

FLORIDA LAND STEWARD



A Quarterly Newsletter for Florida Landowners and Resource Professionals

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IN THIS ISSUE

Gainesville Renewable Energy Center's Forest Stewardship Incentive Program	3
Coyotes Vs. Bobcats: What are They Eating?	4
The Ambrosia and Bark Beetle Academy	5
2011 Florida Agriculture and Natural Resources Economic Report Released	5
Forestry and Natural Resources Webinars	5
Timber Price Update	6
Certified Forest Stewards and Tree Farmers	7

Laurel Wilt-resistant Redbays: Hope for the Future of a Disappearing Species

Adam W. Black, Marc Hughes and Jason A. Smith, University of Florida

For over a decade, the native redbay tree (*Persea borbonia*) that has been such an important component of the coastal plain forests has been facing a bleak future. Shortly after humans realized that Y2K did not result in the end of the world, a single beetle native to Southeast Asia happened to enter the U.S., and along with the baggage it carried, led to the redbay's own near-apocalyptic end. A tree so depended-upon by a variety of wildlife for food and shelter has been dying off at an alarming rate, killed not by the rapidly proliferating beetle directly, but by the symbiotic fungus the beetle actually farms within the tree as its food source.

The estimated hundreds of millions of victims of laurel wilt disease retain their browned leaves for several months, reminding landowners and managers of the reality of the disease. One of the most frustrating parts of this problem is the very limited control options that can be used to halt the spread of the redbay ambrosia beetles (*Xyleborus glabratus*) and their fungal accomplice, *Raffaelea lauricola*. However,

researchers in the University of Florida forest pathology laboratory feel that extinction of the redbay tree is not imminent. With human intervention, the species may be saved and even reforested with naturally resistant individuals.

Laurel wilt introduction and spread

The single ambrosia beetle that started it all is believed to have entered the country among foreign shipping materials delivered to Port Wentworth in Savannah, GA, where the first large scale mortality of redbay was spotted. The beetle's unusual mode of reproduction allows for lone females to produce unfertilized eggs that hatch into males. These in turn breed with their mother, who is then able to produce fertilized eggs, resulting in female offspring and sparking an exponential population explosion that quickly spread north into North Carolina and southward into Florida. It is these areas of intense devastation - the coastal forests of Georgia, South Carolina, and Northeast Florida - that have been of great interest to UF forest pathologist Dr. Jason Smith, and his student, recent PhD recipient Dr. Marc Hughes.

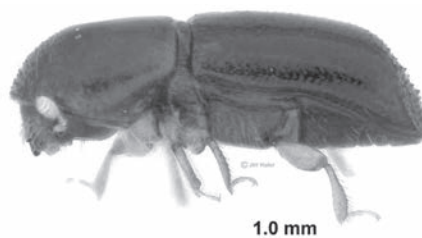
Can resistance be bred?

Since these coastal forests of South Carolina, Georgia and Florida have been impacted by laurel wilt disease



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The exotic redbay ambrosia beetle (*Xyleborus glabratus*). Photo by Dr. Jiri Hulcr.

longer than anywhere else in the country, nearly all of the large trees in the region are dead. However, a scarce number of individual trees remain alive and well among the countless skeletons of their deceased neighbors. It is these survivors that might represent individuals with a unique genetic makeup that allows them to tolerate the disease. If they indeed prove to be resistant, it would mean there is hope for redbay in the forests of the southeast.

A significant portion of Marc's PhD dissertation research (funded by the USDA Forest Service, Region 8) focused on locating these surviving trees and systematically proving whether or not they really were tolerant to infection by the fungal pathogen, or if there were other factors contributing to the tree's survival. In order to test the trees in a controlled setting, he would need to propagate the tree vegetatively. Rooted cuttings would maintain the full genetic profile of the original tree, and multiple copies would be available for thorough research. Without any existing information on this form of cutting-propagation for this species, Marc experimented with different methods and developed a protocol resulting in a high degree of rooting success. This information would also be invaluable for later mass-propagation of any proven resistant clones that could be used for reforestation of devastated areas.

