

## Mal secco

### What is it?

Mal secco is a fungal disease that affects citrus. It is difficult to control, and even more so to eliminate.

### Primary hosts

Mal secco affects the leaves and stems of citrus plants, particularly lemons, and citron, causing them to wither and die back. Bergamot, lime, tangelos, sour orange, and some mandarins are also susceptible. Infection of sweet orange and grapefruit however is not severe. Rootstocks affected include rough lemon and Carrizo and Troyer citranges.

### Where does it occur?

Mal secco has been reported in a number of areas around the Mediterranean Basin and the Black Sea, as well as in Asia Minor, the Middle East, and parts of Africa. Mal secco is not found in Australia.

### Infection and spread

Long-distance spread of Mal secco most often occurs through the movement of infected propagation material and plants. Fruit, roots, stems, and shoots can harbour Mal secco infection without displaying external symptoms. This disease has been detected in lemon seeds, but there is no evidence that it is seedborne in other seed types.

Short range spread is through fungal spores dispersed by wind blown rain. Birds and animals may also be vectors. Mal secco propagules enter new citrus host trees through injured areas, such as those caused by wind, hail or frost damage, as well as pruning cuts and harvest injuries. Germ tubes can also penetrate leaves through stomata.

Optimal conditions for infection occur at temperatures between 14°C and 28°C, whereas slightly higher temperatures, around 20°C to 25°C, favour rapid growth of the fungus and the appearance of visible symptoms on the tree.

Infected twigs and branches that are removed from the tree can remain infectious for several weeks. The fungus is also able to survive in infected twigs in the soil for more than four months.



Infected twig of lemon

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Cross section of an infected trunk of a marsh seedless grapefruit on rough lemon

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A tree which died from infection sprouts from the rootstock and the young shoots show severe symptoms

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## Symptoms

Mal secco attacks trees of any age but is more severe on young trees. Symptoms depend on the infection mode.

When infection occurs in the canopy the most typical symptom is yellowing and clearing of veins. Eventually leaves wilt, dry up and fall, with progressive dieback of twigs and branches. The pathogen moves slowly downwards from shoots to the limbs, trunk and roots. Ash-grey areas may appear on withered twigs, containing many small raised black points (fungal fruiting bodies). Spouting may occur at the bases of affected branches, as well as sucker growth from the rootstock in response to the disease. Eventually the whole tree is affected and dies.

Where infection begins at the roots, progression of symptoms is rapid and fatal. Cut twigs on infected trees show a characteristic pink or orange-red discolouration in the recently invaded xylem. In chronic infections, browning of the heartwood may occur.

## Biosecurity measures

Quarantine is the best way to prevent this disease from entering Australia. The biggest threat is of people smuggling infected planting material into the country. Bringing citrus into Australia illegally places the whole industry at risk.

## How can I protect my orchard from Mal secco?

Check your orchard frequently for the presence of new pests and unusual symptoms. Make sure you are familiar with common citrus pests so you can tell if you see something different.

**If you see anything unusual, call the Exotic Plant Pest Hotline on 1800 084 881.**



Sudden dieback caused by Mal secco

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EXOTIC PLANT PEST HOTLINE  
**1800 084 881**

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## Want more info?

If you would like more information, or to download a copy of the Industry Biosecurity Plan for the Citrus Industry, visit [www.planthealthaustralia.com.au](http://www.planthealthaustralia.com.au), email [admin@phau.com.au](mailto:admin@phau.com.au) or phone (02) 6215 7700.