

Phytophthora root rot of avocado caused by *Phytophthora cinnamomi*

Fact Sheet (January 2023)

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Background

Phytophthora cinnamomi Rands is the causal agent of root rot, canker and dieback on a wide range of plant species. This pathogen was first isolated from cinnamon trees in Sumatra in 1922 [1]. In South Africa, *P. cinnamomi* is a prominent pathogen of avocado, macadamia, eucalyptus and fynbos. It is considered the most serious disease of mature avocado trees in the world.

Symptoms

The major symptom is root rot of the feeder roots that eventually progresses into larger roots. Infected feeder roots will turn black, firm and brittle, and become few in number (Fig. A). It can also infect crowns, trunks, and woody stems forming a reddish-brown canker (Fig. B). Rotting of roots interferes with water uptake and transport to the rest of the tree, resulting in aerial symptoms such as leaf chlorosis, wilting and dieback (Fig. C) [2]. Plants may die rapidly, or survive, often asymptotically, for many years. Heavy rain and waterlogged soils enhance disease development [3].

Biology

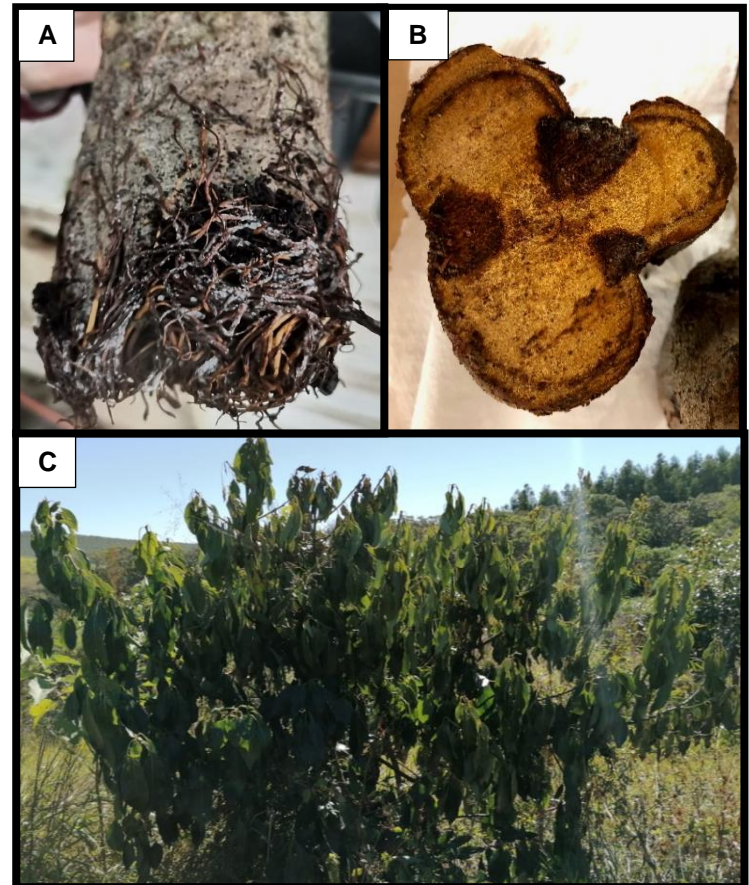
This pathogen can survive as a saprophyte on dead organic matter or as a pathogen on susceptible hosts. Infection mainly occurs through fine, feeder roots, but it can also invade stems, especially through wounds or natural breaks in the peridermal layer [4]. The presence of *P. cinnamomi* as asexual chlamydospores and intracellular hyphal aggregates enable its long-term survival under adverse conditions [5].

Known Hosts

This pathogen has a world-wide distribution with a host range exceeding 5000 species [2, 5, 6]. Economically important hosts include avocado, eucalyptus, chestnut, macadamia, oak, peach and pineapple [5, 7].

Control

Complete eradication of this oomycete is extremely difficult [5]. Therefore, a multifaceted approach is best. Rootstocks with partial resistance to *P. cinnamomi* are available. Dead and pruned infected plant material should be disposed of by burning [8]. Replanting should be done away from infected plants, preferably upslope as plants downslope from any site of infection will be at risk from *P. cinnamomi* [8]. Soil or water movement from infested areas should be prevented. Sprinkler irrigation should not wet the trunk and irrigation should be adequately drained to prevent water logging [9]. Appropriate plant nutrition should be provided, and soil pH should not be too acidic. Solarization of infested areas can be applied following tree removal in warm inland areas. Machinery, tools, spades and footwear should always be washed free of soil and sanitized between trees to limit spread [10]. Fungicides such as fosetyl-Al or potassium phosphonate can be applied through trunk injection, foliar spray, trunk paint, soil drench or with irrigation water. Metalaxyl (Ridomil R) can be applied as granular, a drench or with irrigation [9, 11].



Pictures provided by South African avocado growers and Jesse Hartley.

What to do?

1. Monitor your trees for dieback, cankers and/or root rot.
2. Fill out a FABI diagnostic clinic form, available at app.informationhub.io/form/cl3cy217x00674ts66dcfz1nl or send an email to diagnostic.clinic@fabi.up.ac.za.
3. Collect samples from the soil, trunk (cankers) and roots, package separately in brown paper bags with a wet paper towel in each, place in a crate/polystyrene box and send to the FABI diagnostic clinic.

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