

# Protect bunya pines for future times



## What would the Bunya Mountains be without bunya pines?

The dome-shaped crowns of bunya pines tower above the canopy. While not true pines, these iconic trees with large fruiting 'cones' were a dominant feature of Australia's forests in wetter times long ago. And they've been of cultural significance to First Nations peoples for countless generations. Taking a stroll among the world's largest remaining stand of these magnificent forest giants is one of life's greatest pleasures.

But the failing health and death of bunya pines near popular walking tracks raised suspicions that a serious plant disease has found its way to the Bunya Mountains.

**Bunya pines need our help!**



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## Phytophthora could be causing bunya pines to die

Extensive testing of soil and root samples from the Bunya Mountains National Park identified the presence of two introduced species of *Phytophthora* (disease-causing plant pathogens) where groups of bunya pines have died.

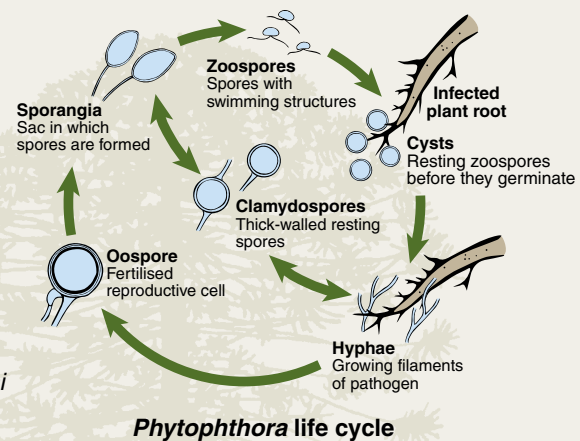
You can't see them, but *Phytophthora multivora* and *Phytophthora cinnamomi* are microscopic organisms known to cause disease in a range of plants. *Phytophthora* belong to a group of fungal-like organisms called water moulds that live in soil. They affect susceptible plants by attacking the root system and decreasing the plant's ability to take up water and nutrients.

On its own *Phytophthora* may not kill a bunya pine, as a root-damaged tree can usually survive in normal conditions using the stores of energy in its trunk. But when under stress (e.g. due to drought) the combination of less available water and damaged root systems takes its toll. Trees essentially starve to death.

## Why should we be worried about *Phytophthora*?

*Phytophthora multivora* and *Phytophthora cinnamomi* are not native to Australia. They can be introduced to new areas by humans, through the movement of soil on shoes, machinery and other equipment or plants on which soil is carried.

While some species of *Phytophthora* do occur here naturally, introduced (non-native) species of *Phytophthora* have been implicated in severe dieback in forests across Australia and Aotearoa New Zealand. We are concerned that this is happening here in the Bunya Mountains too.



*Phytophthora cinnamomi* was first detected in Australia in 1929 and has become a problem in most states. Dieback caused by *Phytophthora* is killing banksias, grass trees, jarrahs (tall eucalypts) and many other plants in Western Australia. In Tasmania, *Phytophthora* affects at least 181 species of plants, primarily in the understorey and ground layers of heathlands, dry sclerophyll forest and scrub. In Victoria, grass trees, heath plants and some eucalypts are most susceptible. Kauri dieback disease, due to *Phytophthora agathidicida*, has affected extensive areas of kauri forests in Aotearoa New Zealand. Kauri, *Agathis australis*, is one of New Zealand's treasures, and is in the same plant family (Araucariaceae) as the bunya pine.

With the Bunya Mountains having the largest stand of bunya pines remaining in the world today, we need to act swiftly to ensure we protect them from harm. And to stop it spreading to other areas and to other plants including grass trees.

*Phytophthora* is tough. It can survive for years in the soil, on footwear and on equipment. It is also 'smart'—when the soil is wet it becomes active and can sense a tree's roots and swim towards it through the soil.



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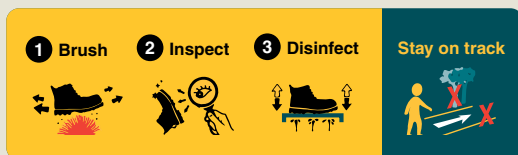
## What is being done?

