
Finding *Phyllosticta citricarpa* when Citrus Black Spot Cannot be Seen

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Take Home Message:

- The fungus that causes citrus black spot can spread silently in a grove before disease detection.
- Movement of the disease can occur without anyone's knowledge through infected plant material.
- Hyperspectral imaging may help detect the asymptomatic infections in young leaves.

Summary: Citrus black spot (CBS) is a quarantinable fungal disease caused by *Phyllosticta citricarpa*. It was first discovered in Florida in 2010 in a grove near Immokalee. The disease has spread from the initial location through the southwestern citrus production region and Polk

County. A new location was identified in Polk County in 2023. One of the challenges with CBS is detecting low levels of infection or early infection. The disease is mostly asymptomatic in leaves and fruit mostly become symptomatic once ripening. Since CBS is a regulated disease, the inadvertent movement of the fungus on plant material is concerning. We are investigating hyperspectral imaging tools to see if the fungus can be detected on and within immature fully expanded leaves. There are two challenges, first, a very common second *Phyllosticta* spp. fungus that harmlessly infects leaves naturally in Florida may confuse the results of any detection not based on PCR and

secondly, once the *P. citricarpa* infects the leaf and becomes embedded as a tiny fungal ball, it is not known when the fungus grows within the leaf extensively. We conducted two experiments where multiple concentrations of spores of both the pathogen and the harmless colonizer were visualized on the leaf surfaces. We have also collected leaves from a grove with a known CBS problem and conducted qPCR to identify which leaves are infected. Imaging was done with the leaves to match the PCR data. The image analysis is ongoing for the hyperspectral results but are expected very soon.

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