



Banana blood disease

Blood disease bacterium

Exotic threat to Western Australia

By Alison Mackie, Quarantine Research Officer, South Perth, Nichole Hammond, Plant Pathologist (Quarantine), South Perth and Satendra Kumar, Quarantine Plant Pathologist, South Perth.

Background

The causal pathogenic bacterium of banana blood disease was originally named *Pseudomonas celebensis* in 1923, however none of the original cultures exist and the name became invalid. The symptoms and epidemiological characteristics of blood disease are very similar to those of insect-transmitted strains of Moko disease in Central and South America, caused by race 2 of *Ralstonia solanacearum*. The disease was considered to be an aberrant form of Moko but after the appearance of the disease in Java further investigations showed that the bacterium was in fact different from the bacteria which causes Moko disease.

Distribution

Blood disease was first reported in 1906 from southern Sulawesi in Indonesia. It spread to west Java in 1987 and has since been reported on most of the islands of the Indonesian archipelago (Lombok Island, West Nusa Tenggara, Sumatra, West Laimantan, the Mouccan Islands and Irian Jaya). Blood disease is not present in Australia.

Hosts

The primary hosts of blood disease include most banana species (*Musa*), especially cooking bananas (ABB). All plant parts are affected (leaves, roots, stems, fruits and flowers) and there are no known banana cultivars resistant to blood disease. Species closely related to *Musa*, such as *Heliconia*, *Strelitzia* and *Ravenala*, have not yet been reported as wild hosts, however, it is possible that they are susceptible.



Reddish-brown discoloration of stem tissue

Symptoms

Blood disease causes yellowing of the leaf margins of the oldest leaves first and eventually the petioles collapse and become necrotic. The presence of blackened and shrivelled male flower buds suggests that the disease is insect transmissible. Fruit may appear unaffected but when the fruit is cut open the pulp displays reddish-brown discoloration and may be rotten or dry. It is this discoloration that gives the disease its name. The discoloration extends from the fruit, through the peduncle down into the rest of the plant via the vascular tissue. Bacterial ooze is visible if the tissue is cut. The discoloration will often be found throughout the mat and in the new suckers of an infected plant.



Blackish-brown rot and discoloration of fruit pulp

Important Disclaimer

The Chief Executive Officer of the Department of Agriculture and Food and the State of Western Australia accept no liability whatsoever by reason of negligence or otherwise arising from the use or release of this information or any part of it.

Spread

Blood disease is insect transmitted and is estimated to be spreading at the rate of approximately 25 kilometres per year in Indonesia. Though there is little information available on the persistence of the pathogen, the disease is also likely to be spread through infected planting material and plant debris. It is not known whether the pathogen alone can persist in soil but is thought to persist in soil for over a year when associated with plant remnants. Blood disease bacterium can survive in fruit for over two weeks and because bunches can appear normal, they may be marketed and subsequently discarded into backyard gardens by the consumer, leading to further sources of infection. Plant quarantine regulations, including controls on the movement of fruits, need to be strictly enforced to limit further spread.

Potential impact

Blood disease of banana has devastated areas of banana production on several of the islands in the Indonesian archipelago; where the disease has caused the abandonment of dessert banana plantations. Crop losses have been estimated to be up to 100% for susceptible varieties, particularly those vulnerable to inflorescence infection via insect vectors. Due to the widespread presence of blood disease in Indonesia and the potential to spread into Papua New Guinea and Australia, blood disease is of concern to producers and quarantine authorities.

Control

The primary means of controlling blood disease is the exclusion of the bacterium from areas where the disease does not occur. Within an affected area, sanitation measures developed for moko disease are likely to be effective against blood disease. The only effective means of control where the pathogen is present is the eradication of infected plants. The systematic nature of infection of the bacterium means that the pathogen cannot be destroyed without also killing the host plant.

As with moko, if blood disease was prevalent in commercial plantations it would be a major problem due to the expensive preventative measures required to control spread of the disease, rather than due to the losses that result. Good cultural practices involving the removal of infected plant material and the disinfection of all tools and machinery decreases the risk of spread of blood disease.

Report suspect sightings to Pest and Disease Information Service on 1800 084 881.

Suspect samples of leaves, plants, plant parts or fruit can be sent for testing to AGWEST Plant Laboratories and clearly marked as 'suspect blood disease' and the appropriate HortGuard box ticked.