Researchers are working to establish proof that bunya pines are susceptible to *Phytophthora*, and to find possible ways of protecting bunya pines from disease.

Plant pathologists from the Queensland Department of Agriculture and Fisheries, in collaboration with universities, are working in the laboratory to confirm that bunya pines and hoop pines show signs of disease when infected by *Phytophthora*. Trials of injecting phosphite (a fungicide) into 50-year-old plantation bunya and hoop pines are being conducted at Imbil State Forest

with the support of HQPlantations to determine if a defence response can be stimulated that might protect the trees and lead to a potential treatment. This treatment has been used in the commercial avocado industry for many years, and in kauri in Aotearoa New Zealand.

Queensland Parks and Wildlife Service is also collaborating with CSIRO and other agencies to track feral pigs. Pigs use their snouts to dig up the soil and can spread soil pathogens. Through discovering more about pig movements, Rangers will be more effective in controlling feral pigs.



## How you and I can help protect bunya pines

### 1 Clean footwear and equipment when going in and out of the forest

Use the washdown stations installed at walking track entrances. Follow instructions carefully, both going in and coming out of a track.

### 2 Clean footwear and equipment before your visit

Clean all soil off footwear, hiking poles, wheels, tents, clothing, backpacks and other gear every time you enter or leave a natural area. Get in the habit of cleaning these at home before you store your gear, and before you leave for a park or other natural area. This will help stop the spread of disease-causing pathogens (as well as weeds and insect pests) from place to place. Even a pinhead of soil is enough to spread disease, so be thorough.

Brush, then scrub with clean water to remove all soil before allowing to dry. Spraying with a non-toxic, non-corrosive and biodegradable disinfectant such as quaternary ammonium disinfectants (e.g. Phytoclean® or SteriGene®) increases the effectiveness, but is not essential. Clean/spray any surfaces that might have been in contact with the ground. Avoid using stream water or open water sources that aren't caught in a sewer or septic system as they could become contaminated.

### 3 Avoid going off track

Keep to tracks and formed roads, particularly in wet conditions when the organism is most active. Rainforest tree roots grow close to the surface and spread out from the trunk, so have a high risk of exposure.

### 4 Never assume anywhere is disease free

Infected trees may take some time to show visible symptoms and *Phytophthora* cannot be seen with the naked eye.

### 5 If an area is closed do not enter

Areas may need to be closed (temporarily or permanently) where unhealthy/dying trees are dangerous to visitors, or where the risk of spreading the disease from an area is high. For your safety and to reduce risk of harm to bunya pines, please heed all signs.

### 6 Keep a spare set of shoes and cleaning kit in your vehicle

Avoid spreading potentially contaminated soil inside your vehicle by having an extra set of footwear for the drive home. Carry a cleaning kit consisting of brushes, a screwdriver for removing soil from treads, a spray bottle of disinfectant, and plastic bags for boots and gear that can't be cleaned on-site.



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### 7 Purchase gear that is easy to clean

Use rubber feet on hiking poles to minimise the amount of soil they pick up. When buying new footwear, consider how easy they will be to clean.

### 8 Wheeled equipment and vehicles pose a high risk

Soil is readily trapped in the wheels of prams, bikes, vehicles and tracked machinery. Clean these thoroughly before moving from one area to another.

## For more information

[www.environment.gov.au/biodiversity/invasive-species/diseases-fungi-and-parasites/phytophthora-cinnamomi-disease](http://www.environment.gov.au/biodiversity/invasive-species/diseases-fungi-and-parasites/phytophthora-cinnamomi-disease)

<https://www.daf.qld.gov.au/business-priorities/agriculture/plants/fruit-vegetable/diseases-disorders/phytophthora-root-rot>

<https://www.dwg.org.au/publications-links/publications/download-info/managing-phytophthora-dieback-in-bushland/>

<https://parks.des.qld.gov.au/before-you-visit/visit-with-care/caring-for-parks>



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Use cleaning stations when going in and out of the forest

