Laurel Wilt Disease: *A Deadly New Plant Disease in the Southeastern United States.*

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Image: Redbay tree infected with Laurel Wilt Disease. USDA FS.
URL: http://www.srs.fs.usda.gov/pubs/su/021/threats.htm

Introduction. Laurel Wilt Disease (LWD) is a fungal disease of plants in the laurel family (Lauraceae). LWD is caused by the fungus, *Raffaelea lauricola*, which is transported from plant to plant by a flea-sized beetle, the Redbay Ambrosia Beetle (*Xyleborus glabratus*). The Redbay Ambrosia Beetle is a relative of weevils, and all ambrosia beetles have a symbiotic relationship with fungi, which the beetles use to inoculate plant tissues in order to aid fungal feeding by beetle larvae and adults. Essentially, the beetle is a fungus farmer.

Image: Redbay Ambrosia Beetle. FL Dept. Ag and Consumer Services.
URL: http://www.insectimages.org/browse/detail.cfm?imgnum=1413003

Introduction and Spread in the Southeastern U.S. The Redbay Ambrosia Beetle (as well as its associated fungus) is believed to have been accidentally introduced into the United States from its native range in China via solid wood packing materials (e.g., shipping crates) at Port Wentworth, near Savannah, Georgia. The beetle was first detected near warehouses in that area in spring, 2002. As of May, 2011, LWD and the Redbay Ambrosia Beetle have been detected in 31 counties in Georgia, 29 counties in Florida, 13 counties in South Carolina, one county in southeastern Mississippi, and four counties in southeastern North Carolina. LWD has now spread at least 250 miles north of the point of original detection near Savannah, Georgia, to Sampson County in southeastern North Carolina.

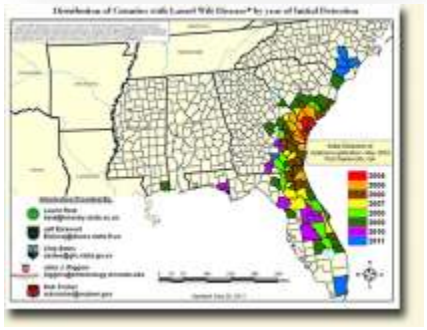

Image: Spread of Laurel Wilt Disease in the Southeastern U.S. – 2004-2011. USDA Forest Service.
URL: http://www.fs.fed.us/r8/foresthealth/laurelwilt/dist_map.shtml

Potential for Natural and Human-Assisted Spread of Laurel Wilt Disease. The Redbay Ambrosia Beetle reproduces either sexually (winged females mate with flightless males to produce only female offspring) or asexually (females produce unfertilized eggs that yield males). A single tree may produce several thousand female beetles in a year. Accordingly, the beetle and disease can spread rapidly through colonies of host trees. Based on field surveys conducted by state and federal agencies since 2004, the Redbay Ambrosia Beetle spreads naturally at a rate of about 20 miles per year. However, it can be spread much greater distances through human-assisted transport of infected wood chips and firewood – as shown by the satellite population of Redbay Ambrosia Beetle and LWD in southeastern Mississippi.

Impacts of Laurel Wilt Disease on Native Plants in the Southeast. Both the Redbay Ambrosia Beetle and the fungus it carries are native to Asia. In Asia, this beetle primarily uses dead wood as a habitat for growing the fungus. But in the southeastern United States, the beetle invades living plants.

Image: Infected Redbay Trees in Florida. USDA Forest Service.
URL: http://www.invasive.org/browse/detail.cfm?imgnum=2199085

Since native plants in the United States did not co-evolve with the beetle and the LWD fungus, and thus have no natural defenses against it, infected plants such as Redbay (*Persea borbonia*), Swampbay (*Persea palustris*), and Sassafras (*Sassafras albidum*) show rapid wilting of leaves and die-off of above-ground stems due to disruption of water transport within plant tissues. Many infected plants do resprout from roots or lower stems following die-off from LWD infection, but such regrowth may eventually succumb to the disease as well.

Other plants in the laurel family and in the Southeast also show vulnerability to LWD. The list of vulnerable species includes **Pondspice** (*Litsea aestivalis*) (federally-threatened), **Pondberry** (*Lindera melissifolia*) (federally-endangered), and the **Avocado** (*Persea americana*), an important crop species in south Florida.

Long Term Ecological Impacts of Laurel Wilt Disease. Redbay and other native plants that are suffering die-off from LWD are valuable members of native plant communities and habitats across the southeastern United States. Many species of wildlife rely partly on such native plants for food and cover, and some insect species, which are important in the food-web or transfer of nutrients from plants to vertebrates, are directly dependent upon some species of plants that are dying from LWD.

Image: Palamedes Swallowtail Butterfly.
URL: http://en.wikipedia.org/wiki/File:Papilio_palamedes.jpg

For example, the Palamedes Swallowtail butterfly (*Papilio palamedes*), which occurs only in the Southeast and in and near habitats supporting Redbay and Swampbay, relies upon these plants as larval or caterpillar hosts. The Spicebush Swallowtail butterfly (*Papilio troilus*), as well as the Promethea Silkmoth (*Callosamia promethea*) which are heavily dependent on Sassafras for their larvae, are also vulnerable to the impacts of this new disease.

Laurel Wilt Disease – Opening the Door for other Biological Invasions. Ecosystem and habitat deterioration brought on by LWD may also lead to further invasion of natural areas by other exotic plants and animals. Introduced invasive plants such as Chinese Tallow (*Triadica sebifera*) typically do not support native insect populations, and as such plants outcompete and displace native plants, habitat and ecosystem productivity is continually diminished. Other introduced invasive plants that will likely colonize habitats as native Lauraceae are lost include: Chinese Privet (*Ligustrum sinense*), Chinaberry (*Melia azedarach*), *Elaeagnus* sp. (likely particularly Thorny Olive = *Elaeagnus pungens* in the coastal Southeast), and others.

Management Strategies for Laurel Wilt Disease. Currently, there are no effective control techniques for either the Redbay Ambrosia Beetle or Laurel Wilt Disease. One potential method involves injection of a systemic fungicide into plant stems or trunks for short-term protection of individual trees. However, such methods are only useful for application in isolated areas, such as yards and commercial properties.

Online Resources:

Laurel Wilt Disease. Florida Department of Agriculture and Consumer Services. Division of Plant Industry. URL: http://www.freshfromflorida.com/pi/enpp/pathology/laurel_wilt_disease.html

Laurel Wilt in Florida. FL Dept. of Agriculture and Consumer Services. Division of Plant Industry. YouTube Video. URL: http://www.youtube.com/watch?v=2x7vgFWLHkY

Laurel Wilt Profile. USDA Forest Service. URL: http://www.fs.fed.us/r8/foresthealth/laurelwilt/index.shtml

Laurel Wilt Profile. Wikipedia. URL: http://en.wikipedia.org/wiki/Laurel_wilt

Papilio palamedes – Palamedes Swallowtail Butterfly - Profile – Wikipedia. URL: http://en.wikipedia.org/wiki/Papilio_palamedes

Redbay Ambrosia Beetle-Laurel Wilt Pathogen: A Potential Major Problem for the Florida Avocado Industry. University of Florida – IFAS Extension. URL: http://edis.ifas.ufl.edu/hs379

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