

## Detection and Recommendations for Mitigation of Laurel Wilt Disease on Native Trees in Urban Landscapes and Avocado Trees in the Home Landscape

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### Background

- The redbay ambrosia beetle is native to India, Japan, Myanmar, and Taiwan.
- The origin of the laurel wilt pathogen is not known but assumed to have evolved with the beetle.
- 2002 Redbay ambrosia beetle first detected in Port Wentworth, Georgia.
- Probable introduction on infested wooden packaging material.
- 2004 Laurel wilt first detected in Georgia and South Carolina.
- 2005 Laurel wilt first detected in redbay trees in Duval County, Florida.
- 2006 Laurel wilt first detected in Indian River County, more than 225 miles south of Duval County.
- 2007 Laurel wilt first detected in avocado trees in Duval and Brevard counties.
- 2008 Laurel wilt detected in avocado trees in Malabar, Brevard County.
- 2009 Laurel wilt detected in Citrus, Flagler, and Suwannee Counties in north Florida and Highland, St. Lucie and Martin counties in central Florida. Laurel wilt suspect samples collected from avocado trees in Miami-Dade County (south Florida) turns out not to be laurel wilt. Laurel wilt confirmed in Mississippi.
- 2010 Redbay ambrosia beetle detected in west-central Miami-Dade County, more than 110 miles south of Martin County. The presence of laurel wilt was not detected. Laurel wilt was detected in Bay County (Panama City area).
- 2011 (February) Laurel wilt was detected in native swampbay trees and redbay ambrosia beetles were trapped in south Miami-Dade County.

### Update

Currently laurel wilt disease continues to spread west and south in the State of Florida. In 2010, a redbay ambrosia beetle was trapped in southwest Miami-Dade County and as expected was carrying spores of the laurel wilt fungus. Extensive surveying of the native trees and dooryard avocado trees in the adjacent urban and natural landscape did not lead to detection of symptoms of laurel wilt or more beetles until 2011. Recently several laurel wilt positive native trees (swampbay) have been detected in south Miami-Dade County. Surveys are in progress to delimit the extent of this new laurel wilt outbreak in the southern end of Miami-Dade County.

The natural spread of laurel wilt disease by the redbay ambrosia beetle in natural areas has been estimated to be 15 to 34 miles per year, but the rate of movement through urban areas of Florida via native and avocado trees is unknown. Of continued concern is the potential human assisted spread through the movement of infested wood or plant material.

The redbay ambrosia beetle is attracted to volatiles naturally emitted by healthy living trees, severed limbs, recent tree stumps, and wounded (pruned) trees in the Laurel Family (Lauraceae) (Table 1). Major trees in the family in Florida include redbay (*Persea borbonia*) a common understory native tree found throughout the natural areas of the Florida peninsula and sometimes as a landscape tree and avocado (*Persea americana*) a common fruit tree in home landscapes and grown commercially in Miami-Dade County. Swampbay (*P. palustris*) is also common in some areas of south Florida. At least 7 other plant species are documented hosts of the redbay ambrosia beetle and laurel wilt and more species have been shown to be susceptible to the laurel wilt pathogen.

The redbay ambrosia beetle bores into host trees (e.g., avocado and redbay) and reproduces in the galleries it forms inside the tree thus protecting them from predators. The developmental time inside the galleries of the host trees from egg to adult is between 7 to 3 months depending upon temperatures and tree host species. Logs, limbs, sections of limbs and stumps may all be infested. Recent research has demonstrated that chipping redbay wood drastically reduces the number of redbay ambrosia beetles that emerge from the chipped wood but, does not eliminate all of them. Furthermore, the laurel wilt pathogen does not appear to be able to live for more than a few weeks in chipped wood. The time from initial beetle contact with a host to tree damage or death varies with the host species, tree health, tree size, and ranges from about 21 days to about 3 months.

This beetle and associated pathogen can be moved in addition to natural spread by:

1. Movement of infested wood, firewood and logs by entrepreneurs, residents, landscape companies, pruning companies and wood-turners.
2. Movement of wood chips from infested wood as mulch.
3. Movement of wood products to landfills that don't burn or bury materials.
4. Illegal dumping of wood products (logs, brush, limbs, etc.).
5. Movement of potentially infested live host trees, e.g., redbay, sassafras, and avocado.

There are several species of ambrosia beetles and associated fungi that may be found in Florida.

