Panama disease tropical race 4

What is Panama TR4?

Panama disease tropical race 4 (Panama TR4) is a serious disease that affects most banana varieties including Cavendish, Lady Finger and Ducasse. It is a fungal disease that lives in soil and can survive undetected for decades. It is easily spread through infected banana plant material, and contaminated soil and water.

It's here in Far North Queensland and it can't be eradicated by any biological or chemical controls. Panama TR4 is one of the greatest threats to worldwide banana production and in some countries, it's had a devastating impact on industries and livelihoods. If the disease is not managed, it has the potential to do the same in Far North Queensland.

DID YOU KNOW?

The fungus produces two types of spores:

Conidia are produced in large numbers and disperse rapidly.

Chlamydospores are hardy and can live in soil for up to 40 years.

For more information visit biosecurity.qld.gov.au or call 13 25 23

The Panama TR4 Program is a joint initiative between the Queensland Government and the Australian Banana Growers' Council.

Version 2, June 2021

Australian Banana Growers' Council Inc.

Queensland Government

How is it spread?

Panama TR4 is a challenging disease to manage because it is easily spread:

- in infected banana plants or plant material and in contaminated soil and water
- by people through the movement of dirty vehicles, equipment, machinery, tools and other items
- over short distances by root to root contact
- from parent banana plants to suckers
- by wildlife such as rats, bandicoots, feral pigs and wading birds
- potentially by insects such as the banana weevil borer
- by natural processes such as heavy rainfall and floods.

What does it do?

Panama TR4 enters the plant via the roots.

Fungal spores germinate and use their filaments (hyphae) to enter the roots through natural openings or wounds, moving through the corm and into the stem.

Until the fungus blocks the vascular tissues carrying the water and nutrients, there might not be any signs that the plant is infected. It may take weeks or a few months for symptoms or signs to show depending on environmental conditions (such as wet, dry or extremely hot) and the plant's age.

As blockage of the vascular tissue develops, the plant turns yellow, wilts and eventually dies.

This delay between infection and external signs of disease means that the fungus could have spread to other banana growing areas undetected.

How is it detected?

There is currently no way to test for Panama TR4 in soil or water. Early detection of plants showing signs of the disease and subsequent sampling and laboratory testing of these plants is the only way to know if the disease is present.

Surveillance is a key priority for Biosecurity Queensland as early detection, rapid destruction and on-farm restrictions are the only way to control and contain the disease.

The Panama TR4 Program team is responsible for visiting farms to identify suspect plants, taking samples for testing and reporting back on results.

If Panama TR4 is confirmed, the team will work with the grower to make sure biosecurity measures are in place to minimise spread of the disease on their farm and to the wider industry.

Growers' role

Biosecurity Queensland encourages growers to undertake their own surveillance for Panama TR4, and to educate farm workers to recognise and report signs of the disease.

The *Panama TR4 Identification Guide* and *Check Your Plants* factsheet are useful tools for more information. Visit panamatr4protect.com.au

What are the signs of Panama TR4?

- Yellow leaf edges in the early stages then progresses across the whole leaf
- Brown or black leaf edges

- Young leaves possibly still green and upright while older leaves and the stem are affected
- Wilted, collapsed and dying older leaves forming a “skirt” around the stem

- Split stem base (but not always) through two or three layers initially – later, deeper and higher up

- Discoloured vascular tissue in the corm and the stem – yellow, red, dark brown/black bands

Do not cut plants to look for internal symptoms of Panama TR4. Cutting or removing a symptomatic plant can spread infected material and stimulate the fungus to increase spore production.

Report sick plants to Biosecurity Queensland on 13 25 23

How to control it

There's no way of getting rid of Panama TR4 once it's in the soil as there are no practical control treatments.

Early detection, rapid destruction of infected banana plants and on-farm restrictions are the only way to control and contain the disease.

Effective biosecurity measures safeguard farm viability and protect the wider industry from Panama TR4.

What could Panama TR4 be confused with?

In the early stages, Panama TR4 symptoms might be mistaken for:

- nutritional deficiencies
- water stress
- bacterial corm rot (*Erwinia*)
- false Panama
- exotic bacterial diseases.

The only way to know for certain that a plant has Panama TR4 is by Biosecurity Queensland inspecting and sampling the suspect plant.

The different races

There are four different races of Panama disease (*Fusarium oxysporum* f. sp. *cubense*).

Race 1	**infects varieties including Lady Finger, Sugar and Ducasse, but not Cavendish[1].**
Race 2	**infects cooking bananas like Bluggoe and Blue Java.**
Race 3	**infects only Heliconia species, not bananas.**
Race 4	**infects most varieties including Cavendish, Lady Finger and Ducasse.**

The two important strains of Race 4 are:

Tropical race 4

occurs in the tropical growing regions. It has had a devastating effect on banana crops around the world particularly in Asia and the Middle East.
It was first detected in Australia in the Northern Territory in 1997 and Far North Queensland in 2015.

Subtropical race 4

occurs in subtropical regions and usually only produces symptoms in Cavendish after a period of cold stress.
Subtropical race 4 has been under quarantine control in south east Queensland, northern New South Wales and Western Australia for some time.

1 A unique population of the fungus is infecting Cavendish at Carnarvon, Western Australia, but it is more closely related to Race 1 than Race 4.

More information and support

Biosecurity Queensland's Panama TR4 Program is working closely with growers, industry and the community to minimise the spread of the disease and support affected farms. We can provide a range of information that can be tailored to your needs.

Call 13 25 23 or email panamatr4@daf.qld.gov.au

For more information visit biosecurity.qld.gov.au or call 13 25 23

The Panama TR4 Program is a joint initiative between the Queensland Government and the Australian Banana Growers' Council.

Australian Banana Growers' Council Inc.

Queensland Government