Jan 22

Pathogen of the month
January 2022

Banana wilt associated phytoplasmas

Fig. 1. ***Leaf yellowing (a), discontinuous vascular necrosis inside banana pseudostem (b), failed bunch production (c), banana and coconut affected together in the field (d), and necrosis of male inflorescences (e).***

Disease: Lethal wilt of banana plants
Pathogen: Banana wilt associated phytoplasmas (BWAP) including members of '*Candidatus* Phytoplasma noviguineense'
Classification: K: Monera P: Tenericutes C: Mollicutes O: Acholeplasmatales F: Acholeplasmataceae

Banana wilt associated phytoplasmas (BWAP) is the term originally given to phytoplasmas associated with a wilt disease of banana plants in Papua New Guinea (PNG). BWAP is actually a poorly understood group of closely related phytoplasmas, some of which, according to current phytoplasma nomenclature rules, belong to the taxon, '*Candidatus* Phytoplasma noviguineense' and others are sufficiently different that they will likely be assigned to another novel 'Candidatus Phytoplasma' taxon. Phytoplasmas are also classified into groups based on their 16S rRNA gene sequences. These phytoplasmas do not belong to any currently accepted 16S rRNA group, but are most similar to phytoplasmas affecting palms elsewhere in the world that belong to groups 16SrIV and 16SrXXII.

Biology and Ecology:

Externally, banana leaves turn yellow and die, fruit bunches are absent or poorly formed and few suckers are produced. Uniquely characteristic symptoms are discontinuous vascular streaking inside the pseudostem and necrosis of the male inflorescences.

Distribution:

This disease has become widespread in PNG, but with a patchy distribution. It has also more recently established on adjacent islands in the Shortland Island group in the neighbouring country, Solomon Islands. The disease is absent from Australia.

Impact:

This disease has been having a devastating impact in PNG for several decades, destroying thousands of banana plants. Banana is a vital staple crop in this country so there is also a severe threat to food security. Banana phytoplasmas are included in Australia's National Priority Plant Pest list.

Host Range:

This is primarily a disease of cooking banana plants (ABB genomic group), with ABB dessert bananas known as 'yawa' also affected. Although infection of outwardly symptomless Cavendish subgroup banana plants (AAA genomic group) has been recorded, it is not known if there was a subsequent disease reaction. In a very limited area in PNG, phytoplasmas belonging to '*Ca.* P. noviguineense' are also associated with a lethal wilt of coconut (*Cocos nucifera*) and betel nut (*Areca catechu*) palms and have been detected in asymptomatic taro plants (*Colocasia esculenta*).

Management options:

Currently, the only effective management technique for this disease is early detection and destruction of infected plants. There is a growing body of knowledge about the possible insect vectors of these phytoplasmas. An understanding of vector identities and life cycles will be vital in formulating a sustainable integrated disease management strategy.

Further Reading: Carvalhais, L. C.; Davis, R. I. Phytoplasma diseases of banana plants. *In*: Kema, G. H., & Drenth, A. (2020). *Achieving sustainable cultivation of bananas. Volume 2: Diseases and pests of banana*. Burleigh Dodds Science Publishing. *In preparation*.

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