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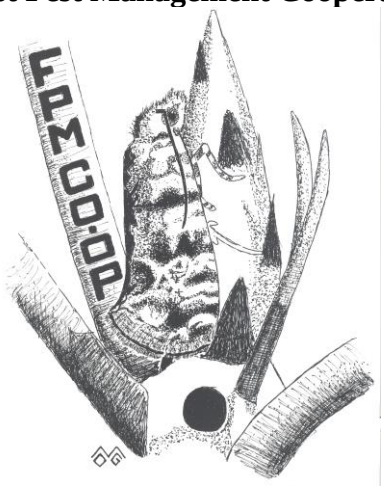
Quarterly Newsletter on Forest Pest Management Issues

Forest Pest Management Cooperative



Nantucket Pine Tip Moth, *Rhyacionia frustrana* (Comstock)

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PEST is a quarterly newsletter that provides up-to-date information on existing forest pest problems, exotic pests, new pest management technology, and current pesticide registrations related to seed orchards and plantations. The newsletter focuses on, but is not limited to, issues occurring in the South (Texas to Florida to Virginia,).

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Announcement:

East Texas Forest Entomology Seminar

The East Texas Forest Entomology Seminar (ETFES) will be held at Kurth Lake and at SFASU College of Forestry and Agriculture on April 23 and 24, respectively. Registration is $40 per person ($10 for students and retirees). Check the SFASU Forestry webpage for details and to preregister after April 1. The ETFES, now in its 42nd year, provides a forum to discuss the latest in forest health issues or research in forest pests, attracting participants from as far away as Mississippi State University and the University of Arkansas. If you wish to have your name placed on the ETFES mailing list to receive future announcements, please contact Ron Billings at rbillings@tfs.tamu.edu. This spring's agenda has yet to be finalized, but will include a discussion of emerald ash borer and other hot issues.

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New FPMC Coordinator

As of February, 2015, responsibilities for coordinating the Forest Pest Management Cooperative have been assigned to Dr. Ronald Billings, principal entomologist with the Texas A&M Forest Service (TFS) since 1973. The majority of his prior duties as Manager, Forest Health (his most recent title), have been transferred to other TFS employees. Billings has served as administrative coordinator of the FPMC since it was established in 1996, but now his primary responsibility and major focus will be to ensure continued success of the FPMC. From his office in College Station, he will be responsible for writing research proposals to seek new sources of funding and encouraging new members to join the co-op. Applied research conducted by the FPMC will be directly supervised by a Program Coordinator in Lufkin. A search is under way to fill this position, left vacant in November when Dr. Melissa Fischer accepted a position with the State of Washington Department of Natural Resources in Colville. Billings will continue to serve as co-chairman and program organizer of the East Texas Forest Entomology Seminar. He also will coordinate the annual SPB prediction survey, a protocol he developed and implemented across the South in the mid-1980s.

Summary of 2014 FPMC Research Projects

In 2014, four primary research project areas – leaf-cutting ants, tip moths, nematodes and systemic injections - were continued from 2013. The FPMC also evaluated control options for conifer mites, walnut twig beetle (vector of the thousand cankers disease fungus) and hypoxylon canker. Results will be presented in the next three *PEST* newsletters (June, September and December, 2015).

EAB Invades Louisiana: Is Texas Next?

(From *Texas Forestry*, April 2015)

Our neighboring state of Louisiana – long known for its cypress-lined swamps, alligators, and Cajun cuisine – can claim another distinction, albeit a dubious one. It is now home to the destructive emerald ash borer (EAB). This invasive insect has killed millions of ash trees in rural and urban forests in 24 states, including Arkansas and Missouri. The detection of EAB last August in six counties of southwestern Arkansas - including within thirty miles of the Louisiana border - suggested it would be just a matter of time before the pest was found in Louisiana – or in Texas for that matter.

In mid-February, entomologists with the US Forest Service/Forest Health Protection, based in Pineville, came across infested ash trees in Webster Parish on the Arkansas border. During a routine roadside stop, the federal entomologists recognized heavy woodpecker activity on several ash trees. Closer inspection (as entomologists are inclined to do) revealed winding galleries and white larvae beneath the bark characteristic of EAB. Their suspicions were soon officially confirmed. EAB had arrived in Louisiana. The infestation, consisting of 12-15 ash trees all showing signs of infestation within a mixed hardwood stand, is located just 42 miles from the Texas state line. The Louisiana Department of Agriculture and several federal agencies are conducting surveys to determine how wide spread the current infestation has become. Once the survey is completed, a quarantine will be placed around the infested area to prohibit the sale of ash nursery stock and prevent movement of hardwood firewood to other areas. Infested ash firewood is believed to be the means by which EAB is transported over long distances. A similar quarantine already has been implemented in 26 counties in southwestern Arkansas. As of March 1, EAB has not been found in Texas.

