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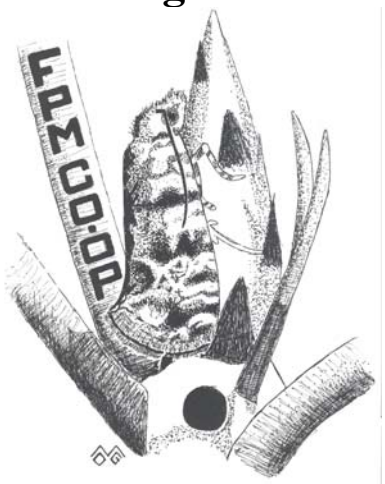
November 2016

Quarterly Newsletter on Forest Pest Management Issues

Forest Pest Management Cooperative



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

Texas A&M Forest Service
200 Technology Way, Suite 1281, College Station, Texas 77845

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, forest plantations and urban trees. The newsletter focuses on, but is not limited to, issues occurring in the South (Texas to Florida to Virginia,).

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East Texas Forest Entomology Seminar

The East Texas Forest Entomology Seminar (ETFES) was initiated in 1973 as a platform to discuss forest insect research and pest management issues. Participants include forest pest management specialists, researchers, foresters, university professors and their students interested in forest entomology in Texas, Arkansas, Louisiana and Mississippi. Traditionally, the ETFES has met twice a year in October and April, usually at Kurth Lake Lodge near Lufkin and at Stephen F. Austin State University in Nacogdoches. This fall session has been postponed and the seminar will be resumed in April, 2017. Contact Drs. Ron Billings (TFS) or David Kulhavy (SFASU) for more information.

EAB in Texas: An Update

Emerald ash borer adults and characteristic “D”-shaped exit holes in ash. Photo courtesy City of Lenexa, Kansas.

The emerald ash borer or EAB, *Agrilus planipennis* (Coleoptera: Buprestidae), is an invasive species native to eastern Asia. This metallic green beetle is a flat-headed wood borer measuring about 0.5 inches long and is responsible for the death of tens of millions of ash trees in the United States and Canada. First discovered near Detroit, Michigan in 2002, its introduction most likely occurred sometime in the mid-1990s.

Since its detection in Michigan in 2002, the EAB has spread to 31 states and 2 Canadian Provinces. Texas became the 26th state to have a positive EAB detection in May 2016. Four adult EAB were found on a single green prism trap near Karnack, Texas in Harrison County. Though the Texas A&M Forest Service (TFS) had traps located within a quarter mile of the detection location, the beetles were found on a USFS trap baited with Z-3 hexenol (leaf volatile) and an experimental (now operational) sex pheromone (3Z-lactone). Continual monitoring at the detection site as well as several dozen delimiting survey traps have caught no subsequent EAB. More importantly, intensive field surveys in the general area have revealed no EAB infested trees to date.

The adult beetles feed on foliage during their entire 3-6 week lifespan but it is the phloem-feeding larvae which are responsible for killing ash trees. Larval galleries girdle the tree, resulting in tree mortality 2-4 years after initial infestation. Recent work by researchers at the epicenter of the EAB outbreak have found that an EAB density of 89 larvae per square meter of phloem is a threshold required to kill the tree. All American ash species, including apparently healthy trees, are susceptible to infestation by EAB.

In 2014, EAB adults were observed emerging from white fringetree, (*Chionanthus virginicus*), another member of the Oleaceae family, though it remains unclear what the health of the fringetrees was prior to infestation and whether or not the adult beetles could sustain themselves on fringetree foliage. In October 2016, EAB eggs placed on Manzanilla olive trees (*Olea europaea*) in a laboratory at Ohio State University completed an entire life cycle (egg, larvae, pupa, adult) though it is unknown if EAB adults will survive on olive foliage and oviposit.

On June 30, 2016 the Texas Department of Agriculture and USDA Animal and Plant Health Inspection Service Plant Protection and Quarantine (APHIS PPQ) placed Harrison County under an emergency quarantine prohibiting the movement of raw ash logs out of the county unless treated to kill all life stages of the insect. The quarantine also prohibits the movement of ALL hardwood firewood out of Harrison County. Firewood is thought to be the primary method by which EAB spreads long distances. All hardwood firewood is regulated because once logs are cut into firewood-sized pieces identification of ash logs becomes very difficult.