After successfully creating replicates of a number of these supposedly resistant individual trees and allowing them to grow to a significant size, Marc inoculated the trees with spores of the laurel wilt fungus. With high hopes that trees would develop minor, non-fatal symptoms at the worst and recover, it was disappointing to see many trees die. Fortunately other clones quickly shrugged off minor symptoms and have rebounded. Those that were able to fight off the



Redbay trees planted at Citra, FL ready to be screened for resistance to laurel wilt. Photo by Marc Hughes.

infection may very well be the key to the future survival of the species.

Decoding the biology of resistance

A mystery yet to be answered is why many of the clones succumbed to the inoculation trials, yet the original trees continue to survive in the wild despite continued disease pressure. These trees that died in Marc's study may actually be resistant in a different sense. One explanation is that these individuals may have a unique chemical makeup that renders them unattractive to the insects. The fungus can only naturally colonize a tree when an ambrosia beetle bores into the trunk and creates its fungal farm. Therefore, if the beetle does not perceive a particular tree to be a desirable place to start a family, there is no chance for inoculation. Upcoming studies will focus on the chemical makeup of these surviving trees and their attractiveness to the redbay ambrosia beetle.

Taking into account the two possible scenarios – resistance to the fungal pathogen or unattractiveness to the beetle vector – further investigations will focus on the ability of these traits to be passed on to seedling progeny and mapping genes responsible for these traits. Many of Marc's selections have produced seed and seedlings and are currently being grown out for testing. A long-term

plan toward reforestation with resistant trees is best realized with as much genetic diversity as possible. A small group of resistant clones mass-produced and planted over the entire range of the redbay would be very limiting on a number of levels. Selective breeding to produce seedlings with inherited resistance would be critical in diversifying the gene pool of the future redbay forests.

Ultimately, tolerant/resistant clones would need to be identified from all portions of the redbay's extensive range. Clones from the Florida Everglades may not be suitable for planting in South Carolina. Those derived from inland populations may not tolerate salt spray experienced by those on the coastal barrier islands. Other ecological considerations would need to be addressed. The larvae of the Palamedes swallowtail butterfly (*Papilio palamedes*) feed almost exclusively on the foliage of redbay trees and faces serious decline with the loss of the trees. It is possible that clones selected due to their unattractiveness to the beetles may be unsuitable for widespread reforestation if the butterfly finds the trees to be similarly unfavorable.

Other plants are susceptible to the laurel wilt fungus

Redbay is not the only tree affected by laurel wilt disease. Two other

native *Persea* species are also being seriously impacted by laurel wilt. Swampbay (*Persea palustris*) is an important component of floodplain forests while Silkbay (*Persea humilis*) is a central Florida endemic restricted to dry scrubland habitats. Additional native members of the Lauraceae family that are known to be susceptible to laurel wilt disease include Sassafras, Pondspice, and spicebush, with the non-native Avocado (*Persea americana*) also affected. Marc's ongoing studies could very well be used as a model that can be applied to the recovery efforts of these additional species.

Further encouraging findings have recently been noted in some additional work Marc has undertaken. Initial studies have shown that another native member of the laurel family, Lancewood (*Nectandra coriacea*), appears to have been unaffected in laboratory inoculations with the laurel wilt fungus. The UF forest pathology lab's continuing studies of this south Florida native species will likely yield further clues in their search for genetic traits that translate to fungal or vector resistance, and ultimately prevent the significant loss of valuable tree species native to the southeast and beyond.

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Gainesville Renewable Energy Center's Forest Stewardship Incentive Program

By Brian Condon, GREC Biomass Procurement Manager, Bio-Resource Management

The Gainesville Renewable Energy Center (GREC) is a 100 MW woody biomass fueled electric generation facility that will produce renewable, baseload electricity for Gainesville Regional Utilities (GRU) under a 30-year contract. GREC is located on US 441 between Gainesville and Alachua and will be fully operational in the fall of 2013.