The Texas A&M Forest Service (TFS), in conjunction with the USDA Animal and Plant Health Inspection Service (APHIS), Texas A&M AgriLife Extension Service, Sam Houston State University, and other collaborators have deployed several thousand detection traps in high risk counties throughout Texas in recent years with negative results (i.e., no EAB found on the traps). Plans are to continue the detection survey with emphasis on East Texas in 2015, if federal funding becomes available. Because of the importance of this pest, TFS plans to install 380 APHIS-provided detection traps in high risk areas, even if additional federal funding is not offered to cover operational costs.

Meanwhile, foresters, landowners, and others who frequent our East Texas forests are encouraged to keep their eyes peeled for declining ash trees. Signs and symptoms of EAB include ash trees dying back from the top, an abundance of basal sprouts (epicormic branches), evidence of woodpecker feeding on the trunk, winding trails (galleries) and/or white inch-long larvae beneath the bark, or "D"-shaped exit holes in dying or dead ash trees. Report any suspicious symptoms to your nearest TFS field office or contact TFS Regional Forest Health Specialists Allen Smith at lasmith@tfs.tamu.edu in East Texas or James Houser at jhouser@tfs.tamu.edu) in Central Texas.

Figure 1: Emerald ash borer adults and "D"-shaped exit holes on ash. (Photo courtesy West Chester Tree Life, LLC.)

Figure 2: Characteristic galleries made by emerald ash borer on infested ash.

Southern Pine Beetle Activity in 2014

As predicted with SPB pheromone traps deployed last spring, East Texas escaped another year with no SPB infestations in 2014. In fact, the last SPB activity west of the Mississippi occurred in the late 1990s. Throughout the 13 southern states, only 390 infestations were reported in 2014, covering some 440 acres. Most SPB spots were reported from the National Forests in Mississippi (216 spots), with a few in Alabama (123 spots), Georgia (20 spots) and Florida (15 spots). For the first time, SPB was reported attacking several thousand pitch pine (*Pinus rigida*) trees on Long Island, New York, in 2014. A SPB outbreak also continued in the Pinelands of New Jersey. The annual South-wide SPB prediction survey using baited traps will be deployed again this spring, timed to the first bloom of dogwood trees. This event coincides with the long-range dispersal of SPB and subsequent initiation of most new infestations. Results will be posted on the TFS webpage at http://tfsweb.tamu.edu.

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Western Pine Beetle Outbreak in the Davis Mountains of West Texas

Texas is the only state in the South that can claim three species of *Dendroctonus* bark beetles. In addition to the southern pine beetle (*D. frontalis*) and the black turpentine beetle (*D. terebrans*) common throughout the South, Texas also has a native population of the western pine beetle (*D. brevicomis*), a pest of ponderosa pine (*P. ponderosa*) in the western region of the state. The most recent outbreak of western pine beetle is taking place in the Davis Mountains and has been on-going since at least 2006 (Figure 3). It became a major problem in 2013 and 2014, following several years of drought (Figure 4). The Texas A&M Forest Service is collaborating with the Nature Conservancy to thin surviving ponderosa pines as a prevention measure. TFS also has collected ponderosa pine cones from Fort Davis trees to extract seed for a future restoration project on nearby Conservancy lands.

Figure 3: Former TFS entomologist Joe Pase examines western pine beetle galleries in the Davis Mountains in 2006. (Photo by R. Billings)

Figure 4: Drought-weakened ponderosa pines in the Davis Mountains killed by the western pine beetle in 2014 (Photo by R. Billings).

New Species of *Dendroctonus* in Central America

Bark beetles of the genus *Dendroctonus* are among the most destructive pests of conifer forests throughout the world. This genus includes the southern pine beetle (*D. frontalis*) attacking pines from New Jersey to Texas and south to Nicaragua, the mountain pine beetle (*D. ponderosae*), a major pest of pines in the western U. S. and Canada, the western pine beetle, a pest of ponderosa pine throughout the western U. S., including in West Texas, the spruce beetle (*D. rufipennis*) in the western U. S., Alaska, and western Canada, and the great spruce bark beetle (*D. micans*), a pest of spruce and pine forests throughout Europe. A new species of *Dendroctonus* can now be added to this list. Discovered by Norwegian forest entomologists in Belize in 2000, the new species has been described officially in recent months and given the name *Dendroctonus mesoamericanus* Armendariz-Toledano and Sullivan.

