

## Managing sudden death in citrus

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Sudden death is associated with poorly aerated and/or poorly drained soil. It is a disease of the crowns and structural roots of citrus trees and is known to occur in all citrus growing areas of New South Wales and Australia.



### Symptoms

Affected trees often wilt and decline rapidly, usually with a good crop of fruit still on the tree. However, progress of the disease can be less dramatic with a slowdown in the rate of tree growth or the tree may be unthrifty for some time prior to collapse. One or more major structural roots are often blackened or dead, and a brown discoloration extends into and across the tree butt stopping at the bud union. A characteristic feature of sudden death is that the discoloured wood smells of rancid coconut oil, especially if the wood is heated. There is no gumming or pitting of the rootstock. The

ink cap fungus *Coprinus micaceus* (Bull.) Fr. is often found fruiting at the base of affected trees, especially in autumn after warm, humid weather.

Sudden death affects trees of all scion varieties predominantly on *Poncirus trifoliata* and Carrizo and Troyer citrange rootstocks. Trees of all ages have succumbed to the disorder, but the incidence is greatest in 7 to 15 year old trees. No pathogen has been identified as solely responsible for sudden death in citrus in Australia. Filamentous plugging occurs in the xylem vessels in the brown discoloured areas of the butt, but the absence of fungal mycelium at the margin of the discoloured area and in healthy tissue suggests that a fungal pathogen is not the primary cause of disease. However this does not eliminate the possibility that a fungus invading the weakened tissue could produce a toxin which causes the brown discoloration of wood.



The *Coprinus* fungus fruits at the base of affected trees.

Tree losses from sudden death have occurred on all soil types from sands to heavy clay. However, the condition occurs predominantly on heavier soils or where drainage problems exist, such as

perched water tables and layers of compacted soil, leading to temporary water logging and anaerobic conditions. Intermittent periods of water logging and poor aeration lead to a weakening of the root system and deterioration of root health. Incidence of sudden death is also associated with excessive fertiliser applications (e.g. ammonia fertilisers) or where the roots have sustained mechanical injuries.

## Control

Removing stress factors that predispose citrus to sudden death can reduce losses. This involves careful site selection, providing good surface and subsurface drainage, establishing trees on ridges or mounds to improve drainage, and careful monitoring of irrigation to avoid over-watering. The use of inter-row cover crops and sod culture can also improve soil structure.

## Further reading

Barkley P 2004, *Citrus Diseases and Disorders*, NSW Agriculture.

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Broadbent, P 2000, 'Dry root rot or sudden death', *Compendium of Citrus Diseases*, 2nd ed., eds LW Timmer, SM Garnsey, JH Graham, APS Press, p. 71.

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