

## Extension Fact Sheet 3: Cocoa Brown Root Rot



**Common name:** Brown root rot

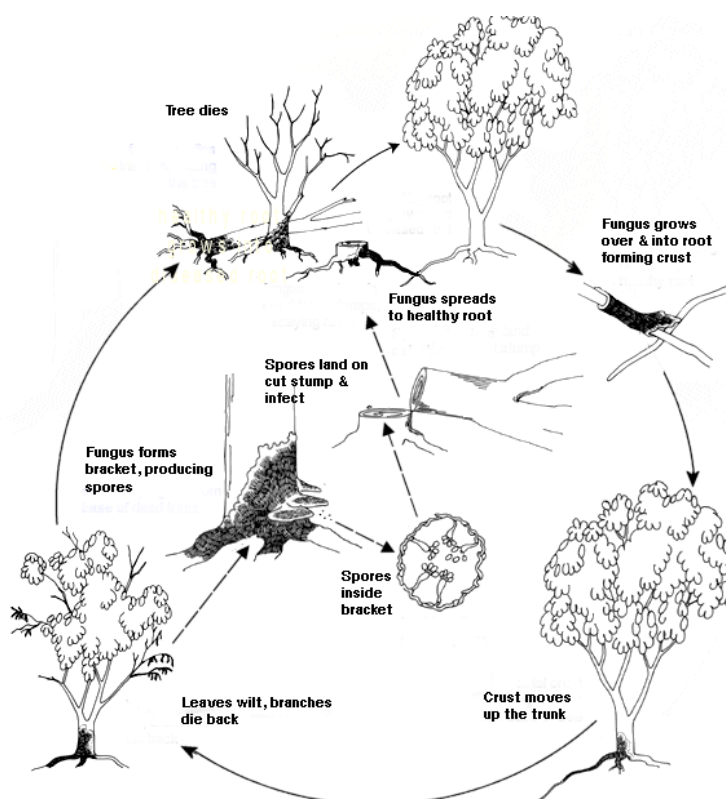
**Scientific name:** *Phellinus noxius*

**Hosts:** The fungus has a wide host range, attacking native forest trees and plantation crops, including cocoa, oil palm, rubber, coffee and *Cordia* (especially in Vanuatu).

### Damage

The fungus attacks the roots, and this causes the leaves to yellow and wilt, beginning at the branch tips. Very quickly, all the leaves fall. The fungus forms a dark brown to black crust on the trunk with a white margin, often with clear drops of liquid; the crust grows up to one metre (photo, left). It grows on the roots, too, and often soil and small stones can be seen within it.

Once a tree is infected, there is no way to cure it: it will die. If left unattended, the fungus will spread outwards along the roots to healthy trees around; infection of these will lead to their death and further spread, so that in a short time a large number of trees are killed.



## Biology and Life Cycle

*Phellinus* lives in the forest where, under natural conditions, it does little harm. However, when the trees are cleared for cocoa or a plantation of timber trees, condition becomes ideal for its spread. In the new plantation, all the trees are alike and if susceptible to *Phellinus*, spread is rapid.

The fungus spreads from the old stumps, left when the forest was cleared. These become infected by spores or more likely by the fungus in the soil. The fungus spreads from these to the cocoa by root-to-root contact. Eventually, it reaches the base of the tree and climbs the outside. The fungus has enzymes to extract nutrients from dead and dying roots and stems. The life cycle is illustrated above (diagram<sup>1</sup>).

The crust is sterile, that means it does not produce spores. However, spores are produced in the brackets. These are dark brown above with red-brown margins and grey underneath. They have not been seen on cocoa in Solomon Islands, but they occur on rotten stumps of many forest trees (photo, centre) and on *Leucaena* (photo, right).

## Signs and Symptoms

Routine inspection of the base of the trees is necessary to look for the crust that grows up the trunk. Also, look for brackets of the fungus on old stumps of forest trees. Also, look for them on shade trees, e.e., *Leucaena*.

## Management

### Cultural control:

After clearing the forest, it is important to survey stumps that have brackets of *Phellinus* growing from them. These should be removed together, if possible, with all roots larger than 2.5 cm diameter. The surveys need to be done on a regular basis, every 3 months at least.

If diseased cocoa trees are seen, remove them immediately, taking out as much of the larger roots as possible. Also, carefully remove the soil from around the trees nearby and inspect for the crust at the base of the trunk and on the larger roots. If seen, remove the trees.

### Chemical control:

There is no chemical control option for this disease.

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<sup>1</sup> The diagram of the life cycle is from APSnet Education Center. Brown root rot. The permission of The American Phytopathological Society to use this diagram is gratefully acknowledged. <http://www.apsnet.org/education/LessonsPlantPath/BrownRootRot/default.htm>