This species has been found attacking eight species of native Central American pines (*Pinus oocarpa, P. caribaea, P. maximinoi, P. hartwegii, P. devonian, P. montezumae, P. pringlei,* and *P. pseudostrobus*). It has been collected from Belize as well as from southern Mexico, Guatemala, El Salvador, Honduras, and Nicaragua. The adults tend to be somewhat larger (2.7- 4.3 mm) than the southern pine beetle (2.3 – 4.0 mm), but there is considerable overlap in size. The two species often colonize the same trees and the new species also makes winding, S-shaped galleries beneath the bark, which tend to be more widely spaced than those of *D. frontalis*. The mature larvae often are visible on the inner bark surface (Figure 5), unlike with SPB (Figure 6). Also, the pitch tubes tend to be larger (Figure 7). Field observations suggest that the new species attacks trees shortly after SPB, filling in the lower trunk and upper crown areas. *D. mesoamericanus* produces its own aggregation pheromone that has yet to be completely identified and doesn't respond to traps baited with SPB pheromones. Further study is need on the attack behavior of this new species and its potential to kill pines in the absence of SPB.

Figure 5: Galleries of *D. mesoamericanus* and exposed larvae. (Photo by R. Billings)

Figure 6: Typical SPB gallery with larvae hidden in inner bark. (Photo by R. Billings)

Figure 7: Pitch tubes of *D. mesoamericanus* on *P. oocarpa* in Honduras. (Photo by R. Billings)

Texas A&M Forest Service Celebrates 100 years

By 1900, the virgin longleaf pine forests of East Texas were falling rapidly to the timber barons' crosscut saw and axe. The forested landscape was being rapidly transformed into a waste land of fire-scarred stumps and erosion-filled streams. A few environmentally-conscious individuals, led by Central Texas banker William Goodrich Jones, responded to this crisis by establishing the Texas Forestry Association (TFA) in 1914. A primary goal of TFA was to encourage the State Legislature to create a forestry agency in Texas as a means to conserve and replenish the state's dwindling forest resources. This goal was accomplished in 1915, when the Department of Forestry (later called the Texas Forest Service, now Texas A&M Forest Service or TFS) was established as part of Texas A&M College. John H. Foster, a Yale forestry graduate, was hired as Texas' first state forester that same year.

Texas became the thirty-fifth state in the nation and the seventh in the South to establish a state forestry agency. Texas was the first in the nation to establish its state forestry agency as part of a land-grant college. In 2015, TFS is marking its 100-year anniversary and this state forestry agency has much to celebrate. Its innovative approach to forestry has served as an example for other states in programs of wildfire protection, incident response, and forest management. TFS was the first state agency to establish a Forest Products Laboratory to find new uses for wood products (1940), the first in the South to utilize small aircraft for wildfire detection (1943), and the first to create a Forest Pest Control Section to address southern pine beetle (SPB) outbreaks and other forest pest problems (1962). It also was among the first in the South to initiate silvicultural research (1932), begin a southern tree improvement program (1951), and establish an urban forestry program (1970). In more recent years, TFS has developed a state-wide Wildfire Protection Plan and the novel, internet-based Wildfire Risk Assessment Portal or TXWRAP (www.texaswildfirerisk.com). One hundred new employees, including 75 wildland firefighters, have recently been hired to implement the Wildfire Protection Plan across the state. Similarly, the Texas Forest Information Portal (http://texasforestinfo.tamu.edu/) provides user-friendly internet access to forest management aides, such as a timber supply analysis, economic impact of forests, forest distribution and private property maps, among other forestry-related apps.

With a mandated responsibility and duty to protect, TFS is the lead agency in wildfire protection in Texas. Through predictive services, prevention programs, and response models, the agency has revolutionized the way states prevent, prepare for, and protect against wildfires. The agency also leads incident management teams during state disasters and has provided leadership for such incidents as the Space Shuttle Columbia recovery, Hurricanes Katrina, Rita, and Ike, and the unprecedented 2011 drought and wildfire season.

