Progress Education Science Technology

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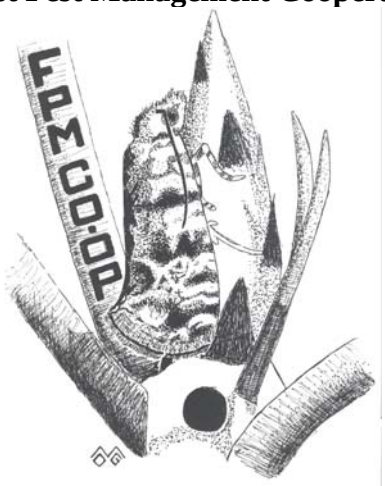
Quarterly Newsletter on Forest Pest Management Issues

Forest Pest Management Cooperative



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

Texas A&M Forest Service
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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 Arthur Temple College of Forestry and Agriculture on October 29th and 30th, respectively. Registration is $40 per person ($10 for students and retirees), which includes The Thursday evening meal and refreshments.. Check the SFASU Forestry webpage for details and to preregister after October 15. The ETFES, now beginning its 43rd year, provides a forum to discuss the latest in forest health issues or research on 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.

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New FPMC Member

The Forest Pest Management Cooperative announces the addition of a new full member. Beginning in CY2016, the USDA Forest Service, International Programs, with headquarters in Washington, D.C., has agreed to join the Coop. As described on their webpage at www.fs.fed.us/international/ip/, this branch of the USDA Forest Service promotes sustainable forest management and biodiversity conservation internationally. The skills of their field-based staff is linked with partners overseas to address the most critical forestry issues and concerns. International Programs regularly taps into the agency's wide range of expertise. Wildlife biologists, forest economists, hydrologists, disaster and fire management specialists, and policy makers are among those who comprise the staff of over thirty thousand employees. International Programs has three main staff units: Technical Cooperation, Policy, and Disaster Assistance Support Program (DASP). Both Technical Cooperation and DASP work closely with the United States Agency for International Development (USAID). Technical Cooperation specifically develops and manages natural resource projects overseas on a wide range of topics (i.e. fire management and forest health). As a consultant for USFS/IP, FPMC Coordinator Ron Billings, for example, has provided several technical assistance visits to countries in Central America in recent years to address outbreaks of the southern pine beetle. The FPMC Executive Team contact will be Oscar Lai (oscaralai@fs.fed.us).

Outbreak of *Dendroctonus* spp. in Honduras

In August 2013, an outbreak of *Dendroctonus* bark beetles (primarily *D. frontalis*, but mixed with the new species *D. mesoamericanus*) was detected in the Olancho Forest Region of central Honduras. Unfortunately, little direct control was conducted that year, since 2013 was an election year and political activities took precedent. By November 2014, the outbreak included more than 1,000 active infestations covering some 10,000 has. (ca. 25,000 acres) (Fig. 1). Following an evaluation of the outbreak at that time, Drs. Ron Billings and Stephen Clarke (USFS/Forest Health Protection, Lufkin, TX) made specific recommendations on direct control. Evaluation of all infestations and application of cut-and-leave or "buffer-cutting" (felling all freshly attacked trees and an equal number of adjacent uninfested trees) to disrupt infestation expansion were promoted as the best approach. An Action Plan was subsequently developed, but little or no funds were immediately available to implement these recommendations.

In August 2015, the expanding outbreak – by then covering almost 100,000 hectares - had spread to nine forest regions. The Honduran government, with support from President Juan Orlando Hernández Alvarado, appropriated the equivalent of $11 million U.S. to address the outbreak. Billings returned to Honduras in September 2015, at the invitation of the Honduran Forestry Institute (ICF), and as a consultant for USFS/International Programs. His recommendations were to divide the pine-forested region into three zones (A = area largely abandoned by SPB, B= area with most active infestations, and C = uninfested area). Priority for direct control will be given to Zone B. As a recognized authority on SPB control, particularly in Honduras where he introduced cut-and-leave in 1982, Billings discussed his recommendations in person with an inter-institutional committee consisting of 22 government and private agencies. He also was invited to meet face-to-face with the President of Honduras (Fig. 2) and many of his Ministers to recommend control action. A revised Action Plan is now being implemented using the mechanical control measures recommended last November as well as the zone concept. Some 150 chainsaw crews and forest technicians to supervise them have been hired to fell green-infested and buffer trees within priority areas (Fig. 3). Once the outbreak is brought under control, emphasis will shift towards preventing forest fires and restoring impacted areas to pine forests. Prompt reforestation will be needed to avoid a shift in land use to short-term agriculture. As of September 12, 2015, the outbreak covered an estimated 150,000 hectares in 12 forest districts, impacting forests valued at $82 million U.S. This is the worst southern pine beetle outbreak in Honduras in the last 50 years. An outbreak in 1962-1965 covered over 2 million hectares, destroying two-thirds of the country's pine forests. Little or no control was applied during this catastrophic outbreak.