Seeking sustainable fuel sources

GREC will obtain biomass fuel from many sources, including urban tree debris and residual material generated by wood using mills in the area. Another important source is woody biomass sourced from north Florida forests. In order to ensure the sustainability and stewardship of

forest ecosystems that are subject to biomass harvest activity, GREC and GRU established two programs that were developed in collaboration with committee of local forest professionals. The first is a set of Minimum Sustainability Standards for Forest-Produced Biomass that obligate GREC to source biomass consistent with a set of criteria that includes compliance with Florida Forest Service Silvicultural Best Management Practices, along with several other requirements.

The second is called the Forest Stewardship Incentive Payment (FSIP) that provides a financial incentive to forest landowners who demonstrate forest management practices that, from the perspective of resource sustainability, are substantively better than current prevailing practices. The FSIP rewards forest landowners with current certification in either the Florida Forest Service's Forest Stewardship Program (FSP) or the Forest



GREC facility. Photo by Brian Condon.

Continued on page 4

Stewardship Council (FSC). For landowners with current certification in the Forest Stewardship Program the incentive payment is \$0.50 per ton of delivered biomass from the certified property, paid directly to the landowner. The payment is \$1.00 per ton of biomass from FSC certified land.

The large majority of biomass that GREC sources from Florida forests is otherwise nonmerchantable material whose removal represents a cost to landowners when reestablishing trees on recently harvested timberland. This material has traditionally been collected in windrows and left to decay or piled and burned, and for many landowners removal of this material via a biomass harvest is advantageous. Another common type of biomass harvest is associated with the management of longleaf or other pine stands that have been encroached by hardwoods due to exclusion of fire or otherwise unsuccessful hardwood control. Removing hardwoods can open the canopy to enable natural regeneration of the targeted pine species, as well as return the site to conditions where prescribed

fire can be used as a silvicultural tool in management.

Biomass harvesting is usually done at the same time that traditional timber products are being harvested and shipped to any number of outlets in the area, but can also be conducted after a roundwood harvest has been completed. Biomass fuel producers generally have the same logging equipment as traditional logging crews, but have added a chipper and chip vans to the operation in order to process and haul the material to GREC. The end result is a tract with significantly reduced site prep costs or greatly improved growing conditions for the residual stand.

Landowners interested in participating in the FSIP must complete a short application and provide proof of current Forest Stewardship Program or Forest Stewardship Council certification. GREC and GRU staff will review the application, and if accepted will pay the incentive to the landowner upon completion of harvesting activity. Keep in mind that there is an annual cap on the total distribution



Stewardship Forest sign – Landowners with forest land certified in the Forest Stewardship Program will receive \$0.50 per ton for biomass.

of incentive payments. Application materials, other information about GREC, as well as a list of qualified biomass production crews can be obtained by contacting the author or by visiting www.gainesvillebiomass.com

Brian Condon can be reached at bc@bio-resource.com, (386) 315-8025

Coyotes Vs. Bobcats: What are They Eating?

By Bill Giuliano, UF/IFAS Dept. of Wildlife Ecology and Conservation

Coyote and bobcat carcasses are still needed. The University of Florida is conducting a study of coyote and bobcat diets in Florida. Of particular interest is the importance of popular wildlife species, including white-tailed deer, turkeys, and bobwhite quail, livestock, and pets in the diet of these predators. Diets will be determined by examining the stomach contents of coyotes and bobcats legally harvested or obtained in Florida. We are asking for your help in obtaining legally acquired coyote and bobcat carcasses, with or

without pelts. We will also accept coyote and bobcat stomachs and intestines if you cannot store the whole carcass. If you have at least 5 animals that you would like to provide us, you can contact Lauren Watine (352-846-0558; lnwatine@ufl.edu) or Bill Giuliano (352-846-0575; docg@ufl.edu) at the University of Florida to arrange for pickup.

