

KAURI DIEBACK

THE SCIENCE BEHIND *PHYTOPHTHORA TAXON AGATHIS* (PTA)

THE FOLLOWING ARE A LIST OF COMMONLY ASKED SCIENTIFIC QUESTIONS AND ANSWERS ABOUT PTA, A NEW TO SCIENCE DISEASE AFFECTING KAURI TREES IN NEW ZEALAND.

The Kauri Dieback Management team currently has a research programme underway and there is still a lot to learn about this disease and its impact on kauri. There are many questions that could take years of detailed study to answer, however, regular updates will be made to the kauri dieback website as information becomes available.

1. Is PTA a fungus, virus, or the same thing that kills cabbage trees?

Although PTA superficially resembles a fungus under the microscope (as you cannot see it with the naked eye) it actually belongs to a distinct group of organisms commonly known as water moulds.

Water moulds belong to a separate kingdom from the fungi, called "Chromista". This kingdom has the same taxonomic rank (classification) as the Plant, Animal, Fungus, Bacteria, and Viral kingdoms.

PTA is not responsible for other diseases commonly seen on native plants in New Zealand. The cabbage tree disease caused by phytoplasma (a specialised type of plant bacterium) is spread by sap sucking insects that feed on the tree.

2. Is this disease native? Could it be a mutation that has arisen through mating between other *Phytophthoras* already here or could it breed to produce an even worse disease?

PTA was recognised to be a new species of *Phytophthora* in 2006 following studies of its DNA. PTA is not a mutation or a mated form of other known *Phytophthora* species. Because it is a new species we still don't know how it interacts with other soil organisms or *Phytophthoras*. More research is needed to answer these questions.

Its origin and time of arrival in New Zealand is still unknown, but evidence suggests it is an exotic species.

3. Are the spores airborne or able to survive in things like soil, seawater and sand?

PTA does not produce airborne spores so is unlikely to travel by wind and airflows. Evidence of slow disease spread also indicates it is not likely to be wind-borne.

Motile (swimming) waterborne spores are produced so they can move through soil waterfilms, freshwater streams and ponds/lakes but these spores do not survive in sand or

Hygiene and tree removal/felling Standard Operating Procedures, which include more detailed information, are available at www.kauridieback.co.nz or by phoning 0800 NZ KAURI (695 2874).



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saltwater. They can move through water but don't survive very long.

Soil-borne spores can survive for longer periods but more research is needed to definitively answer this question.

4. Can PTA be killed by UV light or temperature extremes?

Most *Phytophthora* species are sensitive to low and high temperatures, but we don't yet know what exact temperatures and other treatments (such as UV light) will kill each spore type. Our research programme will investigate possible treatments to kill this pathogen.

5. Should sick trees be cut out to save the living healthy ones nearby?

The removal of dying kauri trees to protect healthy ones is not recommended unless there is a health and safety risk to landowners or park users (for example, falling branches and trees could damage property and people).

Please refer to the detailed kauri tree removal and pruning Standard Operating Procedures on the kauri dieback website (www.kauridieback.co.nz) if you need to remove a tree from your land for safety reasons.

6. Can you breed from seedlines to get resistant trees?

As well as immediate control treatments to kill PTA, more research is needed to find longer term management tools for this disease.

Methods such as resistance breeding have been successfully used overseas against other related *Phytophthora* tree diseases. An example is the protection of the Port Orford Cedar against *Phytophthora lateralis* which you can find out more about at <http://www.fs.fed.us/r6/dorena/poc/index2.shtml> or http://en.wikipedia.org/wiki/Chamaecyparis_lawsoniana

7. Should we be saving seed now and thinking about germplasm banks?

Seedbanks can be used to retain genetic diversity of a plant population and are often used for the selection of disease resistance varieties in (horticultural) crop breeding programmes. Kauri seedbanks could also be used for this purpose in the future, especially if other control options are unsuccessful or not feasible.

8. Why can't fungicides/products already developed against other *Phytophthora* species be used?

Phytophthora diseases are a very common enemy to many other plants including important crops and native species. Many fungicides and tools have already been developed for our farmers, orchardists and home gardeners but every *Phytophthora* can be different and before we use any of the available products against PTA we need to ensure their effectiveness.

9. When should disinfectant be used and where is more information available on hygiene procedures?

People visiting and working in kauri areas need to clean their shoes and all machinery/equipment with soapy water and a scrubbing brush before and after entering each area.

The Joint Management team advises the use of other disinfectants (such as Trigene) only where necessary and when people cannot clean their shoes in between visiting different kauri areas.



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