Symptoms of an ambrosia beetle and vascular wilt infestations include:

1. Leaves and young stems wilting.
2. Leaf color changing from light green to dark purplish-green, bluish-green to greenish-brown.
3. Dead leaves hanging on the tree.
4. Stem and limb dieback.
5. Inspection of the trunk and major limbs may show dried sap (white, crystalline powder-like material). In any case, remove the bark down to the sapwood and look for dark streaking. Dark streaks in the sapwood may indicate fungal infection. Normally this sapwood should be white to yellowish with no dark staining or streaking. In addition, small, dark holes in the sapwood indicate wood boring beetles are present.

Frequently asked question: *Are these symptoms indicative of only laurel wilt?* The answer is not necessarily, in that leaves and young stems wilting, dead leaves hanging onto the stems, and stem and limb dieback may be due to lightning strike, flooding (root rot), severe drought, and/or an infestation of one or more of the many ambrosia beetles we already have here and the fungi they carry or other diseases that would cause vascular plugging (dysfunction). However, these symptoms are suspicious for

the laurel wilt disease and the tree should be sampled to determine if the redbay ambrosia beetle and laurel wilt disease are the cause of the symptoms.

Currently we recommend that homeowners:

1. Report any suspicious redbay, sassafras, and avocado trees to the **Division of Plant Industry at DPI at 1-888-397-1517**. Please be sure the tree is a member of the Laurel family. This insect and disease does not attack oaks, maples, sycamores, palms, mango, lychee, guava, etc.
2. Redbay, avocado and other host species should **not be moved** or sold as firewood, tree trimmings, BBQ smoke-wood, mulch, or wood-turning material.
3. Extreme caution should be used in moving live host trees (e.g., redbay, avocado) and wood products into counties where the pest is not yet found. Insect- and disease-free containerized host trees should only be purchased from reputable nurseries, and trees showing any signs of wilt or dieback should be destroyed immediately.

Some other common questions:

1. *Can the disease be transmitted by contaminated pruning equipment?* Research has demonstrated that the laurel wilt pathogen can be transmitted on hand saws but not power saws. However, we recommend pruning equipment be disinfested after each use. Examples of disinfectants for tools include: 25% chlorine bleach (3 parts water and 1 part bleach); 50% rubbing alcohol (70% isopropyl with equal parts water).
2. *Will cutting out just the dead sections of an infested tree stop the beetle and the fungus from killing the tree?* Normally infestations of ambrosia beetles only cause limited damage to trees and can be controlled by cutting out the dead part of the tree and disposing of it. However, the fungal symbiont (partner) that the redbay ambrosia beetle carries seems to spread upward and downward in an infected tree. We do not know if quickly removing newly infected limbs or sections of limbs will stop the disease from spreading in the tree. If you try removing only the infested sections of the tree with a hand saw you will need to disinfest your pruning saw or clipper between each individual cut so as not to spread the disease when cutting other parts of the tree or other host trees.
3. *Will tarping and composting the cut wood or chips from an infested tree stop beetles from emerging from the infested wood?* Research has shown that chipping redbay ambrosia beetle infested wood does drastically reduce the number of redbay beetles emerging from the chipped wood, but a few beetles may emerge. Tarping the pile of chipped wood is recommended to further reduce the potential for emerging beetles to escape into the environment. Potentially adding leaf litter, grass clippings, and top soil to the chipped wood to make a compost pile will help in the decomposition of the chipped wood. However, some municipalities and cities have strict regulations pertaining to if, where, and when compost piles may be formed in a home landscape. Please contact your local government for more information.
4. *What are regulatory agencies doing with respect to monitoring and control strategies to stop the manmade movement of RAB-LW?* The Florida Department of Agriculture and Consumer Services, Division of Plant Industry (FDACS/DPI) and USDA-APHIS- Plant Protection and Quarantine inspect and regulate the movement of nursery stock that are hosts of the red bay ambrosia beetle. In addition, they have and continue to distribute public outreach materials to educate the public about this problem and

the risks associated with the movement of the various regulated wood products. A new regulation on the movement of firewood and related wood products has been adopted by the FDACS.

### **Tentative recommended control measures for urban and rural residents with host trees (e.g., redbay, swampbay and avocado) in the home landscape**

Rural and urban residents should be on the look-out for redbay, swampbay and other host trees (including avocado) showing signs of rapid wilting, dieback, and insect boring, and should report this to the Division of Plant Industry (**1-888-397-1517**) and/or your local forester through the Division of Forestry (<http://www.fl-dof.com/>). This will help regulatory agencies and scientists track the movement of this pest. Preliminarily, redbay ambrosia beetle attacks of redbay appear to be highest from June through October. We can expect attacks on other Laurel Family species (e.g., swampbay and avocado) to increase during the summer as well.