If you have fewer than 5 animals or are going to be coming through Gainesville, arrangements can be made to get carcasses from you at the University or combine your

animals with others in your area for a pickup. Carcasses or stomachs and intestines should be frozen in a suitable bag or container, and include the name of contributor, animal sex, date harvested/obtained, and location harvested/obtained. We have obtained a permit from the Florida Fish and Wildlife Conservation Commission for this project, and will keep information provided by you for this project anonymous to the extent possible by law. We greatly appreciate your help with this valuable study!

The Ambrosia and Bark Beetle Academy

Jiri Hulcr, UF/IFAS School of Forest Resources and Conservation

The Forest Entomology Lab at the University of Florida is pleased to invite you to a comprehensive workshop on bark and ambrosia beetles in May 2014.

- Are you a landowner or a naturalist interested in bark and ambrosia beetles?
- A forester in charge of pests?
- An extension agent with clients in forestry and natural resources?
- A researcher with beetle-related projects?

You probably need to understand bark and ambrosia beetles, their damage, and biology! Learn from a team of experts through hands-on labs, field demonstration, and lectures. Choose one, two, or all three modules: Regional Applied Focus, Hardcore Identification, and Understanding the Bug. See details and sign up for updates at <http://www.ambrosiasymbiosis.org/academy/>

Jiri Hulcr can be reached at (352) 273-0299 or hulcr@ufl.edu

Forestry and Natural Resources Webinars

This Webinar Portal for Forestry and Natural Resources serves as a launching point for current and archived forestry, conservation, bioenergy and natural resource webinars. Many of the webinars featured on our site provide participants with continuing education credit, free of charge, from professional accrediting organizations such as Society of American Foresters, International Society of Arboriculture, Certified Crop Advisors and others.

The Portal is a service of the Southern Regional Extension Forestry Office, North Carolina State University's Extension Forest Resources, Texas AgriLife Extension Service, other participating land-grant universities and the USDA Natural Resources Conservation Service. For a calendar of upcoming webinars in a variety of land management topics see: <http://www.forestrywebinars.net/webinar-calendar/month#.T-zLkBhgZys.blogger>

2011 Florida Agriculture and Natural Resources Economic Report Released

A study by the University of Florida's Food and Resource Economics Department found Florida's agriculture, natural resources and related food industries provided a \$104 billion impact on the state in 2011. These industries accounted for employment of just under 2 million full- and part-time workers in 2011, including indirect jobs in related sectors. This represents 20 percent of all jobs in the state. Full report available at: <http://edis.ifas.ufl.edu/pdf/files/FE/FE93500.pdf>

Trying to cut down on paper mail?

The Florida Land Steward newsletter is available online from floridalandsteward.org and the link to the current and back issues is included in each weekly email update. If you would like to discontinue the hard copy delivery of each issue to your mailbox and access the newsletter electronically, contact Chris Demers at (352) 846-2375 or cdemers@ufl.edu to request that. Your mailing status won't be changed unless you request it.

Get Email Updates!

Don't miss out on upcoming events and news! Send an email to cdemers@ufl.edu to be added to the Stewardship listserv. Updates are sent weekly.

TIMBER PRICE UPDATE

The timber pricing information below is useful for observing trends over time, but does not reflect current conditions at a particular location. Landowners considering a timber sale are advised to solicit the services of a consulting forester to obtain current local market conditions.

