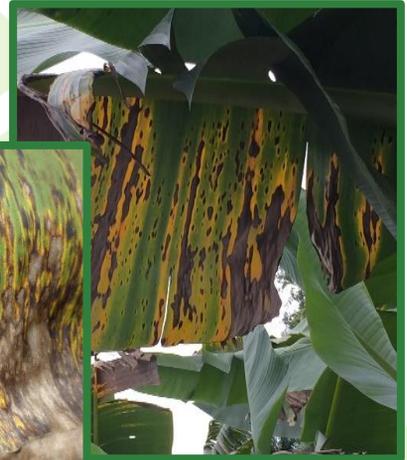


Black Sigatoka



The fungus *Pseudocercospora fijiensis* causes Black Sigatoka (aka Black Leaf Streak Disease, BLSD) on bananas and plantains.



Images c/o Gert Kema, Wageningen Univ., NL

Pathogen Description

The fungus causing BLSD has the scientific name *Pseudocercospora fijiensis* (formerly known as *Mycosphaerella fijiensis*). It reproduces both sexually and asexually with the different phases in its life-cycle producing different spore types. It is a hemi-biotrophic pathogen so it requires living plant tissue for part of its life-cycle and lives on dead/dying plant material at other times.

Mode of Infection

The fungus infects leaf tissue, entering the plant through its stomata typically on the abaxial (lower) side of the leaf. It encircles the substomatal cavity, growing between cells in the mesophyll and into the palisade layer and air cavities. It continues to live and grow this way (without damaging its host) for several weeks before causing widespread cell death. Sexual ascospores and asexual conidia are dispersed from out of the stomata.

Symptoms

First visible signs of infection are reddish-brown spots and streaks parallel to leaf veins. These merge to give larger dark-brown to black streaks, which eventually leads to large patches of dead (necrotic) tissue. Leaf chlorosis (yellowing) and necrosis reduces the photosynthetic capacity of leaves and causes a physiological switch to (early) fruit ripening (making the fruit unfit for export).

Disease Spread

Leaf-to-leaf, and plant-to-plant spread occurs via rain-splash and run-off of conidia. Regional spread (<100 km) can occur with wind-dispersal of ascospores being significant in the outbreak of epidemics. Longer-distance spread is rare because the spores are sensitive

to UV-exposure. Both spore types can occur on the leaf simultaneously.

Control

The commercial Cavendish cultivars on which the banana export industry is based are highly susceptible to the disease, and chemical control via the regular application of fungicides (often weekly) is essential. However, the continuous reduction of fungicide sensitivity in the population of the fungus is a major problem in controlling the disease.

Detection

BLSD may be found together with related fungal pathogens in a so-called 'disease complex' (particularly in SE Asia). This makes it difficult to distinguish by symptoms alone; DNA-based methods have been developed to screen for the fungus in plant tissue (notably using the Polymerase Chain Reaction, PCR).

Interesting Facts

BLSD is considered the most damaging and costly disease of banana & plantain. Banana is grown throughout the tropical and sub-tropical regions of the world, and is a staple crop for many developing countries. It is both a vital income source for subsistence farmers and a multi-billion dollar export industry, in part because banana is the most widely eaten fresh fruit in North America and Europe.

Further reading

Open access journal paper (2016), Combating Sigatoka
<http://dx.doi.org/10.1371/journal.pgen.1006234>

Open access journal paper (2016) Genomics and Disease Control
<http://dx.doi.org/10.1371/journal.pgen.1005876>

Banana Knowledge Bank
<http://www.promusa.org/Black+leaf+streak>