Forest Threats

Bacterial diseases

Tree Protection Co-operative Programme

Created 17 June 2026

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Bacterial diseases

Erwinia wilt and dieback

Erwinia psidii

SYMPTOMS

Symptoms include red discolouration of young tissue and vascular wilt which leads to shoot and branch dieback (Coutinho et al. 2011; Arriel et al. 2014). Small cankers can develop and are associated with blisters below the young actively growing green bark (Coutinho et al. 2011). Lesions are also present on the leaves and are surrounded by a distinct halo (Coutinho et al. 2011).

BIOLOGY

The biology and life cycle is poorly understood. In the study by Coutinho et al. (2011) the disease was only observed on young trees (6 months to 2 years). It is suggested that there was a host shift from guava to *Eucalyptus* (Coutinho et al. 2011). *E. psidii* can cause death to the tops of trees and hence the tree can form double leaders. The trees also appear to recover rapidly and older trees do not seem to be affected.



Pantoea blight and dieback

Pantoea ananatis , Xanthomonas axonopodis , Xanthomonas vasicola pv. vasculorum , Xanthomonas dyei pv. eucalypti

SYMPTOMS

Bacterial blight and dieback is a disease of young *Eucalyptus* trees, either in the nursery or in newly established plantations. Symptoms include water soaked, angular lesions and interveinal necrosis of the leaves which is often concentrated along the main vein or at the edges. Lesions often extend into the petiole and twigs leading to dieback of the young shoots. In the case of *Xae* in Brazil, severe defoliation was recorded when the conditions were favourable for disease development (Ferraz et al. 2018). Symptoms caused by the various bacterial species appear similar and it is thus impossible to identify the causal agent based solely on symptom expression. *Pantoea ananatis* and *Xvv* have been isolated together from the same infected plant (Coutinho et al. 2015).

BIOLOGY

In the case of *P. ananatis* and *Xvv*, younger leaves are more susceptible than older leaves. This is contrary to the case with *Xae* where older leaves were shown to a have a higher percentage of leaf area with lesions than younger leaves (Neves et al. 2014). Free water on the leaf surface is required for penetration of the bacteria. They enter through natural openings such as hydathodes and stomata, and wounds. The optimal temperature for the development of the disease caused by *Xae* is between 26°C and 30°C (Neves et al. 2014) and between 20°C and 25°C with high relative humidity in the case of *P. ananatis* (Coutinho et al. 2002).

Ralstonia bacterial wilt

Ralstonia solanacearum and Ralstonia pseudosolanacearum

SYMPTOMS

A rapid wilting followed by defoliation, death of stems, reduced growth and dark discolouration of the wood (Coutinho et al. 2010). Trees between 2 and 4 years of age are the most susceptible to infection (Wardlaw et al. 2010). Infected trees usually die within 6 months. In South Africa, bacterial wilt is occasionally responsible for tree death. Outbreaks are usually not widespread. Nursery infections have not been reported locally although this is not the case in Brazil (Alfenas et al. 2006).

BIOLOGY

Ralstonia spp. are both soil and waterborne and enter the plant roots through wounds or at the site of rootlet emergence. If the infection is successful they rapidly colonize the xylem tissue leading to the death of the host. Once the host has died, the bacteria then return to the environment and survive in soil, water, reservoir (nonhost) plants (Denny et al. 1994) and other potential hosts such as weeds (Pradhanang et al. 2000). In the case of *Eucalyptus*, latent infections may occur and when the tree is stressed by either abiotic or biotic factors, the disease develops. These stress factors weaken the defence system of the host allowing the pathogen to proliferate (Coutinho & Wingfield, 2017). Currently only two of the plant pathogenic *Ralstonia* species have been reported to be associated with bacterial wilt of *Eucalyptus* and these two species are mostly geographically separated with *R. solanacearum* found in the Americas and *R. pseudosolanacearum* in Africa and Asia (Carstensen et al. 2017).