



## FOREST AND SHADE TREE PESTS

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### Laurel Wilt

**Introduction:** Laurel wilt is a destructive disease of redbay (*Persea borbonia*) and other trees in the laurel family (Lauraceae). The disease is caused by a fungus (*Raffaelea* sp.) that infects the sapwood of host trees, restricting the flow of water and causing the leaves to wilt. The fungus is carried into trees by a non-native insect, the redbay ambrosia beetle (*Xyleborus glabratus*), that was first detected in the United States near Savannah, Georgia, in 2002. The beetle is believed to have been introduced in wooden crating material imported through the shipment of goods from its native range in southeast Asia. Laurel wilt has caused high levels of redbay mortality in South Carolina, Georgia, and Florida and has affected several other hosts including sassafras (*Sassafras albidum*) and avocado (*Persea americana*).

**Symptoms:** Redbay trees with laurel wilt initially exhibit drooping foliage with a reddish or purplish discoloration (Fig. 1). These symptoms may be limited to part of the crown at first, but eventually the entire crown wilts and turns brown (Fig. 2). Wilted leaves may remain on redbay trees for up to a year or more. Removal of bark reveals a black discoloration in the outer sapwood (Fig. 3). Wilted trees may also exhibit small dowels or ‘toothpicks’ of sawdust protruding from the stem, produced by ambrosia beetles as they bore into the wood (Fig. 4). Redbay ambrosia beetles are extremely small (~2 mm long), black-to-brown beetles (Fig. 5) that spend most of their life cycle within the tree.

**Biology:** Redbay ambrosia beetles carry spores of the laurel wilt fungus in their mouthparts. Most native ambrosia beetles attack only dead and dying trees. The redbay ambrosia beetle, however, will initiate attacks on healthy redbays. Initial attacks are difficult to detect, and probably do not result in successful colonization of the tree by the beetle. However, these initial attacks introduce spores of the *Raffaelea* fungus into the water-conducting sapwood, allowing the fungus to move quickly through the vascular system of the tree. After becoming infected, redbays wilt in a matter of weeks to a few months. The dying tree is then colonized by numerous redbay ambrosia beetles (as well as other ambrosia beetle species) that create galleries in the wood, in which they reproduce and cultivate their associated fungi for food. New female redbay ambrosia beetles emerge from infested trees and fly in search of new hosts, whereas males are flightless. In the southeast, there appear to be multiple overlapping generations of redbay ambrosia beetles per year.

**Hosts:** In addition to redbay, other hosts of the laurel wilt fungus that have been confirmed from diseased plants in the field include swamp bay (*Persea palustris*), avocado, sassafras, pondspice (*Litsea aestivalis*), pondberry (*Lindera melissifolia*), and camphor tree (*Cinnamomum camphora*).



**Fig. 1.** Drooping and discolored foliage of a redbay tree in the early stages of laurel wilt.



**Fig. 2.** Brown leaves retained in the crown of a redbay tree killed by laurel wilt.



**Fig. 3.** Black discoloration in the sapwood of a redbay diseased with laurel wilt.

**Impact:** Laurel wilt is devastating to redbay and can kill nearly all mature redbay trees in a stand within 3-5 years. At one site in Florida, mortality of monitored redbay trees  $\geq 1$  inch diameter increased from 10% to 92% in just 15 months (Fig. 6). Laurel wilt has negative aesthetic effects in parks and residential neighborhoods and requires costly shade tree removals in these landscapes. Although research is needed to determine the impact, laurel wilt could negatively affect populations of the Palamedes swallowtail butterfly, the larvae of which feed only on redbay and closely related *Persea* species. Laurel wilt is of serious concern to the commercial avocado industry. Two other confirmed hosts, pondberry and pondspice, are listed as threatened or endangered at the federal and state level, respectively.

**Management:** Laurel wilt can spread to new areas through the movement of host material infested with the redbay ambrosia beetle. The following strategies may help reduce the spread and impact of laurel wilt:

- Avoid the movement of firewood, tree trimmings, or mulch from redbays and other laurel family hosts out of counties in which laurel wilt is known to occur. Avoid long distance transport of firewood in general.
- Whenever possible, leave wood from dead and dying redbays and other laurel family hosts on site instead of transporting it. If the wood is to be transported, dispose of it as locally as possible.
- Burying, covering, burning, or chipping host tree material at its original site or a disposal site is preferable to leaving it intact in the open environment. Chipping wood from an infested tree might not destroy all of the ambrosia beetles due to their extremely small size, but should reduce the suitability of the wood as breeding material.
- Although the pathogen has not yet been documented to spread by this means, consider cleaning/sterilizing saws and pruning blades after cutting an infected tree and before using them on uninfested host tree species.
- Nursery stock in the laurel family showing signs of wilt, sapwood discoloration or ambrosia beetle attack should not be sold or transported, and should be reported to the Division of Plant Industry.
- Preliminary research suggests that root-flare injections with the systemic fungicide propiconazole may help prevent development of laurel wilt in redbay trees. Recommendations based on this research may be available in the near future. Such treatments are likely to be expensive, require periodic reapplication, and should be considered only for very high-value trees.

## References and Other Resources

Laurel Wilt Website Hosted by the USDA Forest Service, Forest Health Protection:  
<http://www.fs.fed.us/r8/foresthealth/laurelwilt/>

Fraedrich, S.W., Harrington, T.C., Rabaglia, R.J., Ulyshen, M.D., Mayfield A.E. III, Hanula, J.L, Eickwort, J.M. and Miller, D.R. 2008. A fungal symbiont of the redbay ambrosia beetle causes a lethal wilt in redbay and other Lauraceae in the southeastern United States. *Plant Disease* 92: 215-224.

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**Fig. 4.** Dowels of ambrosia beetle sawdust protruding from a redbay killed by laurel wilt.



**Fig 5.** The redbay ambrosia beetle on the head of a penny.



**Fig 6.** Redbay mortality caused by laurel wilt in a mixed hardwood forest.