phosphorous acid, help suppress *P. cinnamomi* by protecting healthy tissues and slowing pathogen growth within infected trees. They enhance the tree's natural defence mechanisms, making them an effective treatment when combined with good orchard management practices.

5. Use permit

- The only recommended chemical treatments for *Phytophthora* are covered under **Permit 15259**, which restricts the application of agri-fos to either foliar spray or trunk injection - not both.
- This permit details the Directions for Use, Application Rates and Restrictions and applies to NSW, SA, TAS & WA. VIC is covered under off-label, Control-of-Use legislation.

The permit can be downloaded at permits.apvma.gov.au/PER15259.PDF or by scanning the QR code below:

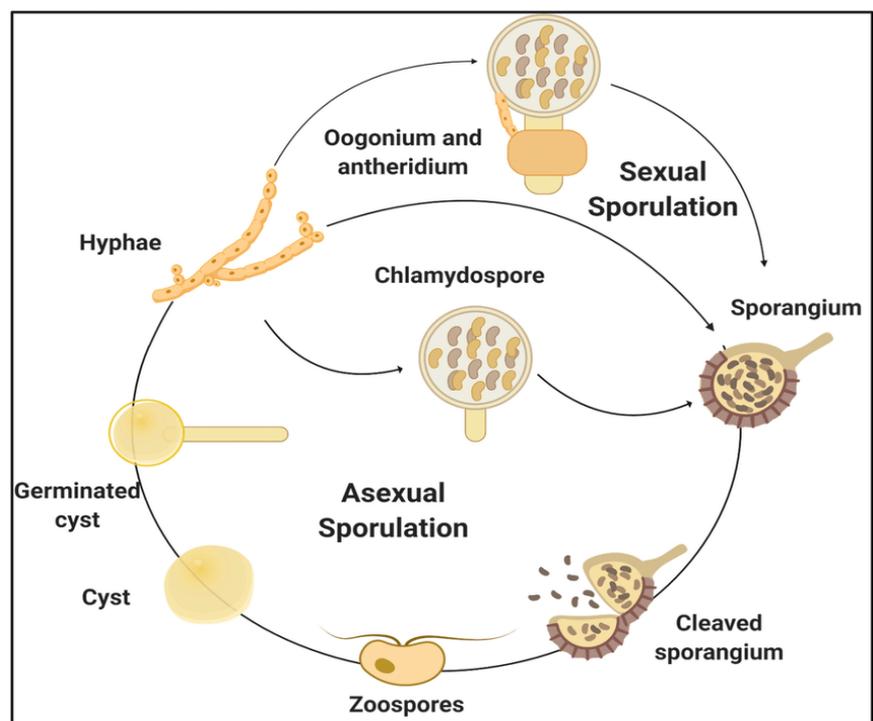


Key Takeaways

- **Soil pH:** Chestnut trees grow best in acidic soils with a pH between 4.5–6.5.
- **Soil type:** Prefer well-drained, light-sandy soils to prevent root diseases.
- **Avoid clay soils:** Chestnut roots struggle in heavy clay, leading to higher disease susceptibility.
- **Nutrition:** Routine fertilisation is essential for tree health, vigour, and yield.
- **Organic matter:** High organic matter can naturally suppress *Phytophthora cinnamomi*.
- **Water management:** Proper irrigation techniques help reduce disease risk by maintaining optimal soil moisture levels.

Remember...

- Different chestnut varieties may respond differently to chemical treatments.
- Always follow label recommendations and permit conditions.
- Consult industry experts if unsure about application rates or timing of treatments.



Life cycle of *Phytophthora cinnamomi*: *P. cinnamomi* infects plants when zoospores attach to root elongation zones. Within 20–30 minutes, they encyst, forming a biofilm, then germinate into hyphae. These hyphae produce cell wall-degrading enzymes (CWDEs), breaking down plant tissue. As they spread through the root cortex and vascular tissues, they cause water stress and necrosis. (Adapted from A. Hardham ANU)



Root Rot Readiness Checklist:

Are You Protecting Your Chestnut Trees?

Use this checklist to assess whether your orchard is well-prepared to prevent and manage *Phytophthora cinnamomi*. Tick ✓ each box where your farm meets the standard. The more boxes you check, the higher your **Root Rot Readiness Ranking!**

Disease Prevention & Biosecurity	
	Have you implemented vehicle and equipment sanitation protocols to prevent the introduction and spread of soilborne pathogens?
	Have you established buffer zones or exclusion areas around infected or high-risk zones?
	Do you restrict access or movement during wet conditions to limit soil transfer?
	Do you avoid applying mulch too close to the trunk where it may create excessive humidity or encourage collar rot?
	Are orchard staff and contractors trained to recognise early symptoms of <i>Phytophthora</i> infection, such as collar rot, wilting, and leaf yellowing?
Orchard Management	
	Is your irrigation system designed to prevent waterlogging and ensure even moisture distribution?
	Are you regularly testing soil moisture to fine-tune irrigation timing?
	Have you mapped water flow and runoff risks across the orchard to guide infrastructure upgrades?
	Have you installed effective drainage infrastructure, such as contour banks or diversion drains, to manage surface water?
	Would you consider using <i>phytophthora</i> resistant or tolerant chestnut varieties or rootstocks if available?
Treatment Strategies	
	Is the treatment zone around the base of each tree weed-free and mulched to encourage consistent penetration?
	Are phosphonate applications delivered using the most effective method (e.g. foliar spray, trunk injection) based on tree size and health?
	Do you observe the required minimum intervals (e.g. three months) between fungicide applications?
	Have you confirmed that soil pH falls within the ideal range (4.5–6.5) for optimal absorption of phosphonate treatments?
	Are you rotating chemical controls and integrating cultural practices (e.g. pruning, soil health) to reduce reliance on any one method?
Long-Term Disease Management	
	Before replanting in previously infected areas, have you taken steps to improve drainage, reduce pathogen load, or solarise the soil?
	Do you have a documented long-term <i>phytophthora</i> monitoring plan that includes soil and tissue testing?
	Do you maintain detailed records of disease outbreaks, treatments applied, and environmental conditions to inform future risk management?
	Do you regularly review and update your disease management plan, incorporating new research, seasonal outcomes, and chemical resistance trends?
	Do you collaborate with extension officers, researchers, or diagnostic labs to stay informed about emerging threats and effective long-term management strategies?



How Did You Score?

- ✓ **0–4: “Rot Rookie”** – Your trees are on borrowed time! Major improvements needed to prevent disaster.

- ✓ **5–9: “Mulch Mediocre”** – You’re making an effort, but *phytophthora* still has the upper hand. Time to step up!

- ✓ **10–14: “Fungicide Fanatic”** – You’re on the right track but need a few more precautions to secure your orchard.

- ✓ **15–18: “Collar Rot Conqueror”** – Your trees are thriving, and *Phytophthora* is running scared! Just a little fine-tuning needed.

- ✓ **19–20: “Phytophthora Phenom”** – You’ve got this! Your orchard is a fortress against root rot, and your chestnut trees salute you.

How did you score? _____

What areas need improvement?

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