

Black Sigatoka

MYCOSPHAERELLA FIJIENSIS (MORELET)

DOTHIDEOMYCETES - CAPNODIALES - MYCOSPHAERELLACEAE

INTRODUCTION

Black Sigatoka disease is caused by the fungal pathogen *Mycosphaerella fijiensis*. The disease affects most varieties of edible bananas. *Musa* spp. and *Heliconia psittacorum* (an ornamental plant) are the main hosts of the fungus.

DESCRIPTION

There are six stages of disease development following infection by the fungus: First stage: is a faint reddish-brown speck less than 0.25 mm diameter visible on the underside of the leaves. Second stage: the specks turn into reddish brown streaks, parallel to the leaf veins. These streaks are visible on the upper and lower sides of the leaf. Third stage: the streaks coalesce, reaching about 20 mm × 2 mm, and change to dark brown (Fig. 1A).

Fourth/first spot stage: lesions develop into elliptical spots with water soaked borders. Fifth stage: Is reached when the dark brown/black center of the spots becomes depressed and the spots are surrounded by a yellow halo (Fig. 1B). Sixth stage: the center of the spot is light grey and dry (Fig. 2). After flowering and fruit production, plants can lose all leaves (Fig. 3).

BIOLOGY

The period between infection and the formation of mature lesions depends on the susceptibility of the cultivar, intensity of infection and environmental conditions. For susceptible cultivars initial specks may appear on the second and third open leaves of a growing plant, streaks on the third and fourth leaves and both spots and streaks on older

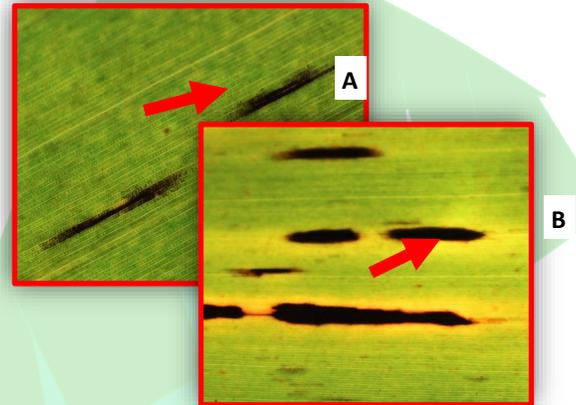


Figure 1: **A.** Dark red to brown streaks on leaf—Third stage of Black Sigatoka **B.** Elliptical spots with a yellow halo - Fifth stage. Photo by Le Guen (www.promusa.org).

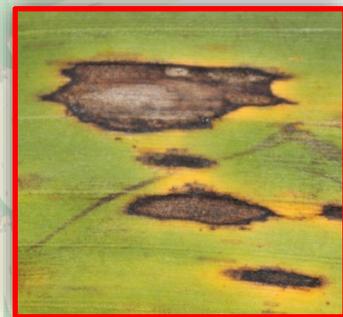


Figure 2¹: Light grey and dry spot, outlined by a black ring and a bright yellow halo—Sixth stage. Photo by H.D. Thurston (www.apsnet.org)



Figure 3²: A banana plant lost all leaves to Black Sigatoka . Photo by H.D. Thurston (www.apsnet.org)

Black Sigatoka

BIOLOGY cont'd

leaves. The fungus spreads by conidia and ascospores in wind and water and need water to germinate and infect plant tissues.

Conidia are produced at the 2nd and 3rd stage of the disease development (streaky-lesions) on the lower surface of the leaves. Where the spots coalesce, in the sixth stage, entire sections of leaves become necrotic and in these sections ascospore production is high (Fig. 4). Ascospores are more commonly how the fungus spreads and occur predominantly on the upper surface of the leaf. At temperatures above 20 °C ascospores infect the leaves and streaks appear along the leaf apex and along leaf margin.

Optimum environment for infection is between 25-27 °C wet conditions and high relative humidity (above 95%). The infection cycle decreases during the dry and hot periods, however, the cycle of infection and re-infection is still continuous.

REGULATORY STATUS

The Black Sigatoka is a quarantine pest for Dominica.

Within the Caribbean Region, it is present in Trinidad & Tobago, Cuba, Jamaica, Haiti, Puerto Rico, Saint Lucia, St. Vincent & the Grenadines and Dominican Republic.

REFERENCE(S)

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Figure 4³: The black dots are ascocarp (structure to release ascospores) of *Mycosphaerella fijiensis* embedded in the necrotic tissue of the leaf . Photo by A. Johanson (www.apsnet.org)

DAMAGE

There are two major impacts of the disease on production:

The first is a reduction in yield due to loss of photosynthetic leaf area. (50-100%).

Secondly, fruit from infected plants ripens prematurely and does not properly fill, sometimes producing a creamy pulp. This poor quality would lead to fruits being rejected for export and fresh market.

ENTRY PATHWAYS

The disease can be spread across long distances by the movement of planting material, such as, infected 'daughter' suckers.

Spread can also occur from the movement of diseased leaf tissue (i.e., banana leaves that are used as ornaments, for wrapping foods, or to protect banana fruits from the sun during transportation).