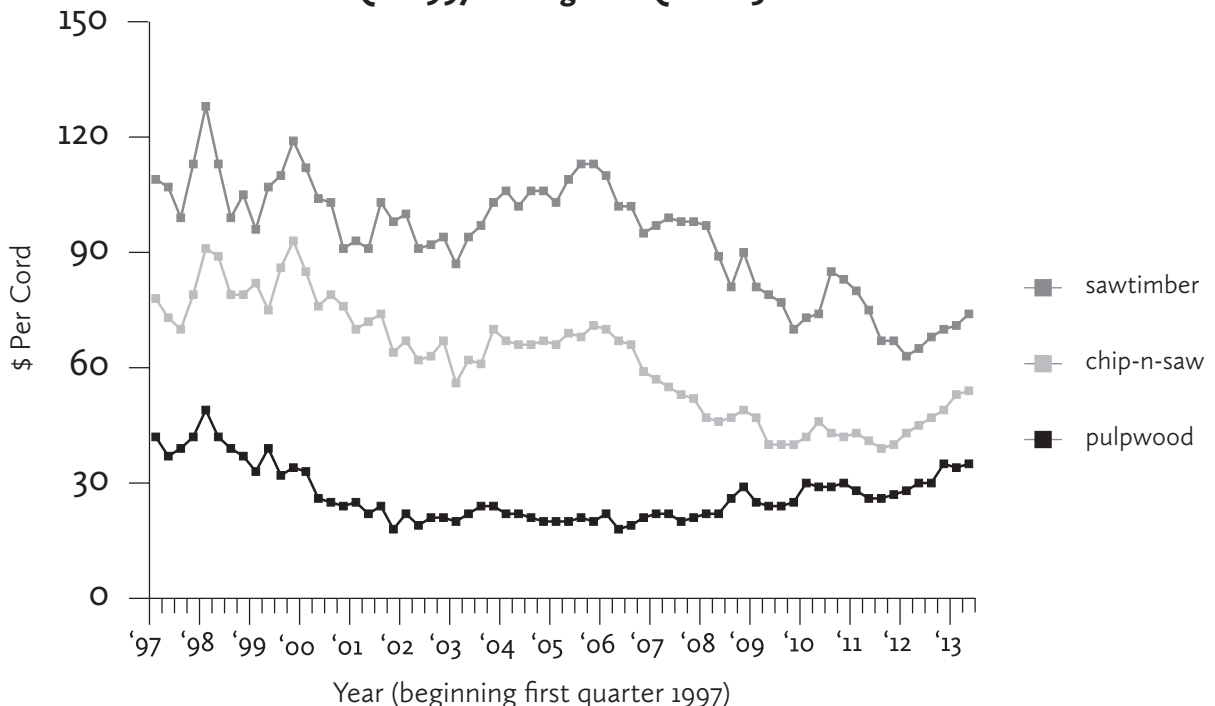
Average stumpage prices for the three major products in Florida, as reported in the 2nd Quarter 2013 Timber Mart-South report were:

Florida Stumpage Prices	
Pine pulpwood:	\$35/cord (\$13/ton), ~ same as 1 st Qtr
Pine C-N-S:	\$54/cord (\$20/ton), ~ same
Pine sawtimber:	\$74/cord (\$26/ton), ↑

Trend Report

South-wide average stumpage prices for all products continued their increase and were higher than they were a year ago. Average stumpage prices for all the major timber products are up compared to the same period last year. Market indicators continued their improvements this quarter, with housing starts up 28% compared to the same period in 2012. Ten bio-energy projects were announced this quarter in the Southeast region, nine of which are wood fuel pellet plants. Demand for wood pellets in Europe continues to strengthen and all eyes are on the wood basket of the Southeast US to meet the demand.

**Average Pine Stumpage Prices for Florida
2nd Qtr 1997 through 2nd Qtr 2013**



Timber Mart-South is compiled and produced at the Center for Forest Business, Warnell School of Forest Resources, University of Georgia, under contract with the Frank W. Norris Foundation, a non-profit corporation serving the forest products industry. See <http://www.tmart-south.com/> for information on subscriptions.

CONGRATULATIONS CERTIFIED FOREST STEWARDS AND TREE FARMERS

For more information about becoming a Certified Forest Steward or Tree Farmer, call your County Forester or learn about it at:

http://www.floridaforestservice.com/forest_management/cfa_steward_index.html

or

http://www.floridaforest.org/tree_farm.php

These landowners have a current Forest Stewardship and/or Tree Farm management plan for their property and have demonstrated excellent stewardship of their land resources.