Figure 1: Expanding SPB infestations in Honduras, September 2015 (Photos by Ron Billings).

Figure 2: Ron Billings meets with Honduran President Juan Orlando Hernández A. to discuss SPB control.

Figure 3: Application of "cut-and-leave" to expanding bark beetle infestations in Honduras, September 2015.

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 on conifer mites and leafcutting ants are summarized below.

Control of Conifer Mites on Loblolly Pine

Conifer mites (family Tetranychidae) attack most species of trees (including conifers) and shrubs. Nursery seedlings and windbreak trees are particularly susceptible because they are often treated with insecticides that kill predators of conifer mites. Pine, hemlock, spruce, juniper, fir, and white-cedar are often heavily attacked. The more important species on nursery seedlings are the spruce mite (*Oligonychus ununguis*), the conifer spider mite (*O. coniferarum*), and the southern red mite (*O. illicis*). These mites do best in cool spring and fall weather. Other mites, including the twospotted spider mite (*Tetranychus uriticae*) do best in dry, hot summer weather.

Heavy infestations of conifer mites cause reduced seedling and young tree growth, along with foliage yellowing or browning. Although most spider mite attacks do not cause mortality, they may predispose trees to attack by insects and disease or to damage by adverse environmental conditions. Spider mite populations can explode after use of insecticides to control other insects when mite predators are killed as well.

The FPMC conducted a study in 2014-2015 to evaluate the efficacy and duration of tree injection of TREE-age™ (emamectin benzoate), IMA-jet (imidacloprid) and a new chemical (Arborjet's AJT-085), for control of secondary conifer mites. The study was conducted on four-year-old loblolly pines at Campbell Global's Boyd Lake Seed Orchard, Jasper, TX. The three treatments and a check were applied to 10 randomly assigned trees and abundance of spider mites monitored by shaking two lower branches over a white sheet. Trees were sampled at time of initial injection and subsequently at intervals of 1, 3, 6, 9, and 12 months. Samples of mites were sent to USFS entomologist Alex Mangini for identification.

The spider mite *Oligonychus milleri* was the most common mite found in all the treatments before and after tree injection. Results show that spider mite numbers increased markedly from date of treatment (December 8, 2014) to February 9, 2015 in the IMA-jet and AJT085-treated trees and the check, but not in the TREE-age treated trees. After six months (June 23, 2015), the spider mite abundance on trees injected with TREE-age had mean numbers of spider mites that were half those of the other treatments. The trees will continue to be monitored periodically throughout 2015.

New Baits Evaluated for Leafcutting Ants

Bayer CropScience, one of the world's leading crop science companies, provided the FPMC with samples of an experimental bait to test for efficacy against the Texas leafcutting ant, *Atta texana*, in 2014. Experiments were conducted in East Texas on a total of 50 ant colonies with 10 replicates per treatment. Treatments consisted of 1) Bayer bait at low rate (5 gm/m^2 of central nest area); 2) Bayer bait at medium rate (10gm/m^2); 3) Bayer bait at high rate (12.5 gm/m^2); 4) Amdro™ Ant Block (10gm/m^2); and 5) untreated check. The number of active entrance/exit mounds were counted prior to treatment and after treatment at 1, 2, 8, and 16 weeks.

Results (Fig. 4) showed that none of the Bayer bait applications effectively controlled leafcutting ant colonies by more than 20%. Even the Amdro™ Ant Block treatment failed to reduce the number of treated colonies by more than 40%. Indeed, several of the treated colonies appeared to recover after eight weeks. The search for an effective toxic bait for Texas leafcutting ants will continue. Until a more toxic bait is tested and registered, injection of entrance holes with PTM™ insecticide remains the most effective means to eliminate leafcutting ant colonies, as previous FPMC studies have shown.

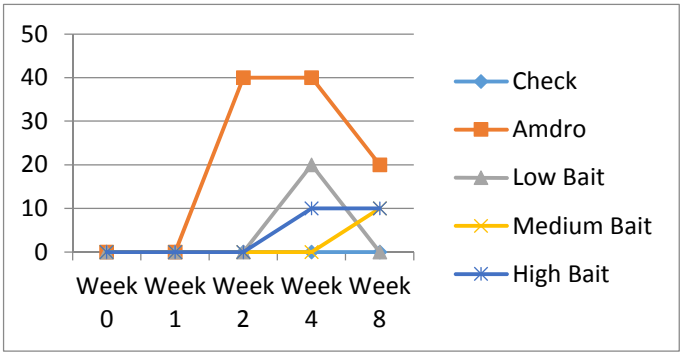

Figure 4: Percent inactive colonies over eight weeks following application of Bayer experimental bait (5, 10 and 12.5gm/m2 and Amdro™ AntBlock. East Texas, September – December 2014.