Since 1970, TFS entomologists have conducted research on the southern pine beetle, seed orchard and pine plantation insects, contributing much to the management of these pest problems. For example, TFS was responsible for developing and promoting the southern pine beetle control tactic known as cut-and-leave as well as the annual pheromone-based SPB prediction system. Both management tools have been adopted throughout the range of SPB on federal, state, and private forest lands. Through frequent technical assistance visits by TFS entomologists, SPB management protocols largely developed by TFS – including cut-and-leave – have been transferred to Mexico, Guatemala, Honduras, El Salvador, and Nicaragua where SPB also is a major pest.

In 1996, TFS created the Forest Pest Management Cooperative (FPMC) to generate financial support for applied research on forest health issues affecting commercial and urban forests. FPMC research has led to the registration of several new insecticides for use against pine seed orchard and plantation pests, as well as pine bark beetles and the emerald ash borer.

TFS has been led by just eight state foresters in its first 100 years, providing stability to the agency. The last three directors (Bruce Miles (1980-1996); James Hull (1996-2008); and Thomas Boggus (2008-present)) were/are career foresters with TFS, having worked their way up through the field ranks. TFS now employs some 550 employees across the nation's second largest state, but is still considered a small agency by Texas standards. This is a notable increase from the staff the first state forester was allowed in 1915 - six fire patrolmen each assigned to a million acres in East Texas to patrol on horseback.

With a century of service now in the rearview mirror, TFS shows no signs of slowing down. Celebrations are scheduled across the state to recognize the agency's milestone. The agency's centennial achievement was recognized by the Texas A&M University System Board of Regents and by the Texas State Legislature in February. TFS has partnered with the George Bush Presidential Library and Museum in College Station to host an exhibit at the museum highlighting the agency's first 100 years. Open March 16 – November 8, the exhibit will feature a TFS fire tower, a World War II-surplus jeep equipped to plow fire lines, and other early wildland fire-fighting equipment and forestry memorabilia.

The agency will host other events throughout the state during its centennial year, including 100 different tree giveaways and the planting of a commemorative tree in each of Texas' 254 counties. A centennial edition of the 1970 book Famous Trees of Texas has been released highlighting 100 trees of historical interest throughout the state. As the second century of service begins, the mission of TFS remains unchanged: *To provide statewide leadership to assure the state's trees, forests, and related natural resources are protected and sustained for the benefit of all.*

Figure 8: Leroy Williamson (right) and Max Ollieu made up the professional staff of the TFS Forest Pest Control Section in 1967. The unit was established in 1962 in response to a severe SPB outbreak (TFS photo archives).

Figure 9: Spraying infested logs with BHC mixed in fuel oil was the principal control method for SPB in East Texas from 1960 – 1970 (TFS photo archives).

EB Proves a Life Saver for Ash Trees Threatened by EAB

The systemic emamectin benzoate (EB), registered by EPA in 2010 for bark beetle and wood borer control, was initially developed by the Forest Pest Management Cooperative to address southern forest pests. Early trials against seed orchard pests proved efficacious, but the commercial market was too small to interest a company in pursuing registration. In research trials conducted by former FPMC Coordinator Dr. Don Grosman, the systemic insecticide also proved effective against conifer bark beetles in both the southern and western U.S. With prospects of a potentially lucrative market, the chemical was registered as a restricted use pesticide against bark beetles and wood borers in both urban and forest settings (Figure 10). It remains the only registered insecticide currently available for southern pine bark beetle prevention in forest situations.

The demand for EB, sold under the trade name of TREE-äge® by Arborjet, Inc., has increased markedly in recent years as a preventative treatment for the invasive emerald ash borer (EAB). In several intensive studies by Michigan State University researcher Dr. Deborah McCullough, a single injection of EB (TREE-äge®) in mid-May or early June provided excellent protection from EAB for at least two years, even in heavily infested areas with high EAB densities. In a replicated study, untreated trees ranging in size from 5 to 21 inches DBH at three sites in Michigan had an average of 68 to 132 EAB larvae per m2 of bark surface. In contrast, trees treated with low rates of emamectin benzoate (0.1-0.2 g active ingredient/inch DBH) averaged only 0.2 larvae per m@, a reduction of 99%. In a similar study in Ohio, canopies of treated trees remained healthy 4 years after treatment, unlike adjacent untreated trees. Touting the virtues of EB for protection from EAB, Dr. McCollough stated "There is no reason for a landscape ash tree to die from emerald ash borer anymore." Ash trees and tree-lined cities have the FPMC to thank for that.

