



FLORIDA FOREST SERVICE

Laurel Wilt Disease

Leaflet Number 13

OVERVIEW

Laurel wilt is a destructive disease of multiple species of trees and shrubs in the laurel family (Lauraceae). The disease is caused by a non-native fungus (*Harringtonia lauricola*) that infects the sapwood of host trees, resulting in a restriction of water flow and causing the leaves to rapidly wilt as the tree dies. This fungus is carried by a non-native insect, the redbay ambrosia beetle (*Xyleborus glabratus* or RAB), which was first detected in the United States near Savannah, Georgia in 2002. Laurel wilt was first documented in Florida in 2005, and by 2017 it had caused widespread mortality of susceptible tree and shrub species in every county in the state.

Hosts

Species in Florida that have been confirmed as hosts of RAB and the laurel wilt fungus include redbay (*Persea borbonia*), swamp bay (*P. palustris*), silk bay (*P. humilis*), avocado (*P. americana*), sassafras (*Sassafras albidum*), pondspice (*Litsea aestivalis*), pondberry (*Lindera melissifolia*), spicebush (*Lindera benzoin*) and camphor tree (*Cinnamomum camphora*).

Identification

The redbay ambrosia beetle is an extremely small (~2 mm long) beetle that spends most of its life cycle inside the host tree. It is rarely noticed by the casual observer. The laurel wilt fungus does not form any external structures such as mushrooms or conks, and can only be positively identified by laboratory analysis of infected wood.

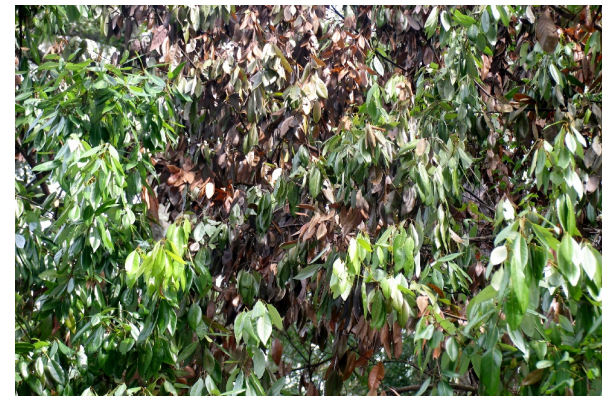
Signs and Symptoms

Initial symptoms of laurel wilt disease include wilting, drooping and discoloration of leaves on major portions of the tree's crown. In most susceptible species this symptom progresses rapidly until the entire crown is brown and wilted, and the dead leaves will often remain attached to the tree for a year or more. Attacks by the black twig borer (*Xylosandrus compactus*) can cause similar leaf wilting, but only scattered small-diameter twigs are affected (see Leaflet Number 21, "Black Twig Borer"). In sassafras, laurel wilt disease often causes the leaves to drop off quickly, making detection of infected sassafras trees more difficult. In avocado trees, the progression of disease is sometimes more gradual; portions of the tree may stay alive and resprout for long periods after some branches have died back. The disease is typically not fatal in camphor trees, usually causing only branch dieback.

Trees infested with ambrosia beetles often have fine, light-colored wood dust being expelled from the entrance holes and collecting on the bark or base of the tree. In calm weather, this may appear as delicate "noodles" of compacted wood dust emerging from the trunk. However, such structures are not always present. Removal of bark from wilted portions of the tree reveals a distinctive dark staining in the sapwood. While crown wilting and ambrosia beetle infestations can also occur in laurel-family trees that are dead or dying from other causes, this sapwood staining symptom is a more reliable and specific indicator of infection by the laurel wilt fungus.



Redbay trees killed by laurel wilt disease in forest setting.



Drooping and discolored foliage of a redbay tree in the early stages of laurel wilt disease (image by A.E. Mayfield).



Cut cross-section of a redbay branch (above) and a redbay stem with bark peeled away (right), showing the dark staining in wood that results from laurel wilt infection.

LAUREL WILT DISEASE

Biology

The redbay ambrosia beetle carries spores of the laurel wilt fungus in specialized structures (mycangia) near its mouthparts. The beetle tunnels directly through the bark and into the wood of the tree, introducing spores in the process. The fungus then spreads into the xylem (water-carrying) vessels of the tree. This triggers a reaction that blocks the xylem vessels, stopping the flow of water from the roots to the rest of the tree. Like other ambrosia beetle species, RAB adults and larvae feed exclusively on the fungal growth that develops on the walls of their tunnels (galleries). They don't consume the wood that they excavate; it is expelled from the tunnel entrance, resulting in the fine "sawdust" that is characteristic of ambrosia beetle infestations. Development from egg to adult occurs within the galleries. Female beetles then emerge and may reinfest the same tree, or fly to find new hosts; the smaller males are flightless. While most other ambrosia beetle species only infest trees that are dead, dying or severely stressed for some other reason, RAB will attack apparently healthy trees, and native North American host species typically have no natural resistance to the laurel wilt fungus.

Impact

Laurel wilt is devastating to native host species such as redbay, swamp bay, silk bay and sassafras. When it establishes in a new area, nearly all mature trees of those species may be killed within 3 to 5 years. RAB remains present in low numbers and will continue to attack and infect scattered small trees indefinitely. RAB shows a preference for larger-diameter trees, and small trees less than 2 cm in diameter are rarely attacked. Leaves of redbay, swamp bay and silk bay are the only known food for caterpillars of the palamedes swallowtail butterfly (*Papilio palamedes*). These tree species are also culturally important for the Native American Miccosukee and Seminole Tribes. Two other confirmed hosts, pondberry and pondspice, are listed as threatened or endangered at the federal and state level, respectively. Laurel wilt has caused significant losses for the commercial avocado industry in Florida, and it also kills avocado trees in home landscapes.

Management

There are no treatments that will reliably save an infected tree after it is showing symptoms. However, these strategies may reduce the spread and impact of laurel wilt:

- When possible, leave wood from dead and dying trees on site instead of transporting it. If the wood must be transported, dispose of it as locally as possible.
- Burning or chipping host tree material at its original site or a disposal site is preferable to leaving it intact in the open environment.
- Avoid long-distance transport of untreated wood such as firewood, tree trimmings and yard debris. Long-distance movement of such material is regulated under Florida law.
- Root flare injections with the systemic fungicide propiconazole can temporarily prevent laurel wilt disease in healthy trees. However, such treatments are expensive, require periodic reapplication and are best reserved for high-value trees.
- Products containing the bark beetle repellent verbenone may reduce the likelihood of RAB attack on individual trees.
- Researchers are working to identify and propagate individual trees that are naturally resistant to (or tolerant of) the laurel wilt fungus.



Leaves wilted and dropping from a sassafras tree with laurel wilt disease (image by Roger Hand).

The redbay ambrosia beetle, which carries the laurel wilt fungus.



A redbay ambrosia beetle placed on a U.S. dime for scale.



Above left, center: "hoodles" of compacted wood dust being pushed out by redbay ambrosia beetles. Above right: bark removed to reveal tiny beetle entrance hole.



Root flare injection with fungicide to prevent laurel wilt disease (image by Christopher Pearce).

