



Update 2011 - Redbay Ambrosia Beetle and Laurel Wilt Disease in Mississippi

By John P. Formby and John J. Riggins

Introduction: Ecologically, native ambrosia beetles play an important role in Mississippi's forest health. Nearly every tree species is a host for at least one ambrosia beetle species. These "fungus farming" beetles transport various fungi from tree to tree and introduce it into the vascular system (veins) of living or dying trees. The fungi spread throughout the vascular system thereby aiding forest nutrient cycling by beginning the decomposition of forest trees.

Unfortunately, the redbay ambrosia beetle (RAB) is not one of our native ambrosia beetles. This exotic beetle is native to tropical parts of Asia. They are called "ambrosia" beetles because they cultivate symbiotic "ambrosia" fungi as food in galleries they bore through the tree. The symbiotic fungus then spreads throughout the vascular system of the tree where it is consumed by the beetle larvae and adults. Regrettably, the RAB and its

symbiotic fungus (*Raffaelea lauricola* T. C. Harr., Fraedrich & Aghayeva) attack trees and shrubs in the laurel family (Lauraceae) causing laurel wilt disease. This is the only known ambrosia beetle-fungus complex to kill healthy trees. The beetle and the fungus are fast acting and difficult to control. Expensive chemical injections only marginally slow the spread and offer limited results.

Signs & Symptoms: The tiny (2mm), cylindrical redbay ambrosia beetle (Fig. 1) is difficult to spot due to its small size. The only evidence of infestation may be holes in the tree bark (Fig. 2) or small compacted sawdust tubes (Fig. 3) protruding from the bark. Proper identification of the beetle is difficult and should be performed by an entomologist.

Symptoms of laurel wilt appear when the fungus spreads throughout the vascular system and blocks vital water conducting cells. Initial symptoms appear as slightly wilted and pale colored leaves, usually in

groups (Fig. 4). Progressively, the leaves turn from light green to a copper bronze and completely wilt. Leaves in later stages of laurel wilt are light brown and highly wilted and/or dead, eventually dropping from the tree.

Biology: The RAB is relatively innocuous in its native habit, and therefore it has not been studied in detail. We are only starting to study the biology of the RAB here in the United States, and much about the ecology and impacts of the RAB in North America is still unknown

What is known is that both males and females spend most of their life inside the tree. Males are tiny and flightless, and usually spend their entire life inside the birth tree, keeping the tunnels and galleries clean of debris and excess fungus. In some cases the male mates with his sisters or mother.

Females do not have to mate, and can lay viable eggs without the presence of males. The unfertilized eggs always result in male offspring. Once mature, a

young female will gather spores from her birth tree and leave with freshly packed mycangia. She will fly up to 2-3 kilometers in search of a suitable host. When a suitable host is located, the female begins boring into the tree to introduce the fungus and lay eggs. Brood development can occur within 50 and 60 days, depending on temperature. Occasionally, the female RAB will attack a healthy tree only to leave a few days later. It is believed that she attacks the tree and introduces the fungus to condition the tree for the next female to come along.

Impact: Ornamental trees have been affected and laurels in many natural stands have been completely destroyed, especially in Jackson Co., MS. Not only are aesthetic values lost, but wildlife ecosystems are also dramatically altered. The redbay tree is essential to the palamedes swallowtail butterfly caterpillar as a larval food source, and many wildlife species such as black bear, songbirds, turkey, and deer enjoy the fruit (drupes).

Management:

Unfortunately, there is very little that can be done to control the spread of the laurel wilt. The redbay ambrosia beetle lives inside

the tree, therefore contact insecticides offer little in the way of control. Fungicides, such as Propiconazole (Alamo[®]), can be injected into individual trees, but are expensive and hardly a fool proof remedy for controlling laurel wilt, requiring reapplication approximately every 7 months.

Update: In Mississippi, the ambrosia beetle and associated fungus not only attack redbay (*Persea borbonia*), but can also attack swampbay (*Persea palustris*), sassafras (*Sassafras albidum*), pondberry (*Lindera mellisifolia*), and pondspice (*Litsea aestivalis*). Pondberry and pondspice are listed as endangered species by the U.S. Fish and Wildlife Service.

The impact of the redbay ambrosia beetle is progressively worsening in Mississippi. The RAB was first detected in Jackson Co., Mississippi in 2008 near the port city of Pascagoula and has since been detected in Harrison Co., Mississippi and Mobile Co., Alabama. Jackson Co. has seen extensive redbay mortality, but minimal sassafras mortality. Currently, in adjacent Mobile Co., Alabama and Harrison Co., Mississippi redbay and sassafras mortality is

minimal. However, we are expecting to see an exponential increase in redbay mortality throughout these newly reported areas as RAB expands its range. See figure 5 for the current distribution of laurel wilt in the U.S.A.

As the beetles spread west across Harrison Co., Mississippi into Hancock Co., Mississippi they will encounter increased levels of sassafras. These populations of sassafras increase in density into the interior of Mississippi and distribution remains continuous throughout the state into Tennessee. Therefore, the potential for *X. glabratus* expansion into the interior United States through Mississippi is probable.

Laurel wilt was also confirmed in Marengo Co., AL during summer of 2011. Marengo Co. is east of Meridian, MS, and is approximately 150 miles inland from previously known infested areas. Laurel wilt is causing extensive mortality (>90%) to sassafras trees in some portions of Marengo Co. We expect this infestation to continue to spread through sassafras, possibly into east-central Mississippi during the next several years

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Figure 1: Adult Female Redbay ambrosia beetle



Figure 2: Entrance or exit holes of ambrosia beetles. © John P. Formby.



Figure 3: Sawdust tubes produced by ambrosia beetles tunneling into the tree. © John P. Formby.

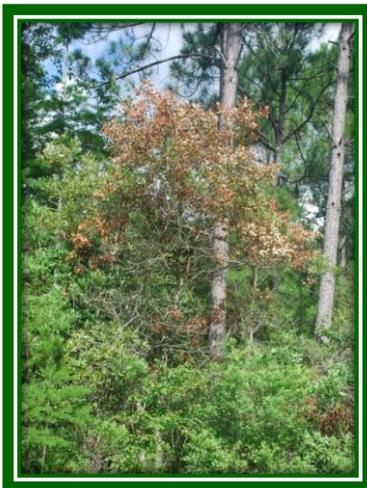


Figure 4: Symptoms of Laurel Wilt Disease in redbay (Jackson Co., MS). © John P. Formby.

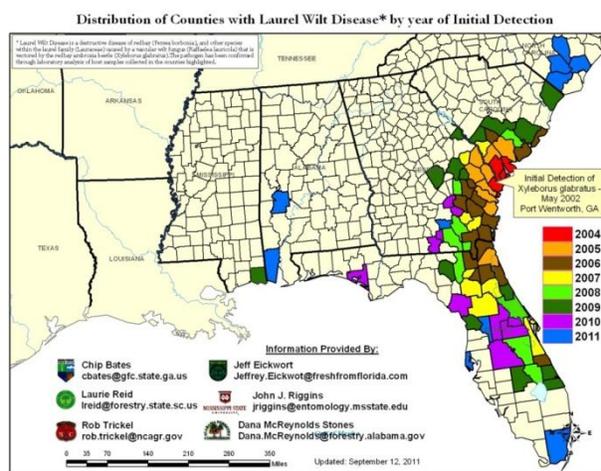


Figure 5: Current confirmed locations of laurel wilt disease in the U.S.A.