TFS has plans to install and monitor nearly 450 EAB traps in 2017, a number similar to that deployed in 2016. Vigorous outreach efforts continue to educate the public about the dangers of EAB and the possible perils involved in moving firewood. Any questions concerning EAB or other invasive pests in Texas can be directed to Allen Smith, TFS Forest Health Coordinator at lasmith@tfs.tamu.edu (903-297-5094).

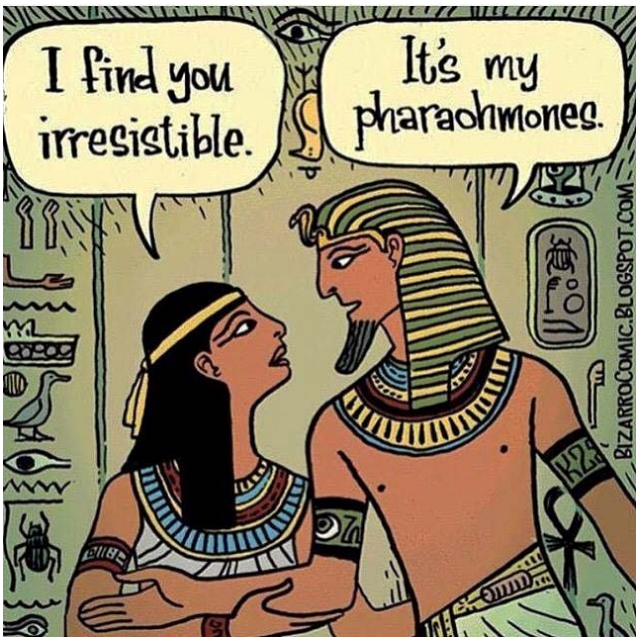
SPB Activity Increased as Expected in Certain Areas of the South in 2016

As the Southwide SPB Prediction Survey correctly forecasted last spring (see June 2016 issue of *PEST*), southern pine beetle activity increased this year in certain areas of the South, including Florida, Alabama and Mississippi. SPB infestations (spots) also were detected in coastal counties of Georgia, outside areas that were surveyed with pheromone traps.

As of November 15, the USFS had reported a total of 1,615 multiple-tree spots, located primarily in Mississippi (674 spots), Alabama (653 spots), Florida (173 spots), and Georgia (95 spots). Of this total, 66% were detected on National Forests or other public lands and the remainder on state and private forest lands. No infestations were detected west of the Mississippi River.

The 1,615 infestations represent a substantial increase from the previous year when only17 SPB

spots were reported across the South. Most expanding infestations on federal lands in 2016 were treated by cut-and-leave, due to the lack of local markets for beetle-killed timber.



Ips Outbreak in the Dominican Republic

Panoramic view of native pine forests (*Pinus occidentalis*) in the Dominican Republic (Photo by R. Billings)

Pine forests in the Dominican Republic (D.R.) cover an area of 3,315 square kilometers (18% of the forests) and consist primarily of native *Pinus occidentalis* and plantations of introduced *P. caribaea.* The primary pest is the six-spined engraver beetle, *Ips calligraphus*, presumably introduced from the southeastern U. S. at least 50 years ago. The more destructive southern pine beetle, *Dendroctonus frontalis*, has not been reported to date on the island of Hispañola (D.R. and Haiti).

Outbreaks of *I. calligraphus* have occurred in the D.R. in 1984-1987, 1997-2000, and most recently from 2013-2016. In September, 2016, FPMC Coordinator Ron Billings evaluated an outbreak of *Ips* bark beetles in the Dominican Republic, at the request of the US Forest Service/International Programs, a full member of the FPMC.

Although two species of *Ips* (*I. calligraphus* and the five-spined *Ips*, *I. grandicollis*) have been introduced into the D.R., the current outbreak consisted of attacks by *Ips calligraphus* resulting from several years of drought. More than 5,000 hectares (12,560 acres) of pine forests have been killed, consisting of both mature pine forests and young plantations.

Young plantation of introduced *Pinus caribaea* killed by *Ips calligraphus* near San José de las Matas, Dominican Republic (Photo by R. Billings)

Fortunately, with the return of seasonal rains, the outbreak had largely subsided by September. Most of the dead trees on privately-owned lands were being salvaged. In the D.R., some 75% of the pine forests are found on public lands and preserves, so much of this timber was left standing or felled and treated with insecticides, prior to replanting.

A large, non-native wood boring insect of the family Buprestidae, genus *Chalcophora*, was found infesting bark beetle-infested pines. This

flatheaded wood borer has just recently become established in the D.R.