#### **Control options for urban landscapes with redbay trees**

Certain high-value redbay trees can be treated for prevention of laurel wilt by use of systemic fungicides. Propiconazole (trade name Alamo®) is currently being used with some success to protect high-value redbay landscape trees. In general, the process involves mass diffusion of diluted fungicide using passive uptake. In some cases, microinjectors are being used. Research has shown that protection lasts for up to 2 years at most. For more information on propiconazole use see:

[http://www.fs.fed.us/r8/foresthealth/laurelwilt/resources/pubs/laurel\\_wilt\\_isa\\_auf\\_article.pdf](http://www.fs.fed.us/r8/foresthealth/laurelwilt/resources/pubs/laurel_wilt_isa_auf_article.pdf)  
<http://www.treecarescience.com/arborceuticals/fungicides/alamo>

There are some landscape companies and arborists that offer a fungicide service (treatment) for redbay trees. Please be sure they are using the correct product and are certified and licensed and have insurance prior to hiring them. At present Alamo® is not registered for use on swampbay trees.

Although Merit® (imidacloprid) is registered for use on landscape and forest trees to control insects its use in areas with highly permeable soils or where surface water is present is not recommended. Furthermore, the material is highly toxic to aquatic invertebrates and bees. Unless trees are protected by a fungicide the use of an insecticide to control the redbay ambrosia beetle will not stop the progression of the disease (i.e., it is too late).

#### **Control options for urban landscapes with avocado trees**

Periodically monitor avocado trees for signs of wilting, leaf drying and browning (death), stem and limb dieback. Contact DPI if you suspect the trees to be infested with laurel wilt.

*Which pest and disease control substances that are available, safe, efficacious and economic for home owners to use to either protect their avocado tree from the beetle or disease?* Currently, there is no insecticide recommendation to control the redbay beetle since by the time trees show signs of laurel wilt the beetles have already infested the tree. Research is ongoing to determine which products and methods of insecticide application would be most suitable for control of the beetle in urban landscapes.

At present there is an emergency exemption for the use of the fungicide Tilt® (propiconazole) fungicide for use as a bark directed spray mixed with 2% Pentra-Bark for control of laurel wilt in avocado trees. However we do not recommend its use at this time because not enough is known about its

efficacy, potential toxicity to the tree, and how long the treatment lasts. However, if Tilt® plus PenraBark is used, the mixture must be applied before the tree is infested with the disease and it has been shown to only work on trees 6-7 years old or less. This material is expensive and not readily available to home owners. People interested in treating their trees should contact a certified and licensed (including pesticide licensed) landscape or arborist company for details on applications and costs of applying this material. Read and follow the label instructions for details and safe handling.

### Tree disposal of dying or dead trees

What should residents do if their tree tests positive for laurel wilt? Contact your local waste disposal service. The wood (i.e., limbs, trunk, and stems) of host landscape trees that are confirmed to be positive for the laurel wilt disease may be placed into the urban debris stream, that is, taken to the local landfill and destroyed or buried. An option is composting the tree. Current recommendations for urban and rural residents with infested avocado or native trees include: notifying DPI immediately, removing the infested tree and having it picked up by local waste management agency for disposal, or composting the tree by cutting the tree to ground, placing all wood (or chips) on top of the stump, and covering with a tarp all the way to the ground. Perhaps the composting process can be accelerated with ingredients such as topsoil, manure, fertilizer and water. For more information on how to build compost piles visit <http://edis.ifas.ufl> or go to <http://edis.ifas.ufl.edu/pdffiles/EP/EP32300.pdf> and <http://edis.ifas.ufl.edu/pdffiles/HE/HE02600.pdf>. Burning is not recommended because of the necessity to obtain state, county, and/or municipal burn permits and the danger of uncontrolled burning by residents.

Table 1. Known hosts of laurel wilt in Florida.

Background	Common name	Scientific name
Native	Redbay	<i>Persea borbonia</i>
	Swampbay	<i>P. palustris</i>
	Silkbay	<i>P. humilis</i>
	Pondberry	<i>Lindera melissifolia</i>
	Sassafras	<i>Sassafras albidum</i>
	Pondspice	<i>Litsea aestivalis</i>
	Spicebush	<i>Lindera benzoin</i>
Non-native	Camphor	<i>Cinnamomum camphora</i>
	Avocado	<i>Persea americana</i>

(c://extension/2011/handouts 2011/Urban landscape recs 4-3-11.docx)