
RECOGNIZING AND TREATING DISEASES IN CARIBBEAN TREES

D. Jean Lodge, Center for Forest Mycology Research, Forest Products Lab, USDA-Forest Service, PO Box 1377, Luquillo, PR 00773. Email: djlodge@coqui.net

INTRODUCTION

Although the majority of tree problems in urban setting are not caused by disease organisms, there are some current and potential disease threats in the Caribbean. **Symptoms** are the expression of stress in the plant. Symptoms may appear to be identical in response to many different types of diseases and physical or chemical damage. It is therefore helpful to determine the **pattern** of symptom in the field. Disease organisms rarely affect my different species, so a cluster of different unrelated plant species showing similar symptom is not likely to be caused by a fungal or bacterial disease. It is always best to look first for physical damage, cultural problem such as planting too deep, girdling roots and poisoning or salt stress (from wave overwash or fertilizers) before looking for disease problems since these may be the primary cause of symptoms or major contributing factors. If a disease is suspected, one should look for **signs** of a disease organism (for example, fruiting structures, mycelial fans or rootlike structures of a fungus). At the same time, one should try to localize the symptoms and the source of the problem (the symptoms may be localized leafspots; discoloration or death at the margins of the leaves, which indicates a problem below; confined to certain branches; localized on one side of the tree; or distributed throughout the tree).

Fruiting body signs

Polypores. If you find fruiting bodies of a fungus that has pores on the lower side (e.g., polypore fungi shelf fungi, or wood ears), most of these are decay organisms that decompose the dead wood rather than aggressive pathogens. Such fruiting bodies on branches indicate that the affected branches are likely to fall from the tree, especially during and after storms. These may need to be pruned out if the risk of falling on people or vehicles is high. Do not apply a tar or sealant on a pruned branch as this will only seal in the moisture and promote decay in the branches or trunk below. If you find polypore fruiting bodies on the main trunk, it suggests that the heartwood is being degraded. The remaining cylinder of live wood may be sufficiently strong to keep the tree from falling over under normal circumstances, but these trees may be susceptible to wind throw during tropical storms and hurricanes, especially if the large support roots are decayed.

Xylariaceae. If there are hard, black fruiting structures of a fungus on the wood, these may belong to a group of ascomycete fungi in the family, Xylariaceae. Flattened, black, and often shiny xylariaceous fungi that cause cankers (sunken areas) on branches of trees (especially mango) are usually in the genus *Camillea*. *Camillea tinctor* usually causes a reddish discoloration in the wood below the fruiting body, but *Camillea obularia* and other species do not cause a discoloration. The branches are likely to break where the canker is located, and these should be pruned out if they pose a high risk. If the lower trunk has clusters of hard, gray or black fruiting bodies that are shaped like clusters of toes, little pancakes with a narrow attachment, or minute water towers with pointed apices, these may belong to the genus *Kretzschmaria* (= *Ustulina*). *Kretzschmaria* can be an aggressive pathogen and is capable of killing trees. Species in the Xylariaceae also decompose wood, and they can therefore weaken the support at the base of the tree.

There is a fungus resembling *Kretzschmaria* that attacks the root collar zone of several shrub and tree species, *Rosellinia bunodes*. The fungus produces clusters of small, round, scaly, dark brown to black fruiting structures that resemble minute pinecones under magnification. The inner bark is normally killed in a zone near the soil line, causing the plants to wilt during drought and to produce adventitious roots above the infected zone during the wet season. The host range of *R. bunodes* is broad, but selective. Hibiscus is

especially susceptible, but *Malaviscus* is not. Coffee and closely related members of the Rubiaceae are also susceptible, as is *Citrus*. The only effective control for this disease is to plant with non-susceptible species, and keep the density of any one species low by planting in mixtures.