Figure 10: FPMC researchers Larry Spivey and Bill Upton inject a pine with emamectin benzoate at Bastrop State Park to prevent Ips bark beetle attack following the devastating 2011 wildfire (Photo by Ron Billings).

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Thought You Might Be Interested to Know . . .

Tawny Crazy Ants Displace Fire Ants in the Gulf Coast

Figure 11: The tawny crazy ant is now sweeping across the Southeastern U.S. (Photo by Joe A. MacGown, Mississippi Entomological Museum).

The tawny crazy ant, *Nylanderia fulva*, (formerly known as the Rasberry crazy ant after pest exterminator Tom Rasberry who first reported it in Houston), gets its name from its light brown color and erratic movements. For better or worse, this invader is beginning to displace the invasive red-imported fire ant, *Solenopsis invicta*. Both species originate from South America. *N. fulva* has been a pest in rural and urban areas of Colombia, South America, where it displaced all other ant species.

There, small poultry such as chickens have died of asphyxiation, while cattle and other larger animals have been attacked around the eyes, nostrils, and hooves. Grasslands have dried out because of the increase in plant-sucking insect pests (hemipterans) which the ants cultivate and the excretions of sugary "honeydew" on which they feed. When attacked, these ants can bite but not sting, and excrete formic acid through a hairy circle on the end of the abdomen. The formic acid is used as a venom which causes a minute pain that quickly fades. Uniquely, the tawny ant also uses formic acid as an antidote against the venom of the fire ant. It recently has been discovered that the crazy ant produces and covers itself with formic acid as an antidote against the fire ant's venom. Tawny crazy ants were found to displace other ant species in their native Argentina and later the U.S., including the red imported fire ant.

It is the first example of an insect being able to neutralize another insect's poison, an ability speculated to have evolved in South America while sharing the same native range. Colonies have multiple queens, a feature that contributes to their survival. The earliest record of *N. fulva* presence in the US is from Brownsville, Texas, in 1938. By the early 2000s, the ants spread across the southeastern portion of Texas including at least 27 counties. As of 2012, the ants have established colonies in all states of the U. S. Gulf Coast. The ant is considered an invasive species. Infestations of *N. fulva* in electrical equipment can cause short circuits, sometimes because the ants chew through insulation. Overheating, corrosion, and mechanical failures also result from accumulations of dead ants and nest detritus in electrical devices. If an ant is electrocuted, it can release an alarm pheromone in dying, which causes other ants to rush over and search for attackers. If a large enough number of ants collects, it may short out systems.

It is unclear why colonies of crazy ants, like many species of ants, are attracted to electrical equipment. They may sense the magnetic fields that surround wires conducting electric current, or they prefer the warmth produced by resistance to the currents in the wires. Some argue they simply are searching for food or an attractive place to nest. The ants are not attracted to ordinary ant baits, and are not controlled by over-the-counter pesticides, and are harder to fully exterminate than many other species because their colonies have multiple queens. In June 2008, the United States Environmental Protection Agency granted temporary approval for the use of fipronil, an anti-termite agent, to control this ant. Its use is restricted to seven counties in the Houston area.

The ant is very small, about 0.125 in (3.2 mm) long, thus smaller than the red imported fire ant. It is covered with reddish-brown hairs. The colonies live under stones or piles; they have no centralized nests, beds, or mounds. They tend aphids for honeydew, feed on small insects and vertebrates, and forage on plants, especially for sweet materials. The ants appear to prefer the warmth and moisture of the coast. The ants don't fly and they normally move, on average, only 200 m per year. Long distance movement is by humans, transporting ants in abandoned boxes, vehicles, or potted plants. Be on the lookout for crazy ant stowaways.

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Meeting Announcement

The 57th annual **Southern Forest Insect Work Conference** will be held July 21-24, 2015, in Fayetteville Arkansas. The conference will include plenary sessions, various concurrent workshops, and a poster session covering recent forest insect research and forest health issues. An insect photo salon also will be offered. The program is still being organized, but hotel reservations can be made at the Chancellor Hotel, 70 Northeast Avenue in Fayetteville by calling 1-855-285-6162 (or 479-442-5555). Mention that you are attending the **Southern Forest Insect Work Conference** to get a special room rate.

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FOREST SERVICE

Forest Pest Management Cooperative's

P.E.S.T. Newsletter

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