

## Citrus butt & root rot (004)

### Common Name

Butt and root rot

### Scientific Name

*Ganoderma* and *Trametes*. There are many species of both, and not all are plant pathogens, especially those belonging to *Trametes*. Also, see Casuarina butt rot caused by *Ganoderma applanatum* (**Fact Sheet no. 195**).

### Distribution

*Ganoderma* species are present in American Samoa, Australia, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Marshall Islands, New Caledonia, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. They have been recorded on citrus in Cook Islands, Fiji, and Solomon Islands.

### Hosts

Oranges and other citrus species are attacked. These fungi have a wide host range and infect many forest and plantation trees. *Ganoderma boninense* is a major problem on oil palm in Solomon Islands.

### Symptoms & Life Cycle

*Ganoderma* and *Trametes* are often called bracket or shelf fungi, because of the shape of the spore-bearing structure that grows from the tree. This is the only part of the fungus that can easily be seen; the rest is in the soil or inside the tree causing white rots. The bracket or shelf is the part of the fungus where the spores or seeds are produced; the spores are very small, too small to be seen without a microscope.

The brackets of *Ganoderma* do not have a stem, but are attached over most of their width to the host tree or stump (Photo 1). Their upper surfaces are reddish-brown to black (Photos 1&2), often irregular and knobbly, with a cream to white margin. Underneath, they are greyish white (Photo 3). They often have a varnished appearance. The underside of the bracket is white to grey. A new zone of pores is added to the bracket each year.

The brackets produce many millions of spores and these travel long distances in the wind. However, it is still uncertain whether root-to-root contact through the soil from one tree to another is the main method of infection or spores through wounds. For example, *Ganoderma* is a major problem in oil palm and in some countries root contact with soilborne fungus is considered to be important whereas, in other countries, spores are thought to be more important, infecting palms via fronds cut to assist fruit harvesting.

The brackets of *Trametes* are zoned, and often are of different colours; also, they form extensive tiers, one on top of another (Photo 4). The underside is cream with tiny pores.

Once inside the tree, the fungi follow the central areas where water and food flow between the roots and the leaves. Brackets develop only when rots are extensive. They may last only a few months (*Trametes*) or several years (*Ganoderma*).

### Impact

Damage to the roots and trunks of oranges and other citrus by butt/root rot fungi prevents the movement of food and water passing up and down the tree. Leaves turn yellow and fall, fruit production ceases, and there is a slow dieback of the branches. Inside the trunk, a white rot develops. Later, either when the tree is still alive or when it is dead, the brackets appear at the base of the trunk (the butt).

It is not known how many months or years pass between infection of a citrus tree and development of the bracket. The first sign of damage is usually dieback of a branch. Slowly, other branches die, until the whole tree is dead; this can take several years.

### Detection & inspection

If branches start to die back, then it is possible that the roots have been infected with *Ganoderma* or *Trametes*. There is no way to be sure until the brackets form. However, it is worthwhile checking the base of any dead or dying trees nearby incase these have brackets growing from them.



Photo 1. *Ganoderma* sp. growing from the base of an orange tree, which is still alive. Note the dark upper surface with the distinctive white margin.



Photo 2. Another *Ganoderma* species. The young brackets can be seen on the left of the trunk. In this case the tree is dead.



Photo 3. Underside of Photo 1, showing the light grey colour of this active spore producing-bracket.



Photo 4. *Trametes* on a dead citrus trunk showing stacks of brackets, one on top of the other.

## Management

### CULTURAL CONTROL

Dig out infected trees: There is no effective treatment for *Ganoderma* or *Trametes* once the bracket appears. It is a sign that the fungi have been feeding on the tree for some time, and large rots are already present. Dig out the trees along with all the main roots.

Do not damage healthy trees: spores of the fungus can enter the butt through wounds. Do not damage the bark. Stop people cutting the bark with bush knives!

### CHEMICAL CONTROL

Chemical control is not an option for these diseases.

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Information from Futch SH, et al. (undated) Ganoderma wood-rotting fungi on citrus stumps. University of Florida Extension Service. (<https://edis.ifas.ufl.edu/hs269>); Dewdney M (2012) Ganoderma root rot. University of Florida-IFAS's Citrus Research and Education Center in Lake Alfred. ([https://cre.ifas.ufl.edu/extension/trade\\_journals/2012/2012\\_December\\_ganoderma.pdf](https://cre.ifas.ufl.edu/extension/trade_journals/2012/2012_December_ganoderma.pdf)); and from Downer AJ, Perry EJ (2019) Wood decay fungi in landscape trees. University of California Statewide IPM Program. Agriculture and Natural Resources, University of California. (<http://ipm.ucanr.edu/PMG/PESTNOTES/pn74109.html>).

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