Leaf spot diseases can be unsightly, but they are rarely fatal to the tree. One of the most common problems reported by homeowners, especially on mangos, avocados, citrus, is a black fungus that covers the leaf surfaces. If the fungus is easily removed by a fingernail, then it is a sooty mold that is growing on the sugary excrement of scale insects. Washing the affected tree with a spray of water under pressure (using a pressure nozzle on a hose) is often beneficial in such cases. Application of a mixture of 4 tablespoons of cooking oil with 4 tablespoons of baking soda, two tablespoons of liquid dishwashing liquid and two gallons of water can be beneficial in inhibiting the scale insects.

Non-localized symptoms without fungal fruiting bodies. If the symptoms are not localized leafspots, a knife (preferably a non-folding type) will be needed to cut 'windows' into the bark in order to view the color of the inner bark of the tree. For example, if the branches are dying back, or the leaves are yellowing, turning brown at the edges or tips, wilting, or falling when they should be retained, the cause of the symptoms is lower down in the tree. One should always make some cuts in healthy bark of the same species to determine what the normal color should be, remembering to clean the knife between trees so as not to spread disease organisms. If the symptoms are localized to a particular branch begin looking from a point just below the symptoms and working down towards the base of the branch. If one side of the tree is expressing symptoms, continue looking at the inner bark of the trunk, then the large roots, and the fine roots. If discolored or dead inner bark is detected, determine the extent of the damage and look for fans or mats of mycelium between the outer and inner bark. Also look to see if other trees of the same species have the same symptoms and damage to the inner bark. Such symptoms and signs may indicate an aggressive pathogen.

New pathogen on Mahogany and Buchenavia. A fungus that is apparently killing trees in wet forests in Puerto Rico is *Beenakia informis*. It was not previously recognized as being an aggressive pathogen. So far, the problem has only been detected in certain species that were either planted in high density or occur naturally in clusters. Mahogany, Guarea, and *Buchenavia* (a relative of ucar, *Bucida*), have all been affected. The fungus forms fruiting bodies on trunks and roots that are greenish-gray, fuzzy, soft and light weight with long, soft, rounded teeth on the lower side. The fruit body is shell-shaped, and the interior has dark and light bands. The fungus produces a light yellow mycelium between the outer and inner bark in the larger roots and lower trunk. The mycelium can be detected even at the border of the healthy and diseased inner bark tissue, which is indicative of true pathogen. When observed with a microscope, the yellow bodies in the mycelium are spiny resting spores (chlamydospores). The sexual-stage spores are produced on the 'teeth', and they also have spiny ornaments.

Mimosa Wilt. Although a poisoning or sudden intrusion of salt water, or severe drought can also cause wilting, sudden wilt in a *Mimosa* tree is most likely Mimosa Wilt. The disease is caused by a variety of the fungus, *Fusarium oxysporum*. The fungus plugs the conducting tissue in the stem. The disease has been found in Puerto Rico. It is not recommended to plant *Mimosa* trees in areas where the fungus is known to be present.

Black Root Rot of Pine. The fungus which causes black root rot, *Leptographium serpens*, was recently introduced into the Dominican Republic. The fungus attacks the fine roots, which appear diseased, but it is very difficult to identify this fungus in the roots. The above-ground symptoms of black root rot are a fairly rapid decline, including thinning and yellowing of the foliage, followed by death. Some areas the Dominican

Republic with native pine, *Pinus occidentalis*, are now severely affected. *Pinus caribbea* that are more than 15 years old are also showing symptoms.

