

Fusarium Wilt of Rosewood

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INTRODUCTION

The Indian rosewood (*Pterocarpus indicus* Willd.) and the weeping Indian rosewood (*P. indicus*, variety “*pendula*”) are popular shade trees commonly grown along streets, on parklands and on large rural properties in tropical and equatorial regions, including the Northern Territory (NT). They grow fast and generally have few problems.

However, they can be attacked by the fungus *Fusarium oxysporum*, which causes Fusarium wilt. Other problems include looper caterpillars, which cause defoliation, leading to dieback. Also, indirect lightning strikes, which can cause longitudinal cracks in the trunk and branches, can result in some losses. Trees grown on shallow rocky soils may be stressed. Also, seasonal defoliation may sometimes occur in the dry season.

FUSARIUM WILT IN ROSEWOOD TREES OVERSEAS

Fusarium wilt has been known to cause severe problems in *P. indicus* trees in Malaysia and Singapore for over 100 years, where they are known as angšana trees and the disease as angšana wilt. In the Seychelles, the disease has been studied since 1998, where it is known as Sandragon disease.



Figure 1. A rosewood tree showing symptoms of Fusarium wilt

THE DISEASE IN THE NT

A few years ago, symptoms of Fusarium wilt and dieback were observed on weeping Indian rosewood trees in Darwin. In the last 12 months, there has been an increase in symptoms on rosewood trees in Darwin's rural areas, particularly in Humpty Doo and McMinns Lagoon. *F. oxysporum* colonies were consistently isolated in culture media from symptomatic weeping Indian rosewood trees. The fungal isolates have cream coloured colonies, which age to a pale orange colour on a potato dextrose agar culture medium. DNA sequencing confirmed the identification of the fungus as *F. oxysporum*. It is not known whether the fungus is of a local or overseas origin. Pathogenicity tests are being carried out to confirm the aetiology of the disease.

SYMPTOMS

Generally, infected trees do not exhibit symptoms until they are at least four to five years old. Leaves become flaccid, turn pale and then yellow and drop off. This is followed by dieback in twigs and branches. The bark peels off and rots, often exposing secondary rots and insect activity. When the rotted bark is chopped off, the infection can be seen as the outer wood turns brown or has brown streaks, in contrast to the white wood with rose resin streaks in healthy trees.

FUSARIUM WILT DISEASES

F. oxysporum is a complex species comprising saprophytic and plant pathogenic isolates. There are tens of *formae speciales* of this species, each infecting different plant hosts. Usually, each *formae specialis* has a narrow host range. It is unknown if *F. oxysporum* isolated from *P. indicus* can infect related plants. There are specific forms of *F. oxysporum* in the NT that cause wilt or 'yellows' diseases in heliconias (unnamed form of *F. oxysporum*), bananas (*F. oxysporum* f. sp. *cubense*), sweet basil (*F. oxysporum* f. sp. *bacilici*) snake beans (*F. oxysporum* f. sp. *tracheiphilum*) and gladioli (*F. oxysporum* f. sp. *gladioli*). Interstate, there are other forms that cause wilts in tomatoes (*F. oxysporum* f. sp. *lycopersici*), cotton (*F. oxysporum* f. sp. *vasinfectum*), watermelon (*F. oxysporum* f. sp. *niveum*), rockmelons (*F. oxysporum* f. sp. *melonis*), cucumbers (*F. oxysporum* f. sp. *cucumerinum*) and snow peas (*F. oxysporum* f. sp. *pisii*).



Figure 2. An infected rosewood tree showing internal browning of the wood

F. oxysporum is a soil-borne fungus, which invades the xylem tissue, or vascular tissue, of plants. The fungus produces three spore types: microconidia, macroconidia and resistant chlamydospores. The fungus is able to persist as chlamydospores in soil for long periods. Chlamydospores are round, one-celled spores with thick resistant cell walls, formed in diseased tissue. Fusarium wilt pathogens can also colonise the root cortex of some non-host plants. Both mechanisms ensure that the disease persists undetected in soil in the absence of host plants for many years.

The fungus is easily transferred through soil. Therefore, the most common method for the spread of Fusarium wilts is through contaminated soil. Boots, machinery, garden tools, vehicle tyres and root vegetables with contaminated soil can spread the pathogen to new localities. Untreated, diseased tree mulch can also serve as a source of disease inoculum. The disease can also be spread through contaminated water and through plants with contaminated roots.

DISEASE MANAGEMENT

Diseases caused by *F. oxysporum* are notoriously very difficult to control. No chemical treatments are available. The only available options are developing resistant varieties or using resistant rootstocks. Resistant varieties are the option for bananas, tomatoes and basil. Grafting is the option in the NT for snake beans and for watermelon and passionfruit interstate.

REFERENCES

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