Southern Pine Beetle Activity in 2015

As predicted with SPB pheromone traps deployed last spring, Texas, Louisiana, Arkansas and Oklahoma enjoyed another year with no SPB infestations in 2015. In fact, the last SPB activity west of the Mississippi occurred in the late 1990s. Most SPB spots to date have been reported from the National Forests in Mississippi. SPB continued to attack several thousand pitch pine (*Pinus rigida*) trees on Long Island, New York, in 2015, as well as some 200 acres of loblolly pine (*P. taeda*) on Chincoteague National Wildlife Refuge off the coast of Virginia.

Emerald Ash Borer in Louisiana: Biological Control Efforts Underway

Efforts are underway in north Louisiana to slow the spread of an invasive species that threatens to destroy native ash trees. The trees play an important part in bottomland ecosystems and also have an economic value to the timber industry. "The emerald ash borer (EAB) was detected for the first time in northern Louisiana in February 2015," said LSU AgCenter entomologist Rodrigo Diaz. "It is a beetle native to China that has decimated ash trees in the northeastern United States within the last 15 years and has been spreading and moving south."

According to Wood Johnson, an entomologist with the U.S. Forest Service in Pineville, emerald ash borer adults have been collected in Claiborne, Bossier and Webster parishes, but have only been found in trees within Webster Parish. Johnson said it is believed that the borers disperse up to half mile per year on their own. However, others say it may travel up to 10-15 miles per year.

The LSU AgCenter, the U.S. Forest Service, the Louisiana Department of Agriculture and Forestry, and the Animal and the U.S. Department of Agriculture's Plant Health Inspection Service have collaborated to get a biocontrol effort off the ground in north Louisiana. Several species of wasps native to Asia are parasites of the borer. Scientists brought the wasps to a quarantine facility in the U.S. to begin a rearing colony in the early 2000s. After several studies, they selected the ones that only attack the emerald ash borers.

"The wasps were first released beginning in 2007 in Brighton, Michigan, and have been released in at least 18 states with Louisiana being the latest," Johnson said. "We are releasing an egg parasitoid that targets the emerald ash borer at two different sites in Webster Parish, near Shongaloo and near Minden," Johnson said. "While it will not stop the spread, it should aid in slowing down the beetle."

The entomologists released three species of wasps at the two sites. One attacks the eggs, and two attack the larvae of the borer. "In a few weeks we will collect bark samples and remove the emerald ash borer larvae to see if the parasitoids are within the larvae and if we are having any impact on the emerald ash borer population," Diaz said. A second approach is to bring bolts of ash infested with emerald ash borer and leave them at the site for two weeks, with hopes that the parasitoids will attack the larvae in the bolts. Warmer temperatures and longer growing seasons in southern climates may increase the population growth of the borer, he said.

Much of the information on the insect comes from research conducted primarily in northern climates. By monitoring the borer and the parasitoid wasps in north Louisiana, the entomologists hope to learn more about both the borers and the wasps in the South. Johnson indicated scientists believe the wasps could have a greater impact in the South because EAB populations have only recently become established (from news release on 7/17/2015 by Brandy Orlando).

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Is EAB in Texas? The Texas A&M Forest Service (TFS) and collaborators installed and monitored several hundred emerald ash borer detection traps in 2015 in ash-growing areas of East and Central Texas. Fortunately, no adult EAB were collected, indicating that this invasive pest has yet to make its way to Texas. Nevertheless, field foresters and private landowners in Texas are requested to keep an eye open for EAB infestations and notify the TFS of any dying or dead ash trees with signs or symptoms of EAB attacks (winding galleries beneath the bark, ash trees dying back from the top down, flacking bark from woodpecker feeding, "D"-shaped exit holes in the bark, etc.). In East Texas, contact TFS Regional Forest Health Specialist Allen Smith (lasmith@tfs.tamu.edu); in Central Texas, contact TFS Regional Forest Health Specialist James Houser (jhouser@tfs.tamu.edu).

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Black Twig Borer Poses a Threat to East Texas Trees

(from *Texas Forestry*, September 2015)

The forests of East Texas are attracting a variety of invasive pests. Laurel wilt, carried by the redbay ambrosia beetle, was recently detected in Hardin and Jasper counties. And the emerald ash borer, discovered last year in northern Louisiana, is knocking on the door, if not already here. Another pest from Asia, the black twig borer, has been here since at least the mid-1980s, but the damage it causes is just now becoming noticeable.