Melody and Jeff Scott, 2013 Florida Tree Farmers of the Year, pictured with Brian Cobble (R), Suwannee County



Susan and William Schaefer, Forest Stewards, pictured with Brian Cobble (center), Suwannee County



Bill Black (L) with Dave Conser, Alachua County



Daniel Webb (R) with Henry Thompson, Escambia County



Patricia Branyon (R) with Barry Stafford, Jackson County

Upcoming Stewardship, Small Farm and Other Events

Date	Event, Location, Contact
Aug. 22	Invasive Exotic Species and Control Workshop , 9am to 3 pm ET, UF/IFAS Indian River Research and Education Center, Fort Pierce, FL. Presented by Florida's Forest Stewardship Program, Treasure Coast CISMA, Osceola County CWMA. \$15 fee. <i>Details and registration online at http://fsp-workshop082213.eventbrite.com/ or call Chris at (352) 846-2375, cdemers@ufl.edu.</i>
Aug. 24	Annual Grape Harvest Festival , 8 am to 4 pm, Center for Viticulture and Small Fruit Research, 6505 Mahan Drive, Tallahassee, FL 32317. Hosted by FAMU. <i>For more information, call (850) 599-3996.</i>
Sept. 12	Forest Stewardship Workshop: Integrate Timber and Wildlife Management , 9 am - 3 pm ET, UF/IFAS Extension Nassau County Office, 543350 US-Hwy 1, Callahan, FL 32011. <i>Details and registration online at http://fsp-workshop091213.eventbrite.com/ or call UF/IFAS Extension Nassau County at (904) 879-1019 to register.</i>
Sept. 19	Invasive Exotic Species and Control Workshop , 9 am to 3 pm CT, UF/IFAS Extension Jackson County Conference Room. Presented by Florida's Forest Stewardship Program and Apalachicola Regional Stewardship Alliance. \$10 fee. <i>Registration online at http://fsp-workshop091913.eventbrite.com/ or call (850) 482-9620.</i>
Sept. 24	Invasive Exotic Species and Control Workshop , 9 am to 3 pm ET, UF/IFAS Extension Clay County, Green Cove Springs, FL. Presented by Florida's Forest Stewardship Program and First Coast Invasive Working Group. \$10 fee covers lunch and materials. <i>Details and registration at http://fsp-workshop092413.eventbrite.com/ or call (904) 284-6355 to register.</i>
Oct. 9	Invasive Exotic Species and Control Workshop , 9 am to 3 pm ET, Florida Center for Wildfire and Forest Management Training, 24059 Childs Road, Brooksville, FL 34601, Presented by Florida's Forest Stewardship Program and Nature Coast Cooperative Invasive Species Management Area. \$10 covers lunch and materials. <i>Details and registration online at http://fsp-workshop100913.eventbrite.com/ or call Shaun Stewart at (352) 754-6865 to register.</i>
Nov. 14	Forest Stewardship Tour at George C. Owens Farm , 8:30 am to 2 pm CT, meet at UF/IFAS Extension Washington County Office. Join us to learn the many benefits of silvopasture – combining livestock and timber. \$10 covers lunch and materials. <i>Details and registration at http://fsp-tour111413.eventbrite.com/ or call UF/IFAS Extension Washington County at (850) 638-6180 to register.</i>
Nov. 21	Forest Stewardship Tour at Kent-Carroll Forests , 9 am to 2 pm CT, UF/IFAS Extension Holmes County. Details to Come. Join us to learn about this multi-enterprise property of forests, blueberries, ponds and wildlife. \$10 covers lunch and materials. <i>Details and registration at http://fsp-tour112113.eventbrite.com/ or call UF/IFAS Extension Holmes at (850) 547-1108 to register.</i>

For many more events and information see: floridalandsteward.org

The Florida Land Steward Newsletter is a University of Florida Extension Service, Florida Forest Service, Florida Fish & Wildlife Conservation Commission, USDA Natural Resources Conservation Service and Florida Tree Farm joint project:

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