An adult flat headed woodborer, possibly *Chalcophora virginiensis*, found on beetle-infested pine in the D.R. Photo by Ron Billings

The Dominican Ministry of Environment and Natural Resources has begun year-round monitoring with pheromone traps in several locations in an effort to establish an early-warning system for *Ips* outbreaks. Trap trees and good forest management are being promoted on private forest lands to reduce the risk of future bark beetle outbreaks.

While in the small town of San José de las Matas, within the outbreak area, Billings and USFS consultant Kevin Carlin presented a short course in Spanish on biology and management of *Ips* bark beetles to a group of forest technicians and government workers. A written report with short- and long-term recommendations, also in Spanish, was provided to Dominican forestry officials following the technical assistance visit.

Exotic Pest Infests Hackberries

An introduced woolly aphid, *Shivaphis celti*, sometimes called the Asian woolly hackberry aphid, infests various hackberry species (*Celtis* spp.). It has recently been observed on native hackberries and sugarberries in Angelina County and other areas of East Texas (Herbert A. "Joe" Pase III, personal communication).

Asian woolly hackberry aphid on hackberry leaf. Photo by Joe Pase.

The aphids secrete abundant amounts of honeydew which drips from the foliage to anything below. Heavily infested trees appear to have been dusted with snow or glisten in bright sunlight as if sprayed with water. Soon, gray/black sooty mold grows on the honeydew creating an unsightly residue.

Damage to the tree is minimal, particularly late in the season and no control is recommended. For more information on this pest, see the webpage at http://ipm.ucanr.edu/PMG/PESTNOTES/pn74111.html.

Efficacy of Sivanto and XX-Pire WG for Control of Seed Orchard Insects

In 2015, the FPMC conducted a study in the Arborgen Seed Orchard near Woodville, Texas to evaluate the efficacy of two new insecticides - Sivanto™ and XX-Pire WG™ for control of cone and seed insects in loblolly pine.

Bayer CropScience recently developed the insecticide Sivanto ™ (a.i. flupyradifurone) which targets piercing-sucking insects (Hemiptera). It has been tested and found to control all life stages (eggs, nymphs and adults) of aphids, psyllids, soft scales, leaf hoppers, whiteflies, and thrips. Sivanto™ is considered "bee friendly", has no spray restrictions, and can be applied to the soil or used as a foliar treatment.

Dow AgroSciences' product XXpire WG™ is a combination insecticide for control of chewing and sucking insects (Lepidoptera and Hemiptera). When applied just to the point of spray run-off at 2.0 – 3.5 oz/100 gallons of water, XXpire WG™ has been found to provide excellent control of aphids, lepidopterous larvae, lacebug, certain scales, mealybug, whitefly, and thrips. XXpireWG™ is a water dispersible granule consisting of a 1:1 ratio of spinetoram to isoclast (sulfoxaflor). Isoclast was discovered by and is proprietary to Dow AgroSciences.

Ten ramets from each of 6-8 loblolly clones were selected (two ramets/clone/treatment). This was a randomized complete block design with clones as blocks.

The treatments included:

1. Sivanto™ (flupyradifurone): sprayed @ 102-205 g ai/acre
2. Sivanto™ soil drench @ 307-410 g ai/acre
3. XXpire WG™ (spinetoram and sulfoxaflor) spray @ 5.5 oz/acre
4. Positive control: TREE-äge (emamectin benzoate) injected at labeled rate
5. Negative control: untreated

The TREE-äge injection treatment was applied in November 2014, the Sivanto soil drench was applied one month prior to pollen flight (March 2015), while sprays were applied using a hydraulic sprayer in early April, approximately 10 days after peak pollen flight to coincide with the presence of early-instar larvae of *Dioryctria amatella* and *D. clarioralis* on the male and female flowers of the pines. Sprays were applied again in early June and early August.

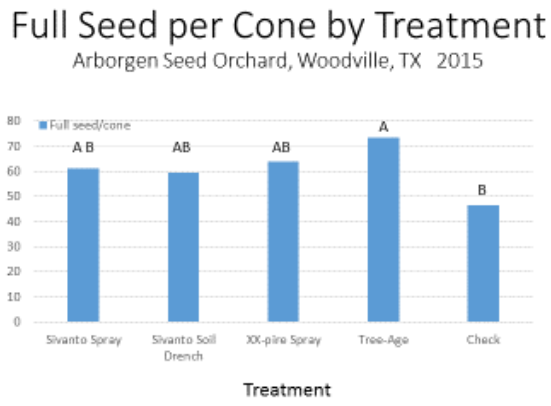
To assess for coneworm and seed bug damage, conelet and cone survival were evaluated. In early April, 2015, 18 branches on each tree (50 conelets, 50 cones if possible) were tagged. The branches chosen were distributed from the top of the tree to the lowest producing branch and there was a single cluster, or several clusters per tag. Counts of surviving conelets and cones from these branches were made in July and October, 2015. The July counts gave a better estimate of early-season loss including conelet abortion and early-season coneworm damage (Mangini et al. unpublished report). Conelet and cone survival generally reflect protection from seed bugs and coneworms, respectively.