The black twig borer, with the scientific name *Xylosandrus compactus*, is a tiny ambrosia beetle barely 1/16 inch long (Fig. 5). It bores into the thin twigs of over 220 trees and shrubs, including southern magnolia, grape, sweetgum, pecan, dogwood, water oak, red maple, redbud, grape and many other plants. Seemingly healthy trees are attacked. The first evidence of an infestation is a condition known as "flagging," where scattered twigs throughout the tree's crown wilt and die (Fig. 6). Close examination of the dead twigs will reveal minute, circular holes (1/32 inch in diameter), usually on the underside of the dead twig (Fig. 7). The adult beetles introduce a fungus which causes a black staining of the sapwood. Females begin laying eggs within the infested twig from spring through fall. The larvae or grubs hatching from the eggs feed on the white fungal "ambrosia" and also on the pith (center) of the twig. Pupation and mating of brood adults occurs within the infested twigs. The insects overwinter as adults, emerging through the entrance holes of the parent beetles and attacking trees most commonly in the spring when dogwoods bloom.

Curiously, males are unable to fly; they mate with females in the twig in which they were reared. Unmated females produce only male offspring. Studies at North Carolina State University have revealed that branches up to 7/8 inch may be infested with as many as 20 females. Fortunately, infestations of the black twig borer do not kill large, established trees, but cause unsightly damage to the crowns, of concern particularly on ornamental trees. Borer infestations may cause more serious damage or death to young or recently transplanted trees and shrubs. Light infestations in forest situations often go unnoticed and require no control. Wilting usually occurs just weeks after initial attack.

The black twig borer was first introduced into Florida from Asia in 1941. The beetle has been collected in traps in East Texas since at least 1987, as far south as Rockport. A current infestation on the Jones State Forest near Conroe has been observed in magnolia, red maple, black and sweetgum, red bay, white oak, water oak and other species. Symptoms of black twig borer infestations also have been noted this year near Orange, Beaumont, and Lufkin.

The preferred control on high-value ornamental trees is to prune out and destroy infested twigs. Flagged branches should be severed three to four inches above the pinhole (beetle entrance hole). Mulching, avoiding over-fertilization, watering during dry spells, and other practices to enhance tree health will make the trees less likely to be attacked. Chemical control using topical insecticide sprays is not recommended nor usually very effective.

Figure 5: Adult male (left) and female black twig borers (Photo courtesy North Carolina State University)

Figure 6: Dead twigs on a southern magnolia infested by black twig borers, Jones State Forest, TX (Photo by Ron Billings).

Figure 7: Tiny entrance holes (1/32 inch in diameter) of black twig borer and associated staining of magnolia twig (Photo by Ron Billings)

New Defoliator Found on Chinese Privet in Texas

Defoliation of dense thickets of Chinese privet, *Ligustrum sinense*, was observed in August within the city limits of Fort Worth, TX by employees of the Fort Worth Parks and Community Services Department (Fig. 8). Since Chinese privet is a common invasive plant in Texas, there was considerable interest in identifying this potentially beneficial insect. First thought to be some species of caterpillar, closer examination of defoliated bushes revealed a species of leaf beetle, identified as *Octotoma plicatula* (Coleoptera: Chrysomelidae) (Fig. 9). This is believed to be the first report of this insect in Texas. It has been reported from several other states, including Oklahoma, Louisiana, Virginia, Georgia, North Carolina, Iowa, Pennsylvania, and Mississippi. The potential of this insect as a biocontrol agent for Chinese privet remains unknown, since little is known about the biology of this defoliator. The fact that it has been found feeding on a variety of native and invasive host plants may limit its usefulness as a biocontrol agent.

Figure 8: Chinese privet defoliated by leaf beetles in Fort Worth.
Photo by Michelle Villafranca.

Figure 9: Adult of *Octotoma plicatula.* Photo by John Hart.

Thought You Might Be Interested to Know . . .

EPA Revised Worker Protection Standards for Pesticide Applicators

The Environmental Protection Agency (EPA) has updated safety standards that will affect all those applying pesticides, including in nurseries and in forests. Major changes include:

- Annual mandatory training to inform farmworkers on the required protections afforded to them. *Currently, training is required only once every 5 years.*
- Expanded training includes instructions to reduce take-home exposure from pesticides on work clothing and other safety topics.
- First-time ever minimum age requirement: Children under 18 are prohibited from handling pesticides.
- Expanded mandatory posting of no-entry signs for the most hazardous pesticides. The signs prohibit entry into pesticide-treated fields until residues decline to a safe level.
- New no-entry application-exclusion zones up to 100 feet surrounding pesticide application equipment will protect workers and others from exposure to pesticide overspray.
- Continue the exemption for farm owners and their immediate families with an expanded definition of immediate family.

Side-by-side comparison of rule changes, and more info on the final standards can be found at:

http://www2.epa.gov/pesticide-worker-safety/revisions-worker-protection-standard

Also note, these updated standards do not go into effect for 14 months to allow for phase-in.

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TEXAS A&M FOREST SERVICE

Forest Pest Management Cooperative's
P.E.S.T. Newsletter

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