Beneficial fungi. In addition to the decomposer fungi that help in the recycling of nutrients from dead organic matter, some Caribbean trees are obligately associated with mushrooms that form a beneficial symbiosis with their roots called ectomycorrhizae. The fungi transfer nutrients and water to the host plant and also protect the feeder roots from desiccation and pathogens. The most common of these in Caribbean urban forestry is *Coccoloba uvifera*, the sea grape. One of the most common species associated with this tree in undisturbed sand dunes in the Greater Antilles is a grayish white *Amanita*. The cap of this fungus has fine folds on the margin. *Cantharellus cinnabarinus* is a striking coral colored chanterrel most commonly associated with *Coccoloba*. Hard puffballs with purplish to blackish interiors (*Scleroderma* sp.) are also common. Other symbionts of *Coccoloba* are mostly in the genus *Lactarius*, and they bleed a watery or milky latex when broken. Some of the most common species associated with *C. uvifera* have distinctive odors (rotting fish) or lovely violet tints (*Lactarius littoralis* Pegler). What is disturbing is that no fruiting bodies of any, of these fungi have been found in highly used beach areas. A loss of ectomycorrhizal fungi may be detrimental to the long-term health of *C. uvifera*.

ACKNOWLEDGEMENT

The Forest Products Laboratory in Madison is maintained in cooperation with the University of Wisconsin, while the lab in Puerto Rico is maintained in cooperation with the USDA-Forest Service International Institute of Tropical Forestry. This article was written and prepared by a U.S. Government employee on official time, and the information is therefore in the public domain and not subject to copyright, but the copyright of this typographic arrangement is © Mycological Society of America.

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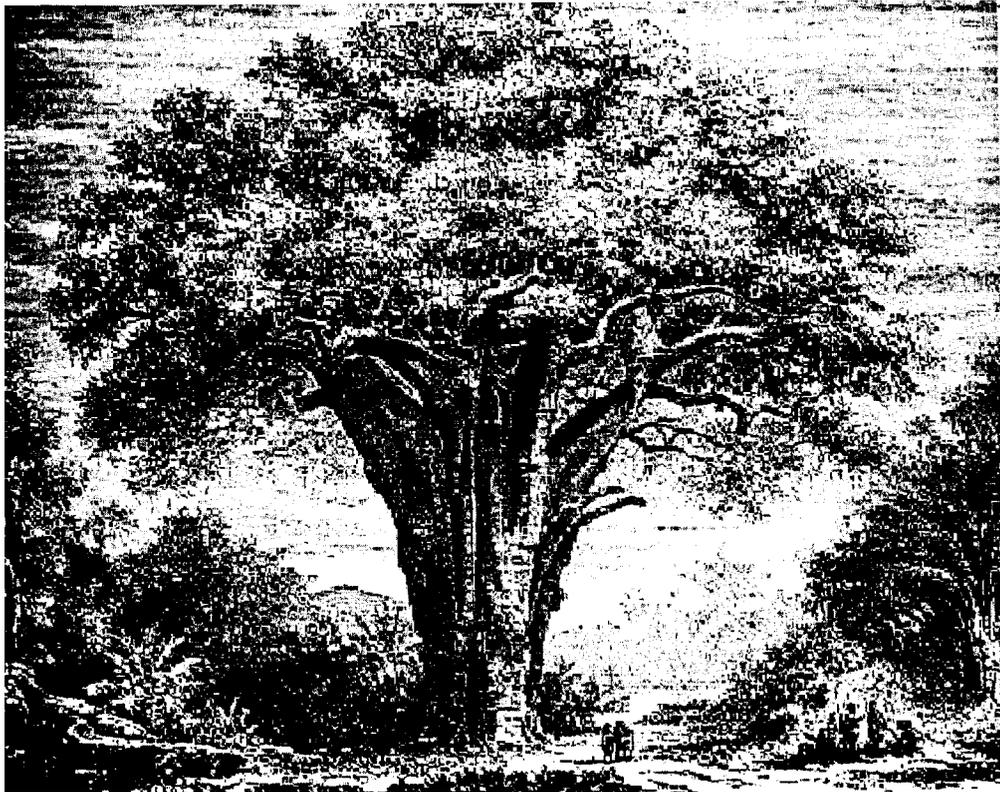
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ISBN: 0-9628909-7-9

Published: June 2002