Samples of 10 conelets per tree were collected in October and evaluated for seedbug damage. Coneworm attacks were evaluated by collecting all cones from each ramet if the trees were small or half of the cones from each ramet if the trees were large. A subsample of 10 healthy cones/ tree were selected; seed lots from these cones were radiographed to determine seed yield/cone and filled seed yield/cone to measure the extent of seed bug damage.

Results revealed there were no significant differences ($P>0.05$) among treatments in number of healthy cones ($P = 0.71$), green infested cones ($P= 0.33$), and other cones ($P= 0.14$). Significant differences based on treatment were found in small dead cones, with the fewest small dead cones attributed to the TREE-äge treatment (Mean = 3.3 versus 16.7 for the check). The number of small dead cones did not vary significantly from the check for the Sivanto spray (mean = 18.9), the Sivanto soild drench (mean = 10.6) or the XX-pire spray (mean = 9.8) treatments.

The TREE-äge treatment also had significantly fewer large dead cones (Mean = 5.4) than did the check trees (mean = 39.7), but this treatment did not vary significantly ($P>0.05$) from the XXpire spray treatment (mean = 16.8), the Sivanto soil drench (mean = 16.9) or the Sivanto spray (mean = 27.5) with regard to large dead cones.

Only the TREE-äge treatment provided a significant increase in full seeds per cone compared to the check (see figure on page 6). Mean numbers of seedbug-damaged seed did not vary significantly among the five treatments ($P=0.27$).



FPMC Hosts Forester from Colombia

Milton Rivera Rojas, a forester from Colombia, worked with the Texas A&M Forest Service and FPMC in August. Photo by Ron Billings.

Milton Rivera Rojas, a forester from Colombia, was invited to spend five weeks in College Station as a guest of the Forest Pest Management Cooperative in July and August. During his stay, he assisted Dr. Billings with the analysis of southern pine beetle seasonal flight patterns and visited several Texas State Forests. Milton has plans to pursue his Ph. D. in forest hydrology, possibly at Texas A&M University.

Staff Forester Bill Upton to Retire

After 30 years of dedicated service, including more than 20 years with the FPMC, Texas A&M Forest Service Staff Forester William "Bill" Upton is fixin' to retire. Bill has been instrumental in setting up and carrying out various field studies for the FPMC, including research studies on pests of pine seed orchards, regeneration weevils, leafcutting ants, conifer mites, pine tip moths, nematodes, hypoxylon canker, oak wilt, and southern and western bark beetles. As a licensed chainsaw operator, Bill has kept a chainsaw at hand to fell and cut infested bolts from baited pine trees for research purposes if and when they are killed by the southern pine beetle.

Bill also has conducted the annual SPB prediction survey, setting out traps, collecting and counting SPB and clerids, ever since the survey was initiated in 1986. He has become an expert in injecting both pines and hardwoods with systemic pesticides for various research projects. He also has been relied upon to conduct X-ray analyses of pine seed from various seed orchard studies for both the FPMC and the Western Gulf Forest Tree Improvement Program.

Past and present FPMC coordinators Drs. Don Grosman, Melissa Fischer and Ron Billings have relied on Bill's experience and dedication to complete detailed field and laboratory studies accurately and on time. He has willingly worked long hours and extra days if needed to complete assigned tasks. We'll miss you, Bill, and wish you the best in your well-deserved retirement.

FPMC Staff Forester Bill Upton has been directly involved in a myriad of field and laboratory research studies for the TFS and FPMC over the last 30 years.

HAVE A HAPPY THANKSGIVING!

Dr. Ronald F. Billings, FPMC Coordinator
L. Allen Smith, Research Supervisor
William W. Upton, Staff Forester II
Larry Spivey, Research Specialist I
Patricia Faries, Staff Assistant I

Texas A&M Forest Service
200 Technology Way, Suite 1281
College Station, TX 77845

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