

LAUREL WILT DISEASE
Or
“An Ecological Disaster” -
Extinction of Red Bay Trees in the Southeast

Executive Summary: Mortality of red bay trees (*Persea borbonia*) in coastal locations in South Carolina, Georgia and Florida is spreading rapidly, resulting in the death of nearly all red bays and sassafras trees in the infected areas. The cause of the disease is a fungus (*Ophiostoma sp.*) vectored by an Asian ambrosia beetle (*Xyleborus glabratus*). Both the beetle and fungus are recent introductions into the United States. At the present time, there is no known method to halt the spread of this disease.

History: In 2002, a species of ambrosia beetle (*Xyleborus glabratus*) new to the U.S. was discovered in a monitoring trap in Port Wentworth near Savannah, Georgia. The beetle is a native of India, Japan and Taiwan. By late 2003, red bay trees (*Persea borbonia*) were dying in coastal South Carolina and the beetle was found on those dead and dying trees and was suspected. Sassafras trees (*Sassafras albidum*) were also impacted. Diseased trees were found to have a fungus, identified as *Ophiostoma sp.*, present in all cases and inoculation experiments confirmed the fungus was the cause of mortality. Examination of the beetle confirmed the fungus was present in all examined beetles. Evidence strongly suggested the beetle was the vector for moving this fungus from tree to tree.

Red Bay Info: Red bay trees extend from Virginia to Louisiana on the coastal plain. A member of the laurel (Lauraceae) family, it is closely related to swamp bays and silk bays. Also in the Lauraceae family are: 1. pondspice (*Litsea aestivalis*); 2. avocados; 3. sassafras; and 4. pondberry or southern spicebush (*Lindera melissifolia*), a federally endangered species. Currently red bays and sassafras are confirmed to be susceptible to this wilt disease. It is unclear if other members of the laurel family can serve as hosts to this disease. Since it is suspected that several members of the family may be impacted, the proposed name for the disease is “Laurel Wilt Disease”.

Red bays have limited commercial use. The wood is sometimes used in cabinetry and boat building and the trees are occasionally used in landscaping. The seeds of red bay are eaten by turkeys, quail, deer, songbirds and bears. Leaves are used in Southern cooking to flavor gumbos.

Red bays are host plants to three butterflies: palamedes, Schaus and spicebush swallowtails. The palamedes is obligate to the red bay as the eggs are laid on the leaves and the emerging caterpillar eats the leaves.

Beetle Biology: The vector for the *Ophiostoma* fungus is an ambrosia beetle. There are 20 species of ambrosia beetles in the U.S. Nine of these species are non-native and eight of these non-native species do not cause any economic or ecological harm. Ambrosia beetles are usually attracted to dying trees. However, *X. glabratus* seems to attack

healthy trees. The beetle burrows into the cambium layer and deposits the fungus which then multiplies and results in the tree's inability to move water and nutrients. The beetle may leave the tree after the initial visit, but once the tree dies, large number of beetles return to the infected tree to eat the fungus. It may take only a single beetle visit to inoculate the fungus into the tree.

Other beetles may attack red bay trees with little impact. For example, attacks by the black twig boring beetle (*Xylosandrus compactus*) will result in limited (few) terminal leaves dying. This is not to be confused with the disease caused by the *Ophiostoma* fungus which results in the death of the entire tree.

Rate of Spread: The initial observation of dead red bay trees in South Carolina was in late 2003. By 2005, the beetle and disease were confirmed in seven counties in northeast Georgia, five counties in South Carolina and Duval County in Florida. The spread of the disease to Florida happened without the disease being observed in southern Georgia. By the end of 2006, the disease had spread to five counties in South Carolina, 15 counties in Georgia and eight counties in Florida. One of the counties in Florida, Indian River County, is approximately 140 miles south of any known infestation. Researchers in South Carolina estimate the rate of spread is approximately 20 miles per year. Rate of spread in Florida far exceeds this estimate.

Currently there is no method to halt or even slow the spread of this wilt disease. It appears the *X. glabratus* beetle is a powerful flier and by the time brown leaves are observed, many trees in the vicinity are already infected. The use of pesticides is not practical as many other species of beneficial insects would be impacted. There are no known biological controls and even if one could be located, it would be years before it would be available for release in the infected area. Transportation of the beetle via inadvertent human actions (e.g. in firewood, in shipment of timber products, or stuck on a vehicle or train) over distances greater than the flight distance also seems to be occurring. On at least two occasions infections have made "jumps" of over 80 miles (from northern Georgia to Duval County in 2004 and from north Florida to Indian River County in 2006).

Monitoring plots on Ft. George Island (Duval County, Florida) show a 92 percent mortality of red bay trees. All red bays above 6 inches in diameter have died. Given this mortality rate, one researcher stated this was an ecological disaster. While no one was willing to predict the long term impact of the loss of red bays (and possibly other laurel species), all researchers agreed it will have major impacts including changes in fire behavior, loss of dependent species and economic consequences.

Ongoing and Proposed Research: Following are some projects that are currently underway or will start in 2007:

1. A workshop on the rapid decline of red bay trees in the southeast was held on January 18 and 19, 2007 in Jekyll Island, Georgia. This paper was prepared to summarize that workshop.
2. South Carolina, Georgia, and Florida will continue to monitor disease spread.

3. U.S. Department of Agriculture – Forest Service (USDA-FS) will continue inoculation studies to determine what other species may be susceptible in the laboratory.
4. All visually infected trees on Jekyll Island, Georgia were removed in December 2006 to determine if manual removal will slow the spread.
5. Florida Division of Forestry (DOF) will start fungicide injection testing at two locations (Ft. Clinch State Park and Jennings State Forest) in the spring of 2007.
6. Cumberland Island National Seashore, Georgia was planning a manual/mechanical removal of all dead and dying red bay trees to determine if sanitation would slow the spread on the island. However, recent investigations show nearly all red bay trees already show signs of the fungus and the tree removal effort has been cancelled.
7. Florida DOF will continue monitoring of sentential avocados on Ft. George Island.

What is next?

1. The USDA-FS will head up a task force to be assembled in spring 2007. This taskforce will be modeled on the Sudden Oak Death taskforce.
2. The USDA-FS also starting a web site to facilitate information exchange on the wilt disease.
3. The USDA-FS is proposing a scientific forum in late 2007 to assemble researchers to give updates on what is known about the disease.

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